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Water Resources Data Montana Water Year 1991

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U.S. GEOLOGICAL SURVEY WATER-DATA REPORT MT–91–1
Prepared in cooperation with the State of Montana
and with other agencies

CALENDAR FOR WATER YEAR 1991

1990

OCTOBER

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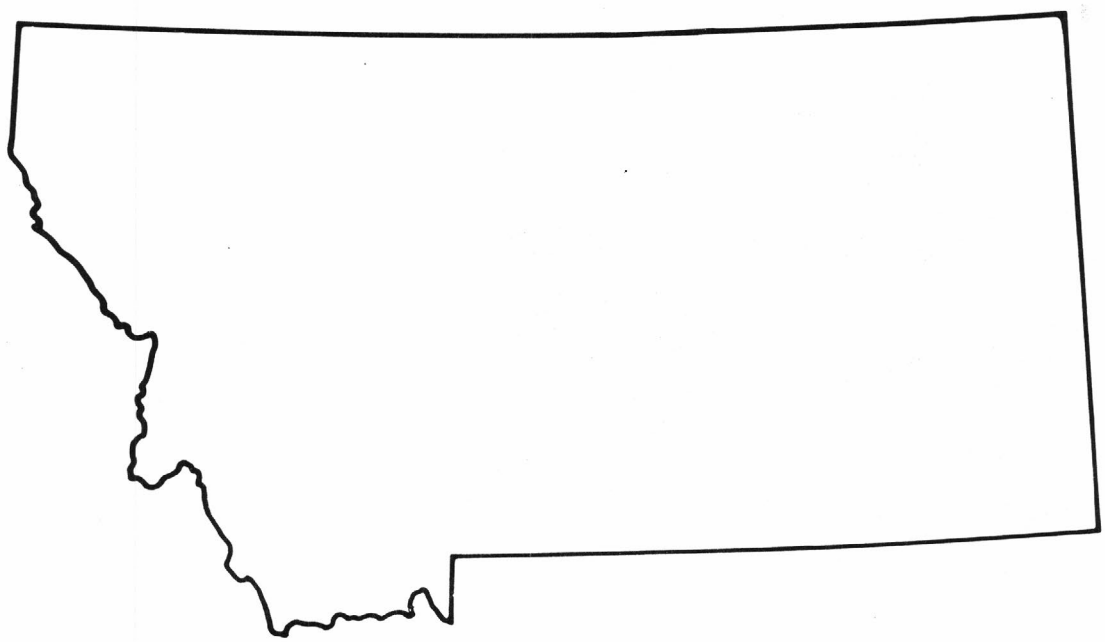
Water Resources Data
Montana
Water Year 1991

by R.R. Shields, J.R. Knapton, M.K. White, T.M. Brosten, and C.L. Chambers



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and with other agencies

U.S. DEPARTMENT OF THE INTERIOR

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1992

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 Montana district, 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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This report is one of a series issued State by State under the general direction of Philip Cohen, Chief Hydrologist, and J.F. Daniel, Assistant Chief Hydrologist for Scientific Publications and Data Management. This report was prepared by the U.S. Geological Survey in cooperation with the State of Montana and with other agencies, under the supervision of J.A. Moreland, District Chief, and J.F. Blakey, Jr., Regional Hydrologist, Central Region.

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16. Abstract (Limit: 200 words)

Water resources data for water year 1991 for Montana consist of records of stage, discharge, and water quality of streams; stage, contents and water quality of lakes and reservoirs; and water levels in wells. This report contains discharge records for 236 gaging stations; stage/contents for 9 lakes and reservoirs; water quality for 103 stations, 3 lake stations; water levels for 275 observation wells and 7 long-term observation wells equipped with continuous recorders. Also included are 53 smaller reservoirs. Additional water year 1991 data collected at crest-stage gage and miscellaneous measurement sites were collected but are not published in this report. These data are stored within the District office files in Helena and are available on request. These data represent part of the National Water Data System operated by the U.S. Geological Survey and cooperating State and Federal agencies in Montana.

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(Letter after station name designates types of data: (d) discharge, (c) chemical, (b) biological, (m) microbiological, (t) water temperature, (s) sediment, (e) elevations or contents)

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INTRODUCTION

The Water Resources Division of the U.S. Geological Survey, in cooperation with State and other Federal agencies, obtains a large amount of data pertaining to the water resources of Montana each water year. These data, accumulated during many water 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 Geological Survey, the data are published annually in this report series entitled, "Water Resources Data, Montana."

Water resources data for water year 1991 for Montana consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; amounts and water quality of atmospheric deposition; and water levels of wells. This volume contains records for water discharge at 236 streamflow-gaging stations; stage and contents at 9 lakes and reservoirs; water quality at 76 gaging stations, 25 water-quality stations; 3 lake stations; and 2 atmospheric deposition stations; and water levels at 275 observation wells and 7 long-term observation wells equipped with continuous recorders. Also included are data for 53 smaller reservoirs. Additional water year 1991 data collected at crest-stage gage and miscellaneous measurement sites were collected but are not published in this report. These data are stored within the district office files in Helena and are available on request. A few pertinent stations in bordering States are also included in this report. In this volume the locations of gaging stations are shown in figure 7, water-quality stations are shown in figure 8, and ground-water observation wells are shown in figure 9. These data represent that part of the National Water Data System collected by the U.S. Geological Survey and cooperating State and Federal agencies in Montana.

Records of discharge or stage of streams, and contents or stage of lakes and reservoirs were first published in a series of U.S. Geological Survey water-supply papers entitled "Surface Water Supply of the United States." Through September 30, 1960, these water-supply papers were in an annual series and then in a 5-year series for 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 consulted in the libraries of the principal cities of the United States or may be purchased from U.S. Geological Survey, Books and Open-File Reports Section, Federal Center, Building 810, Box 25425, Denver, Colorado 80225.

For water years 1961 through 1970, streamflow data were released by the Geological Survey in annual reports on a State-boundary basis. Water-quality records for water years 1964 through 1970 were similarly released either in separate reports or in conjunction with streamflow records.

Beginning with the 1971 water year, water data for streamflow, water quality, and ground water are published in official Survey reports on a State-boundary basis. These official Survey 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-91-1." 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.

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 (406) 449-5263.

COOPERATION

The U.S. Geological Survey and organizations of the State of Montana have had cooperative agreements for the systematic collection of streamflow records since 1906, for water-quality records since 1946, and for ground-water levels since 1964. Organizations that assisted in collecting data through cooperative agreement with the Survey are:

Montana Department of Natural Resources and Conservation
K. Barclay, director

Montana State Highway Commission
J. Rothwell, director of highways

Montana Department of Fish, Wildlife and Parks
K.L. Cool, director

Montana Department of Health and Environmental Sciences
D. Iverson, director

Montana Department of State Lands
D. Casey, commissioner of state lands

Montana Bureau of Mines and Geology
E.T. Ruppel, director

Assistance in the form of funds or services was given by the U.S. Department of State-International Joint Commission, Waterways Treaty Program, in collecting records for 39 gaging stations and 4 water-quality stations; by the Corps of Engineers, U.S. Army, for 26 gaging stations and 7 water-quality stations; by the National Park Service, U.S Department of the Interior, for 6 gaging stations and 7 water-quality stations; by the U.S. Bureau of Reclamation, U.S. Department of the Interior, for 8 gaging stations; the U.S. Bureau of Indian Affairs, U.S. Department of the Interior, for 39 gaging stations and 8 water-quality stations; and the U.S. Environmental Protection Agency, U.S. Department of the Interior, for 4 gaging stations and 8 water-quality stations.

The following organizations aided in collecting records:

The Montana Power Company and the Washington Power Company.

Organizations that supplied data are acknowledged in station descriptions.

GENERAL HYDROLOGIC SETTING

Montana, with an area of about 147,200 mi^2 (square miles) (fig. 1), is the fourth largest State in the Union. The major river basins in the State are the Hudson Bay basin (465 mi^2) and the upper Missouri River basin (120,700 mi^2) east of the Continental Divide and the upper Columbia River basin (26,000 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 18 percent of the State and provides slightly more than 50 percent of the total streamflow.

The major river in the Hudson Bay basin in Montana is the St. Mary River. This river flows north from Montana's Glacier National Park to the Saskatchewan River in Canada and then into Hudson Bay.

The Missouri River basin in Montana includes drainages of the Missouri River and the Yellowstone River. The Missouri River, which is formed by the confluence of the Jefferson, Madison, and Gallatin Rivers in southwestern Montana, flows north through the central part of the State and then east across northern Montana into North Dakota. Major tributaries of the Missouri River are the Dearborn, Smith, Sun, Teton, Marias, Judith, Musselshell, Milk, Redwater, and Poplar Rivers. The Milk River originates in Glacier National Park in Montana, flows northeastward into Canada, and then flows southeastward back into Montana. The Poplar River flows southward from its source in Canada into Montana. The Yellowstone River, which originates in Wyoming, drains the south-central and southeastern parts of Montana. The Yellowstone River joins the Missouri River just east of the Montana-North Dakota border. The major tributaries to the Yellowstone are the Shields, Boulder, and Stillwater Rivers that originate in Montana and the Clarks Fork Yellowstone, Bighorn, Tongue, and Powder Rivers that originate in Wyoming and flow northward into Montana.

The upper Columbia River basin in western Montana is composed of two major river systems: the Kootenai and the Pend Oreille. The Kootenai River system originates in British Columbia, Canada. The Pend Oreille River system originates in Montana and British Columbia. The principal drainages in the Pend Oreille system are the Clark Fork (River), which originates in Montana, and the Flathead River, the North Fork of which originates in British Columbia. The Flathead River joins the Clark Fork near Paradise, Montana.

Two major multipurpose reservoirs have been constructed on the Missouri River. Canyon Ferry Lake, which was formed in 1953 by the U.S. Bureau of Reclamation's Canyon Ferry Dam, is 25 miles long and has a usable capacity of about 2.04 million acre-feet. Fort Peck Lake was formed in 1939 by the U.S. Army Corps of Engineers' Fort Peck Dam. It is more than 100 miles long and has a storage capacity of 18.9 million acre-feet. The Yellowstone River has no dams or storage reservoirs on its mainstem and is the longest free-flowing river in the conterminous United States.

Major multipurpose reservoirs in the upper Columbia River basin have been constructed on the Kootenai and Flathead Rivers. Lake Koocanusa, which was formed on the Kootenai River by Libby Dam in 1972, has a usable capacity of 5.7 million acre-feet. In the Flathead River basin, the largest storage projects are Hungry Horse Reservoir (completed in 1952)--a multipurpose project on the South Fork Flathead River with a usable capacity of about 3.5 million acre-feet and Flathead Lake--a natural lake (surface area 195 mi^2) with a usable capacity that was increased to about 1.8 million acre-feet with the construction of Kerr Dam in 1937.

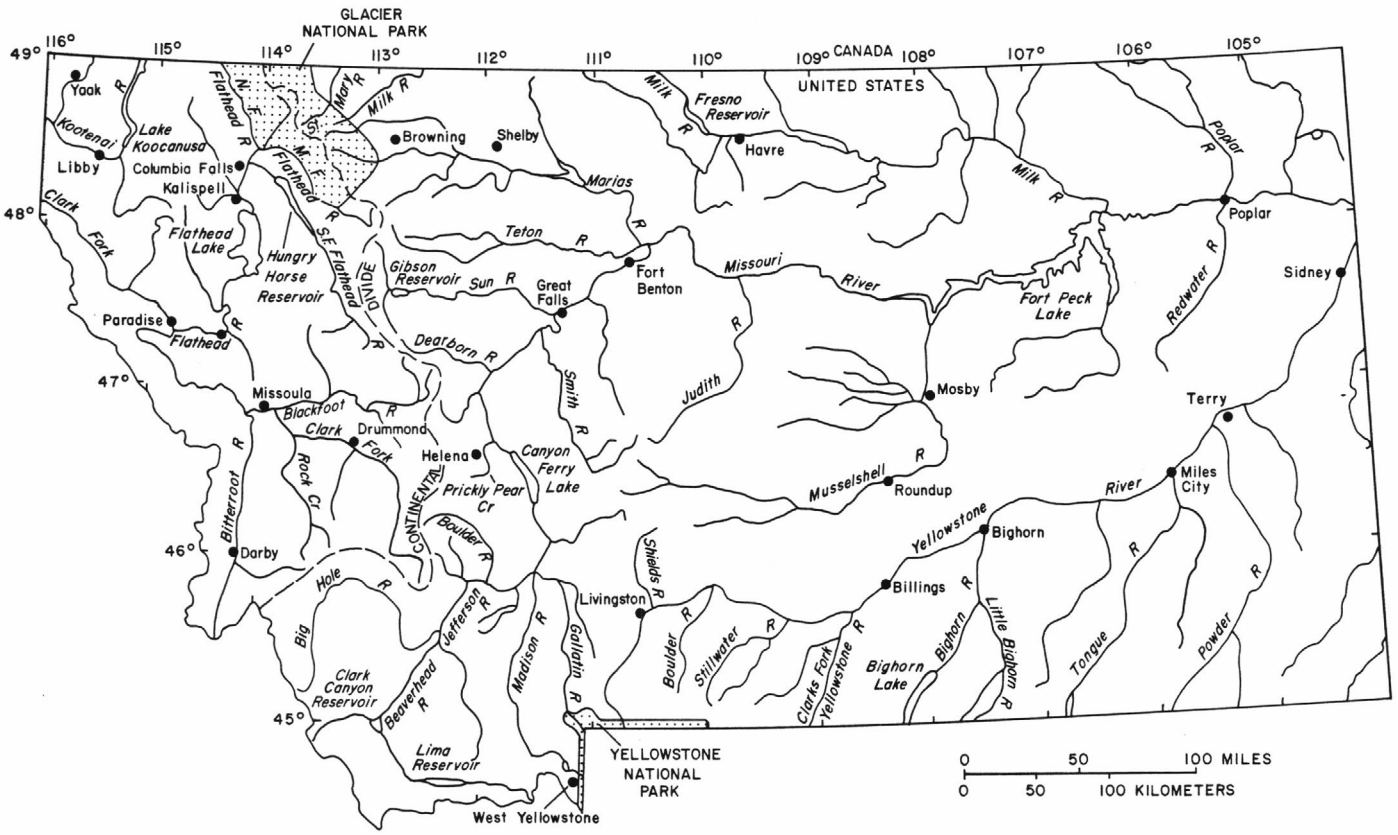
The western and southwestern parts of the State are in the Northern and Middle Rocky Mountains physiographic provinces. The central and eastern parts are in the Great Plains province. The Northern and Middle Rocky Mountains provinces are characterized by rugged mountains and intermontane valleys, whereas the Great Plains province consists of plains and small mountain ranges. Climate and hydrologic conditions differ substantially between the two provinces. The elevation ranges from about 10,000 feet at the Continental Divide in Glacier National Park and more than 12,000 feet in the headwaters of the Yellowstone River in Yellowstone National Park to about 1,800 feet where the Kootenai River flows from the State.

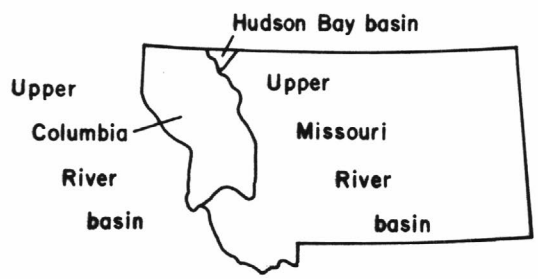
Annual precipitation varies considerably throughout the basins, from about 100-120 inches along the Continental Divide in Glacier National Park to about 6-12 inches in eastern Montana and in some of the intermontane valleys. The predominant factor controlling the diverse precipitation patterns in Montana is the effect of geographic and topographic features on the two primary moisture systems that bring warm, moist air into the State from either the Gulf of Mexico or the Pacific Ocean. In mountainous areas, much of the 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.

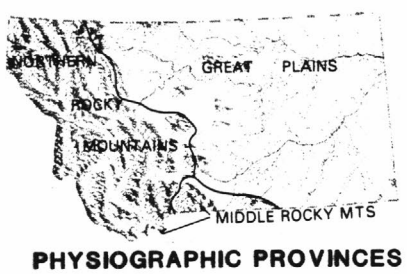
Peak runoff from the basins can result from spring snowmelt, snowmelt mixed with rain, or intense rainfall. In addition, backwater from ice jams commonly creates flooding in the lower Yellowstone River basin. The record flood of April 1952 in northeastern Montana is an example of spring snowmelt flooding. Floods in June 1964, June 1975, and May 1981 are examples of runoff caused by snowmelt mixed with rain. A flood in May 1978 in the southeastern part of the State is an example of flooding caused by intense rainfall--about 5 inches in 2 days. 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 help decrease flooding. The stored water is used for irrigation (the predominant use of water statewide), power generation, and recreation.

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 for domestic and agricultural uses may be exceeded. Water quality varies markedly between the western mountains and the eastern plains. In the mountains, where the rocks generally are older (commonly of Precambrian age) and more resistant to weathering and the runoff is rapid, the streamflow characteristically is a calcium bicarbonate type. The dissolved-solids concentrations in mountain streams seldom exceed 500 mg/L (milligrams per liter), even during base-flow conditions. Water in the eastern two-thirds of the State, where Cretaceous and Tertiary rocks are dominant, commonly is a sodium sulfate type; dissolved-solids concentrations range from about 100 to 8,000 mg/L. Snowmelt and intense rainstorms sometimes produce rapid runoff that results in smaller concentrations of dissolved solids, and calcium and bicarbonate become the dominant ions.

A notable exception to the general classification of streamflow in eastern Montana occurs in the northeastern part of the State, where the runoff and base-flow waters typically are a sodium bicarbonate type. Substantial concentrations of boron--as much as 2,000 µg/L (micrograms per liter) in the Poplar River north of Poplar--also are common. The water in the downstream reaches of the Yellowstone and Missouri Rivers, which originate in the mountains, is another exception. Characteristics of mountain-type water are present, but gradually diminish as the water moves downstream and mixes with water from tributaries in eastern Montana.







PHYSIOGRAPHIC PROVINCES

Figure 1.--General geographic features of Montana.

In the Hudson Bay and upper Missouri River basins, ground water is present in alluvium along streams, in glacial deposits in the north and northeastern parts of the State, and in consolidated rocks underlying most of the area. In the upper Columbia River basin, the quantities of ground water in storage generally are largest in the alluvium of the intermontane valleys. Also, the alluvium generally contains the most productive aquifers; yields to wells along the major streams may be several hundred gallons per minute. These deposits are readily recharged by precipitation, by streams during periods of high flow, and by applied irrigation water. The composition of the glacial deposits largely determines their potential for yielding water to wells. Where outwash gravels are present, the potential for developing large-yield wells is good; where till is present, yields generally are limited to a few gallons per minute. Many consolidated-rock formations are water yielding, but, owing to the complexity of the geology, not all the formations will be present in any given area. Also, the well depth required to penetrate a given formation will vary with location. Yields from wells completed in consolidated rocks generally are only a few gallons per minute; however, several hundred gallons per minute can be obtained from deeply buried, fractured or cavernous limestone in localized areas.

HYDROLOGIC-MONITORING ACTIVITY--WATER YEAR 1991

Three streamflow-gaging stations and 15 water-quality stations were established in Montana during water year 1991 to aid in the assessment of the State's water resources. One station was installed on the Jocko River near Dixon to monitor streamflow. A station was installed on Flint Creek near Drummond to monitor streamflow and water quality. The third station was installed on Cut Bank Creek near Browning to monitor streamflow.

Two streamflow-gaging stations and 12 water-quality stations were discontinued at the end of the water year. The stations were discontinued because either sufficient data had been collected to meet users' needs or funding was not available to continue the data collection.

SUMMARY OF HYDROLOGIC CONDITIONS--WATER YEAR 1991

Precipitation and Temperature

Weather in Montana during water year 1991 was near normal. Despite the near-normal conditions for most of the State, the effects of the drought continued until spring of 1991 in the northeastern, southeastern, central and southwestern parts of the State. Major effects of the drought that persisted were declining reservoir contents, deficient soil moisture, declining ground-water levels, and declining streamflows.

Annual precipitation for water year 1991 was near or greater than normal throughout the State, with averages ranging from 99 percent of normal in southwestern Montana to 129 percent of normal in northeastern Montana. Data for precipitation, departure from normal precipitation, and percentage of normal precipitation for seven divisions of the State are listed in table 1. Precipitation amounts ranged from an average of 15.22 in. at southwestern Montana stations to 20.33 in. at western Montana stations.

Table 1.--*Precipitation and departure from normal, in inches*[1]

Division (number of stations)	October 1990 through March 1991			April through September 1991			Water year 1991		
	Precipitation	Departure from normal, 1951-80	Percentage of normal	Precipitation	Departure from normal, 1951-80	Percentage of normal	Precipitation	Departure from normal, 1951-80	Percentage of normal
Western (42)	10.91	+0.18	102	9.42	+0.13	101	20.33	+0.31	102
Southwestern (25)	4.18	-1.17	78	11.04	+1.07	111	15.22	-.10	99
North Central (40)	3.21	+.09	103	12.39	+2.42	124	15.60	+2.51	119
Central (36)	3.30	-1.08	75	12.36	+1.83	117	15.66	+.75	105
South Central (26)	4.47	-.88	84	13.49	+2.79	126	17.96	+1.91	112
Northeastern (28)	1.81	-.82	69	15.10	+4.60	144	16.91	+3.78	129
Southeastern (23)	2.33	-1.09	68	14.12	+3.81	137	16.45	+2.72	120

[1] Data from U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, 1991, Climatological data, Montana: v. 93, no. 10 through v. 94, no. 9.

Most National Weather Service stations in Montana measure precipitation only in valley locations. Data for precipitation falling as snow in the mountainous western part of the State during the winter are published by the U.S. Soil Conservation Service in the report "Montana Water Supply Outlook"; data for 1991 are listed in table 2. Normals for precipitation and snowpack are based on different periods of record. Normals for precipitation are determined from a base period of 1951-80 and normals for snowpack are determined from a base period of 1961-85. Once 30 years of data for snowpack have been collected and compiled, the base periods will be the same.

The snowpack for the winter of 1990-91 was near or greater than normal, except in the upper Missouri, Judith-Musselshell, upper Yellowstone, and Bighorn basins, where it was less than normal from January to April. By April 1, 1991, the snowpack ranged from 78 to 125 percent of normal. A large stormfront moved across the State during April 10-12 and left large accumulations of snow at the higher elevations, which significantly increased the snowpack. By May 1, the snowpack ranged from 94 to 154 percent of normal. By June 1, most snow courses were near normal for the first time in several years.

Table 2.--*Water content of mountain snowpack as percent of normal*[1]

Drainage basin	1991				
	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1
Hudson Bay:					
St. Mary	164	149	123	123	131
Missouri:					
Upper Missouri	80	73	66	78	96
Sun-Teton-Marias	171	150	123	125	154
Judith-Musselshell	78	85	74	82	136
Milk	126	129	108	115	133
Upper Yellowstone	87	80	72	82	110
Bighorn	97	86	81	94	117
Tongue	84	95	99	106	126
Powder	85	89	89	100	123
Upper Columbia:					
Kootenai	140	118	102	113	118
Clark Fork	109	96	84	88	94
Flathead	144	133	118	116	123

[1]Data from U.S. Department of Agriculture, Soil Conservation Service, 1991. Normal based on 1961-85 period of record.

Precipitation for May and June was greater than normal except in southwestern Montana where it was less than normal in June. May and June generally are the periods of greatest rainfall. However, precipitation for the remaining water year was less than normal because of generally sparse summer rainfall.

Air temperatures for water year 1991 varied considerably. Statewide, monthly mean temperatures ranged from 10.7 °F (degrees Fahrenheit) less than normal in December to 14.6 °F greater than normal in February. The coldest month was December, whereas February, March, August, and September temperatures were significantly greater than normal. The warm temperatures in August and September combined with less than normal precipitation represents a pattern that has been prevalent during the past few years. For example, September 1990 was one of the warmest, driest months on record.

Streamflow

Streamflow data for water year 1991 are compared to long-term data for water years 1961-90 at seven streamflow-gaging stations (fig. 2). The effects of the greater than normal precipitation in water year 1991 and the increased soil moisture that replenished deficiencies from the drought in water years 1988-90 are reflected in the streamflow records. In the northwestern part of the State, rainfall from a November 1990 storm increased streamflow to greater than normal. The flow in the Middle Fork Flathead River near West Glacier (station 12358500) was the second largest for the period of record for November. The storm was unusual, because November precipitation normally falls as snow. Although precipitation was near or greater than normal in 1991, effects of the drought on streamflow persisted in the southwestern and northeastern parts of the State.

Compared to the mean annual discharge for water years 1961-90, the annual discharge at the seven streamflow-gaging stations during water year 1991 was: Marias River near Shelby (station 06099500), 146 percent of normal; Redwater River at Circle (station 06177500), 34 percent of normal; Middle Fork Flathead River near West Glacier , 136 percent of normal; Clark Fork at St. Regis (station 12354500), 89 percent of normal; Missouri River at Toston (station 06054500), 77 percent of normal; Yellowstone River at Corwin Springs (station 06191500), 100 percent of normal; and Yellowstone River at Billings (station 06214500), 97 percent of normal. By comparison, annual streamflow for water year 1991 was larger than for water year 1990 at all seven sites.

The long-term (1910-91) trend of annual discharge at two unregulated gaging stations is shown in figure 3. At one site (Yellowstone River at Corwin Springs), streamflow in 1991 was greater than the 1910-91 normal, interrupting the past 4-year cycle of less than normal streamflow. At the other site (Middle Fork Flathead River near West Glacier), annual streamflow was greater than the 1910-91 normal for the third consecutive year.

Melting of the greater than normal snowpack and rainfall runoff in May and June caused minor flooding in some areas. Peak discharges for selected streamflow-gaging stations in the State are listed in table 3. A peak-of-record discharge occurred in May at the Tobacco River near Eureka (station 12301300), with a magnitude estimated to have a 25-year recurrence interval. Five stations recorded peak discharges at, or slightly less than, the 10-year recurrence interval. Eight stations recorded peak discharges at, or slightly less than, the 5-year recurrence interval. Severe thunderstorms with locally intense rainfall moved across the State from about June 20 to July 2. During this period, many small drainage basins had flash flooding. On June 21, streamflow from Razor Creek, south of Roundup, swept across U.S. Highway 87, killing one motorist who was caught in the floodwaters. This flood peak was calculated by indirect measurement to be 6,330 ft^3/s. During the same period, 30 peak flows of record were recorded at crest-stage stations that were monitored as part of the "Small Drainage" cooperative program with the Montana Department of Transportation. Currently, 146 crest-stage stations are operated in this program.

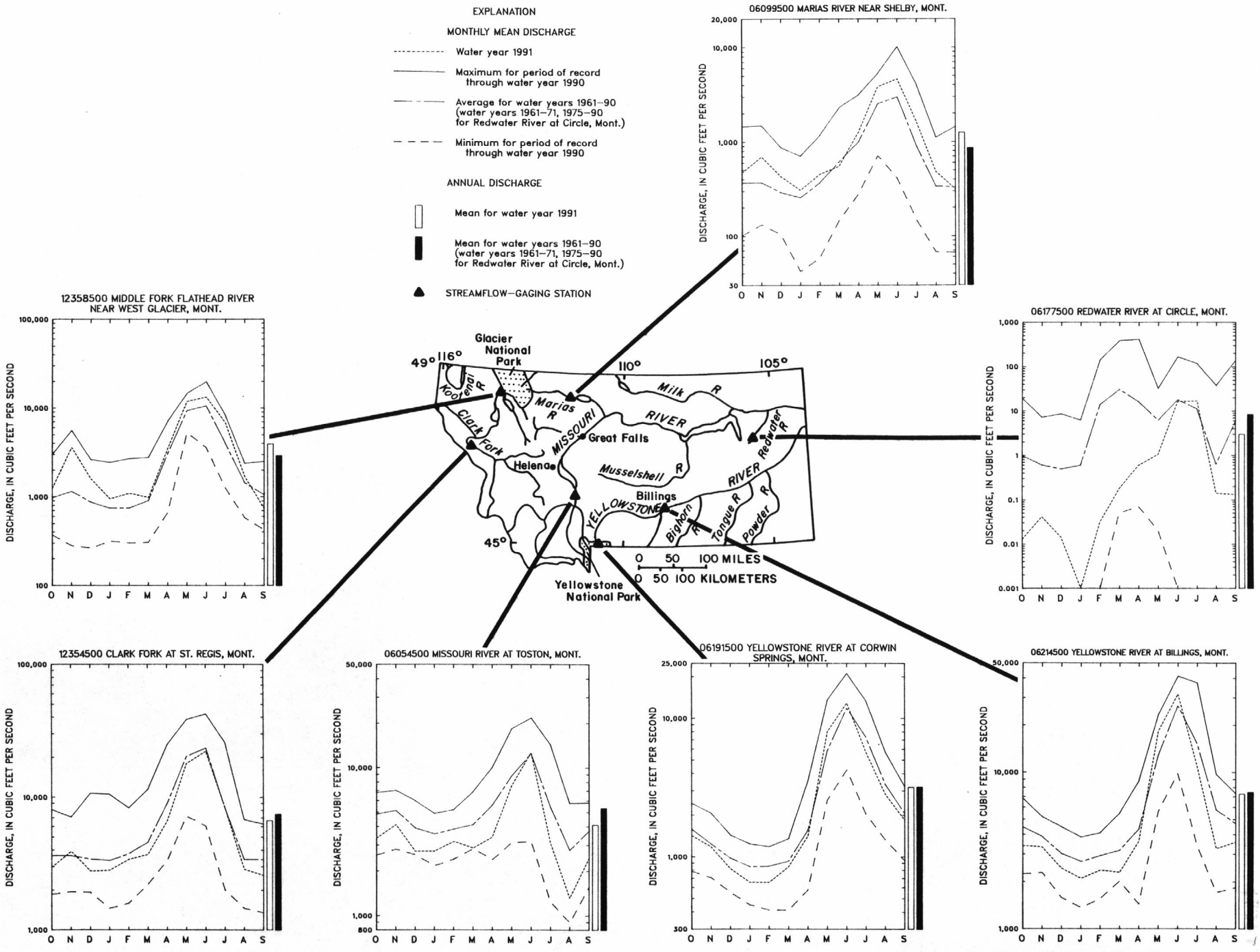


Figure 2.--Streamflow data for water year 1991 compared to long-term data at selected streamflow-gaging stations. The long-term data for water years 1961-90 at all stations except the Redwater River at Circle (station 06177500), where the long-term data are for water years 1961-71 and 1975-90.

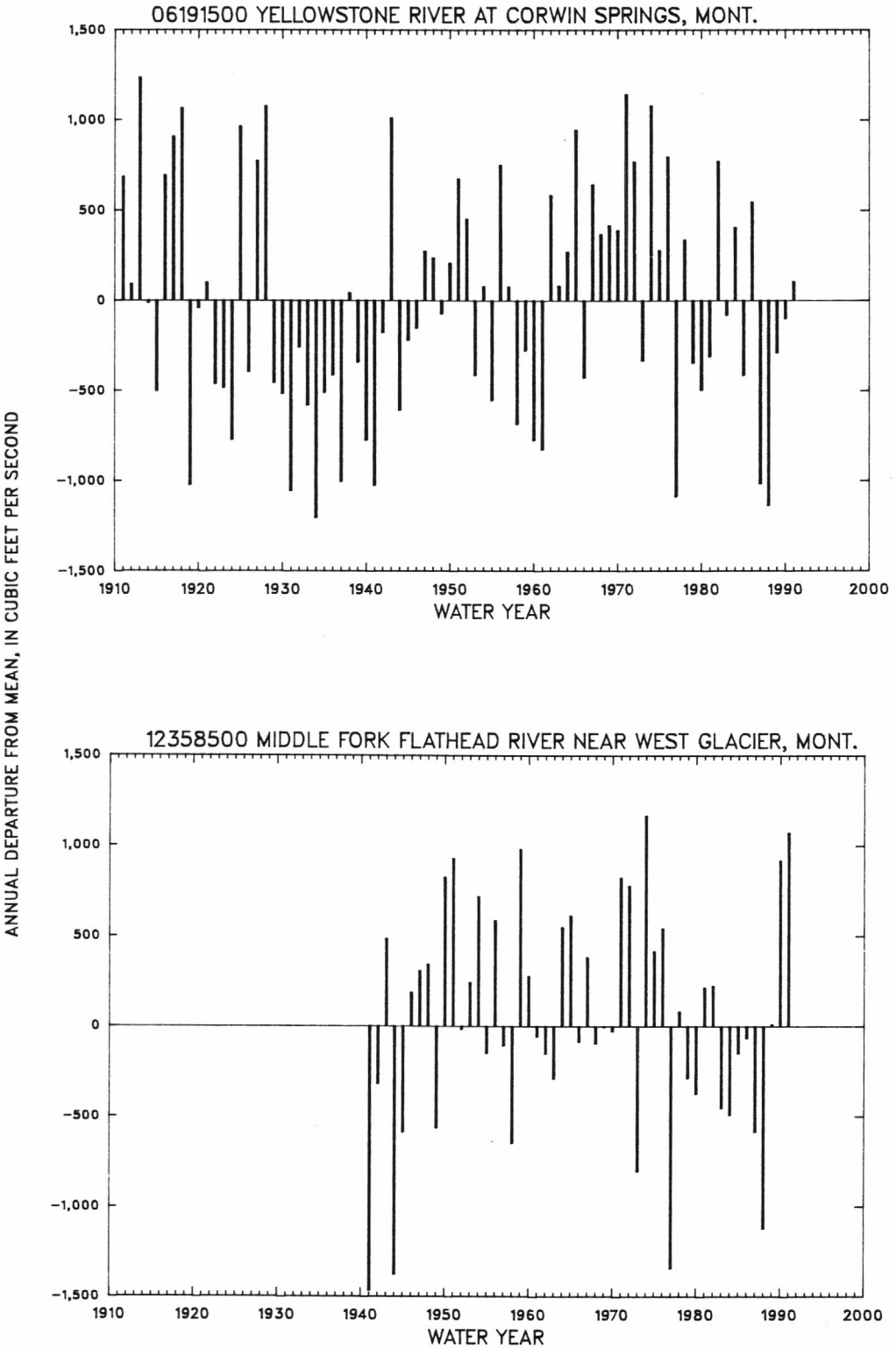


Figure 3.--Annual departure from mean annual streamflow at two unregulated streamflow-gaging stations.

Table 3.--*Comparisons of instantaneous peak discharge for water year 1991 with instantaneous peak discharge for period of record at selected stations*

[<, less than]

Station number	Station name	Drainage area (square miles)	Peak discharge, water year 1991			Peak discharge, period of record	
			Date	Cubic feet per second	Recurrence interval (years)	Date	Cubic feet per second
05014500	Swiftcurrent Creek at Many Glacier	30.9	05/19	1,500	10	06/08/64	6,700
05017500	St. Mary River near Babb	278	05/22	4,740	<10	06/09/64	16,500
06025500	Big Hole River near Melrose	2,476	06/07	10,600	<10	06/10/72	14,300
06054500	Missouri River at Toston	14,669	06/09	23,800	<5	06/06/48	32,000
06062500	Tenmile Creek near Rimini	32.7	05/21	171	<2	05/22/81	3,290
06089000	Sun River near Vaughn	1,854	05/22	7,150	<5	06/09/64	53,500
06099500	Marias River near Shelby	3,242	06/22	12,600	5	06/09/64	241,000
06115200	Missouri River near Landusky	40,987	06/17	27,900	<2	06/06/53	137,000
06120500	Musselshell River at Harlowton	1,125	06/06	2,540	<10	06/20/75	7,270
06154400	Peoples Creek near Hays	220	06/30	719	<5	06/08/72	8,460
06174500	Milk River at Nashua	22,332	07/08	6,170	<2	04/18/52	45,300
06191500	Yellowstone River at Corwin Springs	2,623	05/25	20,500	<5	06/14,15/18	32,000
06200000	Boulder River at Big Timber	523	06/12	6,900	<5	05/28/56	9,840
06214500	Yellowstone River at Billings	11,795	06/07	51,500	<5	06/19/74	69,500
06289000	Little Bighorn River at State line, near Wyola	193	05/21	1,190	2	06/03/44	2,730
06308500	Tongue River at Miles City	5,379	09/15	3,610	<2	06/15/62	13,300
06329500	Yellowstone River near Sidney	69,103	06/12	61,200	<2	06/02/21	159,000
12301300	Tobacco River near Eureka	440	05/13	3,180	25	05/13/91	3,180
12304500	Yaak River near Troy	766	04/05	8,690	<5	05/21/56	12,100
12332000	Middle Fork Rock Creek near Philipsburg	123	06/07	960	2	06/16/74	1,680
12335500	Nevada Creek above reservoir, near Finn	116	05/19	314	<2	06/02/53	1,800
12340000	Blackfoot River near Bonner	2,290	05/20	9,290	2	06/10/64	19,200
12354500	Clark Fork at St. Regis	10,709	05/20	34,800	<2	05/24/48	68,900
12358500	Middle Fork Flathead River near West Glacier	1,128	05/19	35,000	<10	06/09/64	140,000
12370000	Swan River near Bigfork	671	05/21	4,570	<2	06/20/74	8,890

Despite the generally near-normal streamflows recorded in 1991, periods of less than normal flow were observed at several streamflow-gaging stations. Most of the low flows, which were recorded during the extreme cold of December 1990, were residual effects of the drought conditions that were prevalent during preceding years. Minimum daily discharges for selected streamflow-gaging stations are listed in table 4. One-day low flow having a 50-year recurrence interval occurred on the Little Bighorn River. One-day low flows having 20-year recurrence intervals were recorded at stations on the Missouri, Blackfoot, and Clark Fork Rivers. One-day low flows having 10-year recurrence intervals were recorded on Prickly Pear Creek and the Big Hole and Boulder Rivers. The remaining 18 sites in the station list had minimum daily flows with recurrence intervals ranging from less than 2 to 5 years. The summer low flows on the Missouri River continued to cause water shortages for downstream water users and adversely affected fish populations.

Managers of major reservoirs in the Missouri River basin continued to contend with substantial water shortages attributed to residual effects of the preceding years of drought. Exceptions were the Sun and Milk River basins, where reservoir storage had increased markedly owing to the November rain storm and near normal May-June snowmelt/rainfall runoff. The percentage of normal (based on water years 1961-90) storage by month for major reservoirs is identified in table 5. At the end of water year 1991, Fort Peck Lake, Clark Canyon Reservoir, and Lima Reservoir had significantly less than normal storage. In contrast, Canyon Ferry Lake, Hungry Horse Reservoir, Flathead Lake, Gibson Reservoir, and Fresno Reservoir were at normal levels, and Bighorn Lake was at a greater than normal level.

Quality of Streamflow

The National Stream Quality Accounting Network (NASQAN) is a data-collection network used to assess the quality of the Nation's water through systematic and continuing measurements at key locations on major streams. Presently, Montana has 16 NASQAN stations throughout the State. Data collection began at the first station in 1973.

Statistical summaries for selected water-quality measurements at eight NASQAN stations on the mainstems of the St. Mary, Missouri, Yellowstone, Clark Fork, and Flathead Rivers are presented in table 6. The statistical summaries include the minimum and maximum values for water year 1991 and for the period of record through 1990. Statistical summaries of dissolved-solids concentrations at the same stations for water year 1991 and for the period of record are represented in figure 4 in the form of boxplots.

Generally, the concentrations of dissolved solids (and major ions) in streams are related inversely to streamflow. High streamflows resulting from snowmelt and rainfall runoff have small dissolved-solids concentrations; conversely, low streamflows composed largely of ground water discharging to streams (base flow) have larger dissolved-solids concentrations. This inverse relation between dissolved solids and streamflow is less pronounced at sites downstream from lakes and reservoirs, where two components of flow--runoff and base flow--can be retained and mixed.

Table 4.--*Minimum daily discharge for water year 1991 and minimum instantaneous discharge for period of record at selected stations*

[<, less than]

Station number	Station name	Drainage area (square miles)	Minimum daily discharge, water year 1991			Minimum instantaneous discharge, period of record	
			Date	Cubic feet per second	Recurrence interval (years)	Date	Cubic feet per second
05014500	Swiftcurrent Creek at Many Glacier	30.9	02/02	11	2	11/14,16/76	0
05017500	St. Mary River near Babb	278	12/31	57	2	01/05/63	26
06025500	Big Hole River near Melrose	2,476	12/21	100	10	08/17/31	49
06054500	Missouri River at Toston	14,669	12/20	800	20	07/16/89	450
06061500	Prickly Pear Creek near Clancy	192	12/22	8	10	01/26/58	.5
06089000	Sun River near Vaughn	1,854	12/22	200	<2	05/24/44	20
06099500	Marias River near Shelby	3,242	12/23	150	<2	08/20/19	10
06115200	Missouri River near Landusky	40,987	01/15	3,900	<2	07/08/36	1,120
06120500	Musselshell River at Harlowton	1,125	12/22	17	2	(1)	0
06174500	Milk River at Nashua	22,332	10/31	35	<5	(1)	0
06181000	Poplar River near Poplar	3,174	01/15	.1	5	(1)	0
06191500	Yellowstone River at Corwin Springs	2,623	12/22	500	5	02/02/89	343
06200000	Boulder River at Big Timber	523	12/21	30	10	08/26/61	10
06214500	Yellowstone River at Billings	11,795	12/21	1,100	<5	12/12/32	430
06289000	Little Bighorn River at State line, near Wyola	193	12/20	19	50	02/02/89	18
06308500	Tongue River at Miles City	5,379	09/5-6	32	2	08/13,14/40	0
06329500	Yellowstone River near Sidney	69,103	12/26	1,800	<5	05/17/61	470
12301300	Tobacco River near Eureka	440	09/20	77	<2	01/11/63	20
12304500	Yaak River near Troy	766	10/01	114	<2	12/09/72	50
12332000	Middle Fork Rock Creek near Philipsburg	123	12/20	17	<2	02/09/53	5.3
12335500	Nevada Creek above reservoir, near Finn	116	09/05	4.8	<2	(1)	<2.0
12340000	Blackfoot River near Bonner	2,290	12/20	200	20	02/02/89	156
12354500	Clark Fork at St. Regis	10,709	12/22	1,000	20	02/03/89	732
12358500	Middle Fork Flathead River near West Glacier	1,128	10/01	566	<2	11/27/52	<173
12370000	Swan River near Bigfork	671	09/29-30	462	<2	01/26-29/30	193

[1] At times.

Table 5.--*Percentage of normal storage, by month, during water year 1991 for major reservoirs used to supply water principally for hydroelectric-power generation and irrigation*

Reservoir	Usable capacity (acre-feet)	Percentage of normal storage based on 1961-90 period of record											
		Oct. 90	Nov.	Dec.	Jan. 91	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
Hydroelectric-power generation:													
Canyon Ferry Lake	2,043,000	92	95	93	90	92	95	96	100	103	98	94	89
Fort Peck Lake	18,910,000	70	69	69	69	71	70	69	71	74	76	76	77
Bighorn Lake	1,356,000	117	122	121	114	111	106	106	122	129	129	122	130
Hungry Horse Reservoir	3,451,000	92	99	107	101	93	82	81	87	96	102	102	94
Flathead Lake	1,791,000	102	105	94	100	104	114	109	105	102	99	100	102
Irrigation:													
Lima Reservoir	84,050	27	36	34	34	33	34	50	71	51	16	11	20
Clark Canyon Reservoir	255,600	44	50	55	59	64	67	66	66	65	54	47	52
Gibson Reservoir	99,050	150	145	123	111	108	96	116	94	101	128	157	95
Fresno Reservoir	103,000	97	101	101	99	105	74	83	112	120	138	133	103

Table 6.--*Comparison of minimum and maximum values for selected water-quality constituents and properties for water year 1991 and for the period of NASQAN[1] record at eight stations*

[<, less than]

Station number	Station	Water year 1991			Period of NASQAN record through water year 1990		
		Number of samples	Minimum	Maximum	Number of samples	Minimum	Maximum
	Dissolved solids, in milligrams per liter						
05020500	St. Mary River at international boundary	6	77	127	93	70	195
06054500	Missouri River at Toston	4	156	249	147	125	308
06115200	Missouri River near Landusky	6	267	346	80	104	950
06192500	Yellowstone River near Livingston	6	85	201	79	66	258
06214500	Yellowstone River at Billings	4	148	300	122	70	439
06329500	Yellowstone River near Sidney	6	268	562	226	158	874
12353000	Clark Fork below Missoula	6	74	154	85	59	218
12363000	Flathead River at Columbia Falls	4	62	95	64	68	128
	Dissolved phosphorus, in milligrams per liter						
05020500	St. Mary River at international boundary	6	<0.01	0.11	94	<0.01	0.04
06054500	Missouri River at Toston	4	.01	.03	88	<.01	.09
06115200	Missouri River near Landusky	6	<.01	.02	80	<.01	.39
06192500	Yellowstone River near Livingston	6	<.01	.03	148	<.01	.09
06214500	Yellowstone River at Billings	4	<.01	.04	85	<.01	.14
06329500	Yellowstone River near Sidney	6	<.01	.02	99	<.01	.07
12353000	Clark Fork below Missoula	6	<.01	.07	85	<.01	.29
12363000	Flathead River at Columbia Falls	4	<.001	.008	64	<.001	.03
	Dissolved oxygen, in percent of saturation						
05020500	St. Mary River at international boundary	6	95	118	117	83	112
06054500	Missouri River at Toston	37	77	131	186	89	128
06115200	Missouri River near Landusky	6	91	97	154	60	106
06192500	Yellowstone River near Livingston	6	91	113	127	73	138
06214500	Yellowstone River at Billings	4	97	100	170	78	152
06329500	Yellowstone River near Sidney	6	90	98	259	43	109
12353000	Clark Fork below Missoula	6	101	111	110	81	146
12363000	Flathead River at Columbia Falls	4	96	102	115	92	107
	Dissolved arsenic, in micrograms per liter						
05020500	St. Mary River at international boundary	4	<1	<1	51	<1	<10
06054500	Missouri River at Toston	35	19	74	70	8	100
06115200	Missouri River near Landusky	4	10	15	54	2	25
06192500	Yellowstone River near Livingston	4	9	26	43	6	37
06214500	Yellowstone River at Billings	4	6	11	62	2	14
06329500	Yellowstone River near Sidney	4	4	12	62	1	12
12353000	Clark Fork below Missoula	4	1	2	48	1	12
12363000	Flathead River at Columbia Falls	4	<1	<1	46	<1	2
	Turbidity, in nephelometric turbidity units						
05020500	St. Mary River at international boundary	6	1.0	67	88	0.3	110
06054500	Missouri River at Toston	4	2.3	45	79	.1	60
06115200	Missouri River near Landusky	6	2.8	27	80	1.5	7,500
06192500	Yellowstone River near Livingston	6	1.0	15	79	.6	38
06214500	Yellowstone River at Billings	4	2.4	71	78	.2	140
06329500	Yellowstone River near Sidney	6	8.6	250	99	1.0	2,500
12353000	Clark Fork below Missoula	6	1.3	27	85	.4	100
12363000	Flathead River at Columbia Falls	4	.3	42	65	.2	100

[1]National Stream Quality Accounting Network.

The information in table 6 and figure 4 indicates that dissolved-solids concentrations for most stations during 1991 were generally smaller than for many previous years. At six of the eight stations, the median concentrations for 1991 were somewhat less than the medians for the periods of record. Minimum concentrations at the six stations also tended to be small. At the Flathead River at Columbia Falls station, the minimum dissolved-solids concentration (62 mg/L) measured in 1991 was the smallest for the period of record. The greater than normal precipitation and increased runoff throughout many parts of the State contributed to generally smaller dissolved-solids concentrations. Exceptions to the above conditions were the Yellowstone River near Livingston and the Yellowstone River at Billings, where median dissolved-solids concentrations were near normal or slightly larger. The dissolved-solids concentrations are a reflection of near-normal runoff in the upper Yellowstone River basin during 1991.

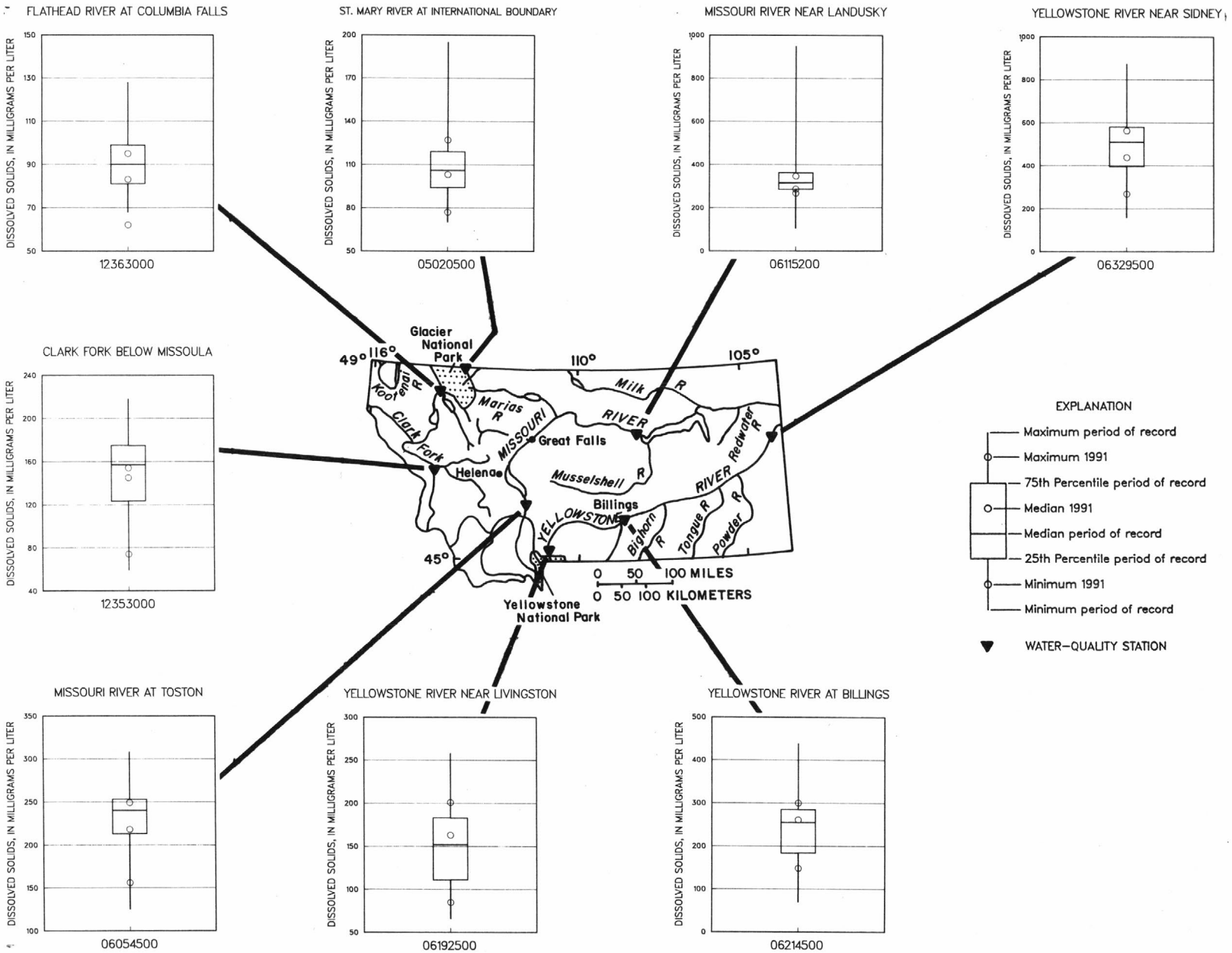


Figure 4.--Dissolved-solids concentrations for water year 1991 compared to data for the period of record through water year 1990.

Phosphorus, along with nitrogen, is recognized as a major constituent for growth of aquatic plants. Excessive phosphorus concentrations, commonly caused by human activity, can result in biological enrichment such as increased growths of algae and other aquatic plants. At seven of the eight stations, dissolved-phosphorus values in 1991 were well within the range of values for the period of record. The exception was St. Mary River at international boundary, where dissolved phosphorus was measured on June 12, at 0.11 mg/L, which exceeded the previous maximum value of 0.04 mg/L. The measurement was made during snowmelt runoff at a moderately large streamflow of 3,880 ft^3/s. Total phosphorus measured at the same time had a concentration of 0.12 mg/L, indicating most of the phosphorus was dissolved rather than attached to sediment.

Dissolved oxygen in streams sustains most aquatic organisms and is an important constituent that allows for the purification of wastes. Dissolved oxygen is commonly reported in percent of saturation, where 100 percent is considered to be ideal for most aquatic organisms. At six of the eight stations, the minimum and maximum values for 1991 were in a normal range near 100 percent of saturation. The St. Mary River at international boundary had a new maximum value of 118 percent of saturation measured at mid-afternoon on June 12. On the Missouri River at Toston, new extreme oxygen-saturation percentages were set in 1991 for both minimum (77 percent) and maximum (131 percent). Both new values were from within a 24-hour period of hourly measurements made in early September. The maximum percentage was measured in late afternoon when photosynthetic processes released large quantities of oxygen to the stream. The minimum percentage was measured before dawn when photosynthesis had stopped and only plant respiration was occurring. Except for this 24-hour period, nearly all other dissolved-oxygen measurements for 1991 and the period of record were made during the normal working day.

Arsenic is toxic to humans and other organisms if it occurs in excess of relatively small concentrations. To protect human health, the U.S. Environmental Protection Agency has established a Maximum Contaminant Level of 50 µg/L for the National Primary Drinking Water Regulations[1]. Arsenic-laden waters from geothermal sources in Yellowstone National Park enter headwater tributaries of the Missouri and Yellowstone Rivers. The arsenic concentrations decrease downstream as a result of dilution from tributary inflow and physical and chemical processes that tend to immobilize the element. Although arsenic concentrations at stations on both the Missouri and Yellowstone Rivers were large during 1991 compared to natural waters throughout the country, the values were not anomalous when compared to past station records.

Turbidity, which is directly related to suspended-sediment concentration, generally increases with stream discharge as a result of eroded sediment transported by runoff. Measurements of turbidity at most stations during 1991 were within their normal range. However, on the St. Mary River at international boundary and the Flathead River at Columbia Falls, the maximum values for 1991 were significantly larger than those of 1990 and most other years.

Ground-Water Levels

Water levels were measured in 282 wells of a statewide network of 296 wells during water year 1991. Although some measurements are for October 1991, and thus were obtained during water year 1992, they are representative of conditions during late water year 1991 and, therefore, are presented herein. Fourteen wells in the statewide network were not measured for various reasons. Water levels in most wells in the network are measured annually; however, water levels in some wells are measured more frequently. Fourteen wells are equipped with continuous water-level recorders and have varying length of record. Hydrographs for seven network wells are shown in figure 5. The network water-level data are presented in table 7.

About one-third of the wells in the statewide network are completed in unconsolidated aquifers and are relatively shallow. Water levels in these wells commonly fluctuate throughout the year and from year to year as a result of changes in climatic conditions or human activities, such as large-scale withdrawals, or both. In general, water levels in these relatively shallow wells were higher in water year 1991 than for comparable times in water year 1990, but were below average for the period of record.

A 143-foot-deep observation well in Sheridan County (well 32N58E04DBBD02) is completed in a buried channel of Pleistocene glacial outwash of the ancestral Missouri River. The hydrograph (fig. 5) shows seasonal fluctuations in water levels and an overall decrease in water levels since 1987 in response to increased irrigation pumpage and the hot, dry climatic conditions from water year 1988 through the winter of water year 1991.

A 377-foot-deep observation well in Sanders County (well 23N24W34ADAA01) is completed in a confined sand and gravel Quaternary alluvial aquifer. The hydrograph shows seasonal fluctuations in water levels and an overall decrease in water levels from 1972 through 1977 and from 1981 through 1985 (fig. 5). Water from the aquifer is used extensively for irrigation. The long-term decreases are at least partly a result of increased withdrawals. Overall recovery of water levels from 1978 through 1980 and from 1986 through 1991 was a result of increased precipitation during several of these years and decreased demand for irrigation water.

A 47-foot-deep observation well in Beaverhead County (08S09W01CCCC01) is completed in Tertiary sediments of the Beaverhead River valley. Water levels were measured several times a year from 1966 through 1984 and then yearly to 1991 when a continuous recorder was installed. The hydrograph (fig. 5) shows that water levels generally increased from 1966 through 1971, generally decreased from 1972 through 1980, and remained relatively stable from 1981 through 1984. Although the frequency of measurement changed in 1985, the hydrograph shows a general decrease in water levels from 1985 through 1989. Water levels generally have increased since 1989 to present levels, but are still below most levels recorded in the 1960's and 1970's.

A 68-foot-deep observation well in Powder River County (well 04S45E04BDDB01) is completed in shallow Quaternary alluvium consisting of sand and gravel. Water levels in the aquifer are largely affected by precipitation and stream stage with seasonal variation evident in the hydrograph. Water levels at this site are not directly affected by human activities. Overall, water levels have decreased from 1986 through 1991 (fig. 5).

About two-thirds of the wells in the statewide network are completed in deep, consolidated aquifers. Water levels in these wells generally do not fluctuate substantially from year to year unless they are affected by climate changes or human activities. Many of these deeper wells are completed in coal or sandstone aquifers in the

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[1]U.S. Environmental Protection Agency, 1991, Maximum contaminant levels (subpart B of part 141, National primary drinking water regulations): U.S. Code of Federal Regulations, Title 40, Parts 100-149, revised as of July 1, 1991, p. 585-588.

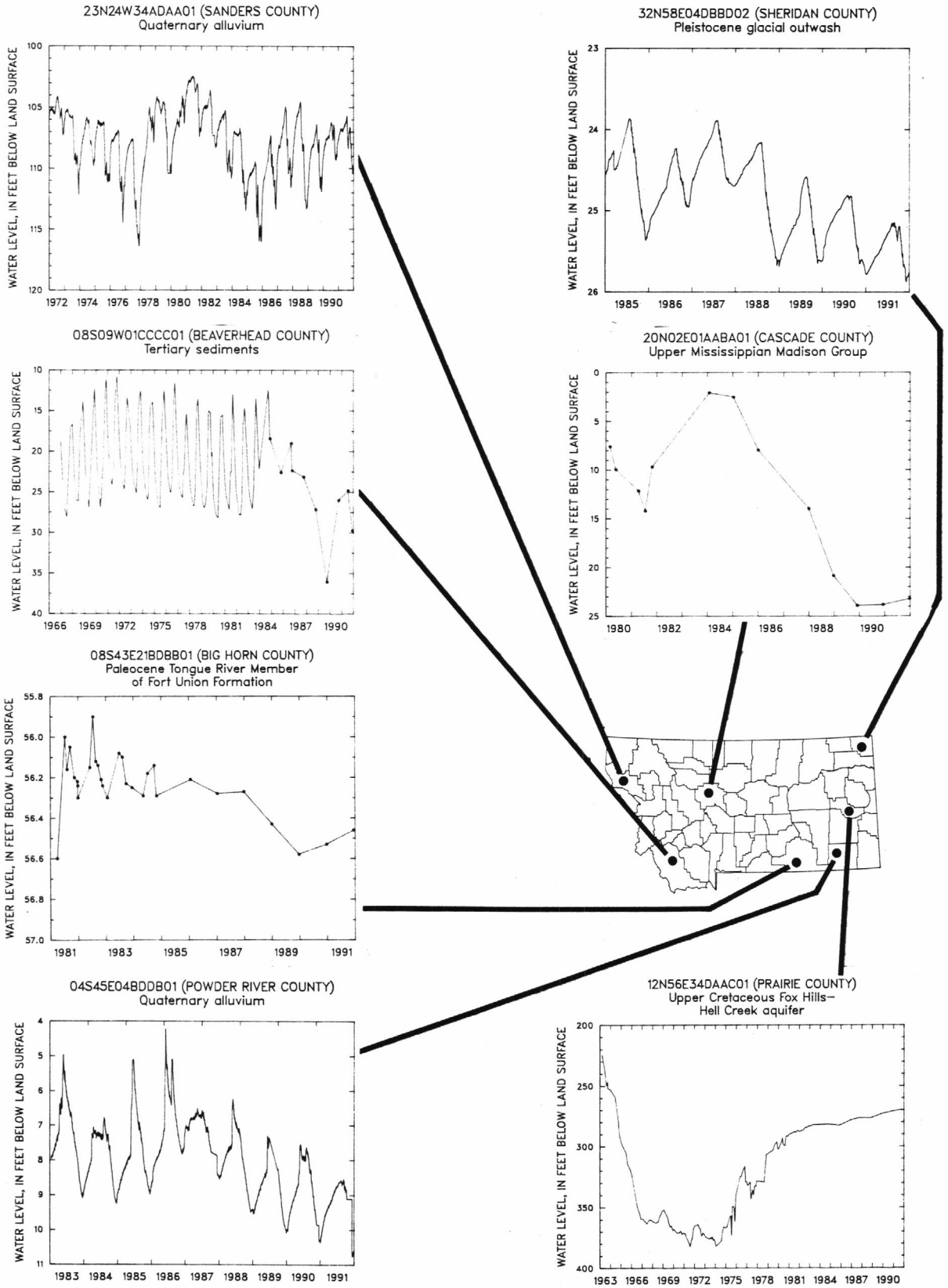

Figure 5.--Long-term fluctuations of water levels in selected observation wells.

Tongue River Member of the Fort Union Formation (Paleocene age) in eastern Montana. As shown by the hydrograph for a 223-foot-deep well in Big Horn County (well 08S43E21BDBB01), which is completed in a combined coal and sandstone aquifer, water levels in these aquifers remained relatively stable from 1981 through 1987, decreased from 1988 through 1989, and increased from 1990 through 1991. The water-level changes probably are the result of climate changes that affect recharge.

A 1,467-foot-deep well in Prairie County (well 12N56E34DAAC01) is completed in the Fox Hills-Hell Creek aquifer (Late Cretaceous age). The hydrograph shows decreasing water levels from 1963 through 1973 caused by industrial withdrawals, and generally increasing water levels from 1974 to the present as withdrawals decreased.

An important aquifer in west-central Montana is the Madison Group (Mississippian age), which consists primarily of limestone. The hydrograph for a 605-foot-deep well in Cascade County (well 20N02E01AABA01) completed in the Madison Group shows a general decrease in water levels from 1984 through 1989 because of increased withdrawals and less than normal recharge from precipitation; water levels have been relatively stable since 1989.

Table 7.--*Water levels in observation wells*

[Local number--composed of township, range, section, position within a section, and sequential number. Depth of well--in feet below land surface. Aquifer--the names were retrieved from the National Water Data Storage and Retrieval System (WATSTORE) and some may not follow current usage of the U.S. Geological Survey. Date of measurement--reported as month, day, year. Water-level--in feet below or above (+) land surface. Symbol: --, no data; D, well is dry]

Local number	Depth of well	Aquifer	Date of measurement	Water level
37N27W21CBAB01	45	Pleistocene glaciolacustrine deposits	08-15-91	9.57
			10-17-91	12.11
37N27W24BABB01	230	Pleistocene glacial outwash	08-13-91	110.99
			10-17-91	112.01
37N27W27ACCB01	320	Pleistocene glaciolacustrine deposits	08-15-91	138.48
			10-17-91	139.41
37N47E01ABBB01	53	Pleistocene glacial outwash	12-12-90	22.19
			03-07-91	22.49
			06-24-91	22.34
			10-03-91	21.82
37N47E01ABBB02	83	Paleocene Tongue River Member of Fort Union Formation	12-12-90	22.69
			03-07-91	23.00
			06-24-91	22.79
			10-03-91	22.79
37N47E12BBBB01	147	Paleocene Tongue River Member of Fort Union Formation	12-12-90	79.79
			03-07-91	79.85
			06-24-91	79.86
			10-03-91	79.77
37N47E13AADD01	208	Paleocene Tongue River Member of Fort Union Formation	12-12-90	14.37
			03-07-91	14.13
			06-24-91	14.31
			10-03-91	14.51
37N47E13ADAA01	45	Pleistocene glacial outwash	12-12-90	14.92
			03-07-91	14.67
			06-24-91	14.85
			10-03-91	15.04
37N47E17DABB02	266	Paleocene Tongue River Member of Fort Union Formation	06-24-91	217.81
			10-01-91	218.03
37N47E23AADD02	120	Paleocene Tongue River Member of Fort Union Formation	12-12-90	82.56
			03-07-91	82.49
			06-24-91	82.52
			10-03-91	82.65
37N48E05AAAA01	218	Paleocene Fort Union Formation	06-24-91	+.71
			10-03-91	+.54
37N48E05BABB01	43	Pleistocene glacial outwash	03-07-91	8.48
			06-24-91	8.45
36N28W01ADC 01	206	Pleistocene glacial till	08-14-91	104.01
			10-17-91	97.90
36N28W11AADB01	290	Pleistocene glaciolacustrine deposits	10-17-91	40.36
36N27W05DCBC01	168	Pleistocene glaciolacustrine deposits	08-15-91	35.12
			10-17-91	33.81

Table 7.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Date of measurement	Water level
36N09E05DBAD01	1,015	Upper Cretaceous Eagle Sandstone	10-11-91	8.85
36N25E06CBCB01	75	Pliocene Flaxville Formation	09-23-91	64.30
36N26E33DBD 01	67	Pliocene Flaxville Formation	09-23-91	56.09
35N02E27AABD01	250	Upper Cretaceous Eagle Sandstone	10-29-91	19.12
35N24E09DBBC01	53	Pliocene Flaxville Formation	09-23-91	42.46
35N33E19DBA 01	246	Upper Cretaceous Judith River Formation of Montana Group	09-28-91	78.50
34N24E06DCCC01	200	Upper Cretaceous Fox Hills Sandstone	09-23-91	67.52
33N06W12AAA 03	250	Upper Cretaceous Two Medicine Formation of Montana Group	10-07-91	28.78
32N15E17DDDC01	180	Quaternary alluvium	10-08-91	36.43
32N58E04DBBD02	143	Pleistocene glacial outwash	05-08-91 10-11-91	25.20 25.66
31N14E03CDDC01	215	Upper Cretaceous Judith River Formation of Montana Group	09-23-91	45.49
31N24E06BCC 01	70	Pleistocene alluvium	09-23-91	8.02
30N33W05ABAB01	187	Pleistocene glaciolacustrine deposits	10-16-91	+19.54
30N33W30DAAD01	43	Pleistocene glaciolacustrine deposits	08-16-91 10-16-91	9.69 10.28
30N33W30DAAD02	23	Pleistocene glaciolacustrine deposits	08-16-91 10-16-91	8.59 9.19
30N05W33DDB 01	122	Upper Cretaceous Virgelle Sandstone Member of Eagle Sandstone	10-07-91	45.71
30N38E09CADB01	195	Upper Cretaceous Judith River Formation of Montana Group	09-10-91	52.35
29N22W14BBDD01	220	Pleistocene glaciolacustrine deposits	08-13-91 10-25-91	134.32 134.03
29N22W28ACCC01	200	Pleistocene glaciolacustrine deposits	08-13-91 10-25-91	160.09 160.67
29N22W36BCBD01	452	Pleistocene glaciolacustrine deposits	10-25-91	140.18
29N21W20CCCC01	278	Pleistocene glaciolacustrine deposits	08-13-91 10-25-91	109.54 107.23
29N13E21AABA02	210	Pleistocene alluvium	01-15-91 02-27-91 04-24-91 08-21-91	18.23 18.42 18.18 18.15
27N56E34AABC01	118	Paleocene Tongue River Member of Fort Union Formation	10-10-91	39.68
26N23E23ACAA02	244	Upper Cretaceous Virgelle Sandstone Member of Eagle Sandstone	12-13-90 02-12-91	19.80 19.89
26N23E23DCAC01	300	Upper Cretaceous Virgelle Sandstone Member of Eagle Sandstone	12-13-90 02-12-91	20.69 20.60
26N24E31BADC01	174	Lower Cretaceous First Cat Creek sandstone of Colorado Group	10-23-91	24.75
26N24E31BDDC01	226	Lower Cretaceous Third Cat Creek sandstone of Kootenai Formation	10-23-91	+1.41
26N24E32BCBA01	140	Upper Mississippian Mission Canyon Limestone	12-13-90 02-12-91	41.99 43.05
26N49E13ACAB01	180	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-10-91	43.98
26N54E17DCAA01	240	Paleocene Tongue River Member of Fort Union Formation	10-10-91	91.96
26N59E22DBDD01	212	Paleocene Tongue River Member of Fort Union Formation	10-10-91	37.66
25N47E04DAAB01	200	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-10-91	68.91
25N50E24CBDA01	220	Paleocene Lebo Shale Member of Fort Union Formation	10-10-91	9.00

Table 7.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Date of measurement	Water level
24N23W21BCDA01	250	Pleistocene glacial till	01-09-91	36.10
			04-02-91	35.88
			07-10-91	35.11
			10-08-91	35.49
24N44E20CABD01	300	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-08-91	179.61
24N47E35BBBA01	101	Paleocene Lebo Shale Member of Fort Union Formation	10-10-91	18.06
24N47E35BBBC01	640	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-10-91	196.28
24N54E29CACB01	190	Paleocene Tongue River Member of Fort Union Formation	10-10-91	53.36
24N56E25DDAC01	60	Paleocene Tongue River Member of Fort Union Formation	10-10-91	5.15
23N24W27CDDD01	184	Pleistocene alluvium	01-09-91	26.35
			04-03-91	25.72
			07-10-91	25.90
			10-08-91	29.09
23N24W34ADAA01	377	Quaternary alluvium	11-28-90	106.90
			01-04-91	106.90
			01-09-91	106.89
			04-03-91	106.30
			04-24-91	105.68
			05-24-91	108.28
			07-10-91	106.69
			07-11-91	106.68
			07-24-91	107.70
			08-15-91	108.87
			10-08-91	109.76
23N43E34BABC01	175	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-08-91	104.11
23N51E20BBBD01	175	Paleocene Fort Union Formation	10-10-91	20.51
22N58E10CCCC01	135	Paleocene Fort Union Formation	10-10-91	69.06
21N20W24CAAA02	290	Pleistocene glacial till	01-28-91	10.16
			04-08-91	11.37
			08-01-91	49.39
			10-08-91	11.95
21N45E26DAAD01	95	Paleocene Tongue River Member of Fort Union Formation	10-08-91	48.01
21N47E12CCCC01	213	Paleocene Tongue River Member of Fort Union Formation	10-09-91	65.75
21N51E10ABCD01	131	Paleocene Tongue River Member of Fort Union Formation	10-09-91	14.95
21N53E08ADCC01	70	Paleocene Tongue River Member of Fort Union Formation	10-09-91	26.73
21N56E28ADDC01	220	Paleocene Tongue River Member of Fort Union Formation	10-10-91	87.96
20N22W30DADD01	155	Quaternary alluvium	01-10-91	3.52
			04-10-91	3.65
			08-08-91	3.13
			10-08-91	2.96
20N02E01AABA01	605	Upper Mississippian Madison Group	09-19-91	23.22
20N03E32ADDC01	215	Lower Cretaceous Flood Shale Member of Blackleaf Formation	09-19-91	51.95
20N47E36ADDD01	220	Paleocene Tongue River Member of Fort Union Formation	10-09-91	46.68
20N52E17BBBB01	180	Paleocene Tongue River Member of Fort Union Formation	10-09-91	76.32
20N53E04DAAA01	280	Paleocene Tongue River Member of Fort Union Formation	10-09-91	141.98
20N53E14BBCC01	206	Paleocene Tongue River Member of Fort Union Formation	10-09-91	89.31
20N53E20CCCC01	259	Paleocene Tongue River Member of Fort Union Formation	10-09-91	141.19
20N54E01DCDD01	220	Paleocene Tongue River Member of Fort Union Formation	10-10-91	40.87
20N55E32AAAA01	200	Paleocene Tongue River Member of Fort Union Formation	10-20-91	155.99
20N55E32AAAA02	112	Paleocene Tongue River Member of Fort Union Formation	10-20-91	D
20N56E08DDCD01	223	Paleocene Tongue River Member of Fort Union Formation	10-10-91	138.35

Table 7.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Date of measurement	Water level
20N56E08DDCD02	180	Paleocene Tongue River Member of Fort Union Formation	10-20-91	109.46
19N20W35AAA 01	54	Pleistocene glaciolacustrine deposits	01-28-91	38.79
			04-02-91	39.70
			07-30-91	43.41
			10-08-91	42.30
19N03E01AABA01	65	Lower Cretaceous Kootenai Formation	09-19-91	43.73
19N06E23BADA01	75	Upper Jurassic Swift Formation of Ellis Group	09-19-91	43.76
19N06E26ACAD01	435	Upper Mississippian Madison Group	09-19-91	210.15
19N53E24CCDC01	220	Paleocene Tongue River Member of Fort Union Formation	10-10-91	143.48
18N20W14DBDC01	30	Pleistocene glacial till	01-09-91	13.63
			04-02-91	14.90
			08-01-91	14.15
			10-08-91	12.35
18N30E19BBBA01	1,003	Upper Cretaceous Judith River Formation of Montana Group	09-24-91	+47.62
18N38E20BBAB01	518	Upper Cretaceous Hell Creek Formation	10-08-91	60.19
18N40E01DBBB01	159	Paleocene Fort Union Formation	10-08-91	33.42
18N44E13AAAC01	278	Paleocene Tongue River Member of Fort Union Formation	10-08-91	96.23
18N50E16CBBB01	161	Paleocene Lebo Shale Member of Fort Union Formation	10-08-91	47.24
17N47E16DDDD01	242	Paleocene Tongue River Member of Fort Union Formation	10-08-91	149.30
16N19W08ACBD01	307	Pleistocene alluvium	11-27-90	162.83
			01-04-91	169.92
			03-07-91	174.79
			04-18-91	178.22
			07-11-91	142.58
			10-15-91	157.32
16N44E25BBAA01	263	Paleocene Tongue River Member of Fort Union Formation	10-08-91	88.34
16N44E25BBAB01	1,460	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-08-91	157.58
16N44E25BBAC01	103	Paleocene Tongue River Member of Fort Union Formation	10-08-91	31.54
16N45E29CDDB01	172	Paleocene Tongue River Member of Fort Union Formation	10-08-91	96.69
16N50E06DDCD01	380	Paleocene Tongue River Member of Fort Union Formation	10-08-91	291.04
16N51E36DCCC01	202	Paleocene Tullock Member of Fort Union Formation	10-08-91	152.39
15N12W36BCDD01	206	Pleistocene glacial drift	04-26-91	95.79
			06-24-91	95.92
			09-30-91	96.25
15N19E09BABC01	90	Lower Cretaceous Third Cat Creek sandstone of Kootenai Formation	09-24-91	35.18
15N46E04BBBC01	160	Paleocene Tongue River Member of Fort Union Formation	10-08-91	109.79
15N53E12ABAB01	317	Paleocene Lebo Shale Member of Fort Union Formation	10-08-91	132.84
15N53E12ABAB02	193	Paleocene Tongue River Member of Fort Union Formation	10-08-91	79.89
15N53E12ABAB03	172	Paleocene Tongue River Member of Fort Union Formation	10-08-91	71.42
15N55E12ABDC01	675	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-08-91	57.74
14N49E21AAAA01	440	Paleocene Tullock Member of Fort Union Formation	10-08-91	120.30
13N19W29DADD01	84	Quaternary alluvium	07-12-91	44.42
			09-17-91	50.89
13N51E31BCDD01	565	Upper Cretaceous Hell Creek Formation	10-08-91	.85
13N51E31BCDD02	340	Paleocene Tullock Member of Fort Union Formation	10-08-91	107.06
13N51E31BDCB01	860	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-08-91	31.62
13N53E18ABAA01	62	Paleocene Tongue River Member of Fort Union Formation	10-08-91	46.99

Table 7.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Date of measurement	Water level
13N56E30CCBC01	100	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-12-91	39.02
12N55E20DCCD01	1,185	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-11-91	80.74
12N55E25CDCC01	1,275	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-12-91	43.58
12N56E23CCDA01	1,449	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-12-91	237.40
12N56E23DCCA01	1,195	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-12-91	266.06
12N56E24CABD01	145	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-12-91	133.96
12N56E25CBDB01	1,480	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-12-91	298.36
12N56E34DAAC01	1,467	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-11-91	269.68
11N03W30DADA01	44	Quaternary alluvium	11-08-90	2.63
			12-13-90	3.39
			02-06-91	4.26
			03-14-91	4.69
			04-13-91	4.96
			05-17-91	4.97
			05-30-91	4.80
			06-13-91	4.34
			08-21-91	1.24
			09-20-91	.69
11N36E28BACD01	2,745	Lower Cretaceous Third Cat Creek sandstone of Kootenai Formation	10-07-91	+112.88
11N57E21CDBB01	1,230	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-11-91	59.11
10N07W30BBC 01	70	Tertiary System	04-04-91	34.95
			09-18-91	32.04
10N04W02CBAA01	110	Cretaceous bedrock	12-06-90	34.56
			01-11-91	34.93
			02-07-91	35.26
			03-15-91	35.63
			04-19-91	35.86
			05-16-91	36.73
			06-26-91	36.45
			07-30-91	37.13
			08-30-91	36.57
			09-24-91	36.25
			10-28-91	36.57
10N04W10DDDA01	23	Quaternary alluvium	11-08-90	8.12
			12-10-90	8.09
			02-06-91	7.76
			03-14-91	7.53
			04-13-91	7.32
			05-17-91	7.18
			05-30-91	3.93
			06-13-91	3.11
			08-21-91	7.47
			09-20-91	8.47
10N03W03BACB01	65	Quaternary alluvium	11-08-90	2.98
			12-12-90	3.08
			02-06-91	3.44
			03-14-91	3.32
			04-13-91	3.13
			05-17-91	2.56
			05-30-91	2.24
			06-13-91	2.12
			09-20-91	2.44
10N03W05CCDD01	23	Quaternary alluvium	11-08-90	10.02
			12-12-90	10.06
			02-06-91	11.74
			03-14-91	10.32
			04-13-91	10.72
			05-17-91	10.55
			05-30-91	9.31
			06-13-91	9.27
			08-21-91	10.55
			09-20-91	12.61

Table 7.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Date of measurement	Water level
10N03W09ACCC01	64	Quaternary alluvium	11-08-90	3.53
			12-12-90	2.57
			02-06-91	2.82
			05-17-91	2.10
			05-30-91	1.54
			06-13-91	1.86
			09-20-91	2.37
10N03W11DDCC01	40	Quaternary alluvium	11-07-90	18.39
			12-10-90	21.23
			02-06-91	25.03
			03-14-91	25.37
			04-13-91	27.17
			05-17-91	26.12
			05-30-91	24.77
			06-13-91	24.12
			08-21-91	17.62
			09-20-91	17.07
10N03W15DDCA01	326	Quaternary alluvium	11-01-90	7.72
			12-01-90	9.43
			01-01-91	10.43
			02-01-91	9.93
			03-01-91	10.13
			04-01-91	11.61
			05-01-91	12.70
10N03W17ACAD01	28	Quaternary alluvium	11-08-90	20.00
			12-12-90	D
			05-17-91	D
			05-30-91	D
			06-13-91	D
			09-20-91	17.37
10N03W22AAAA01	23	Quaternary alluvium	11-07-90	12.89
			12-10-90	14.88
			02-06-91	10.65
			03-14-91	13.23
			04-13-91	15.65
			05-17-91	17.87
			05-30-91	14.48
			06-13-91	13.08
			08-21-91	13.42
			09-20-91	12.41
10N02W18DDCD01	70	Tertiary sediments	12-10-90	50.36
			01-14-91	52.57
			02-06-91	53.90
			03-14-91	55.70
			04-13-91	57.17
			05-17-91	58.35
			05-30-91	58.05
			06-13-91	56.35
			08-21-91	46.35
			09-20-91	45.25
10N36E06CACA01	195	Upper Cretaceous Judith River Formation of Montana Group	10-07-91	93.25
10N45E28BBBA01	951	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-07-91	224.83
10N45E28BBBA02	362	Paleocene Tullock Member of Fort Union Formation	10-08-91	111.12
10N45E28BBBB01	762	Upper Cretaceous Hell Creek Formation	10-08-91	224.40
10N55E25CDCD01	1,150	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-12-91	74.68
10N58E19ABBA01	166	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-11-91	123.49
08N20W19BAAD03	52	Tertiary System	04-25-91	16.12
			09-17-91	14.34
08N19W07CBBD01	117	Tertiary sediments	09-17-91	99.30

Table 7.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Date of measurement	Water level
08N09W27BDDD01	94	Tertiary sediments	11-21-90	24.96
			01-04-91	25.16
			02-13-91	25.27
			04-01-91	25.17
			05-14-91	24.95
			07-09-91	23.11
			08-16-91	24.81
			09-12-91	25.03
			10-03-91	25.27
08N31E36DDDD01	1,175	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-07-91	215.47
08N31E36DDDD02	850	Upper Cretaceous Hell Creek Formation	10-07-91	208.88
08N31E36DDDD03	486	Upper Cretaceous Hell Creek Formation	10-07-91	127.90
08N50E18BDBC01	280	Paleocene Tullock Member of Fort Union Formation	10-13-91	38.00
07N09W08ADD 01	13	Pleistocene alluvium	09-18-91	9.59
07N47E24AAD 01	50	Paleocene Fort Union Formation	10-07-91	33.51
07N50E05CCBD01	700	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-13-91	397.58
07N57E24BBCB01	362	Paleocene Tongue River Member of Fort Union Formation	10-12-91	216.76
06N20W19CCCC02	40	Quaternary alluvium	11-27-90	12.77
			01-14-91	15.02
			02-25-91	16.34
			04-02-91	16.95
			05-28-91	10.87
			06-25-91	6.53
			08-07-91	6.51
			10-01-91	7.33
06N09W21CDBC01	150	Tertiary sediments	09-12-91	92.27
			09-18-91	92.54
06N44E36CACD01	902	Upper Cretaceous Fox Hills Sandstone	10-07-91	128.58
06N44E36CACD02	609	Upper Cretaceous Hell Creek Formation	10-07-91	128.69
06N44E36CACD03	316	Upper Cretaceous Hell Creek Formation	10-07-91	140.99
05N10W10CCBC01	115	Tertiary sediments	09-13-91	73.60
05N01E27CCBB01	215	Tertiary sediments	04-30-91	92.73
			09-26-91	89.94
05N25E16CCCC01	1,350	Upper Cretaceous Fox Hills Sandstone	10-07-91	534.00
05N25E16CCCC02	427	Upper Cretaceous Hell Creek Formation	10-07-91	164.47
05N55E23AADB01	1,080	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-12-91	36.81
05N58E14BBBB01	360	Paleocene Tongue River Member of Fort Union Formation	10-12-91	95.40
04N10W10DC 02	20	Pleistocene alluvium	01-04-91	5.10
			02-13-91	5.38
			04-01-91	5.26
			05-14-91	4.56
			07-09-91	3.95
			08-16-91	4.79
			10-03-91	4.69
04N01E02BBCC01	191	Tertiary sediments	04-30-91	38.98
04N01E10BBCB01	447	Tertiary sediments	04-30-91	117.35
			09-26-91	119.36
04N01E13BCBC01	209	Tertiary sediments	05-01-91	40.17
			09-26-91	40.00
04N01E15BCBB01	348	Tertiary sediments	04-30-91	143.34
			09-26-91	146.34
04N40E31DCAA01	199	Upper Cretaceous Hell Creek Formation	09-09-91	50.64

Table 7.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Date of measurement	Water level
02N27E35DBAB01	5,070	Upper Mississippian Mission Canyon Limestone	11-19-90	+999.7
02N43E24CCBC01	60	Quaternary alluvium	09-09-91	17.04
02N43E24CDDA01	21	Quaternary alluvium	09-09-91	11.22
01N04E25DCDD01	101	Quaternary alluvium	10-09-91	12.98
01N41E21DBDB01	125	Paleocene Tongue River Member of Fort Union Formation	09-09-91	73.48
01N41E22CCAD01	72	Holocene spoil banks	09-09-91	17.44
01N41E26BCAB01	195	Paleocene Tongue River Member of Fort Union Formation	09-09-91	23.81
01N41E36DCBA01	150	Paleocene Tongue River Member of Fort Union Formation	09-09-91	135.97
01N54E18DDAC01	8,422	Upper Mississippian Mission Canyon Limestone	10-13-91	+777.20
01N54E18DDBA01	400	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-13-91	44.53
01S25E17AAAA01	42	Quaternary alluvium	05-09-91	5.96
01S33E19DAA 01	25	Pleistocene terrace deposits	09-11-91	18.92
01S33E24BCBC02	26	Quaternary alluvium	09-11-91	10.10
02S23E16DADD01	63	Quaternary alluvium	05-09-91	27.47
02S41E19DABA01	43	Quaternary alluvium	09-09-91	7.82
02S44E35DAAB01	84	Quaternary alluvium	09-09-91	31.97
02S49E22DCCA04	118	Paleocene Tongue River Member of Fort Union Formation	10-13-91	78.08
03S33E09DCC 01	74	Pleistocene terrace deposits	01-07-91	42.02
			02-06-91	41.68
			05-22-91	41.88
			06-27-91	40.75
			08-06-91	40.21
			09-06-91	39.99
03S33E16BBBB01	19	Quaternary alluvium	01-07-91	2.61
			02-06-91	3.00
			04-19-91	3.08
			05-22-91	2.92
			06-27-91	2.59
			08-06-91	2.66
			09-06-91	3.03
03S33E16BBBB02	46	Quaternary alluvium	01-07-91	31.25
			02-06-91	31.29
			04-19-91	31.24
			05-22-91	31.42
			06-27-91	31.43
			08-06-91	31.38
			09-06-91	31.36
03S35E18DABD01	400	Upper Cretaceous Parkman Sandstone of Montana Group	09-11-91	137.75
03S44E09ADD 01	84	Quaternary alluvium	09-09-91	39.37
03S45E05DBAA01	148	Paleocene Tongue River Member of Fort Union Formation	09-09-91	48.95
04S06W16AAAA02	57	Tertiary sediments	06-26-91	28.92
			09-17-91	25.53
			09-19-91	25.34
04S06W35BBBB01	170	Tertiary sediments	06-26-91	+12.5
			09-17-91	+15.82
04S32E35AAAA01	39	Quaternary alluvium	01-07-91	14.66
			02-06-91	16.28
			04-19-91	17.23
			05-22-91	15.39
			06-27-91	6.76
			08-06-91	6.68
			09-06-91	6.50

Table 7.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Date of measurement	Water level
04S45E04BDDB01	68	Quaternary alluvium	12-13-90	9.42
			03-08-91	8.92
			05-31-91	8.68
			09-09-91	10.76
			09-12-91	10.77
04S45E15BCDD01	60	Quaternary alluvium	09-09-91	13.74
04S45E28BDDD01	269	Paleocene Tongue River Member of Fort Union Formation	09-09-91	127.50
05S06W10BCCA01	200	Tertiary sediments	06-25-91	144.95
			09-17-91	136.20
05S45E04ABCC01	223	Paleocene Tongue River Member of Fort Union Formation	09-09-91	143.88
05S45E16ADDD01	320	Paleocene Tongue River Member of Fort Union Formation	09-09-91	145.63
05S45E23ABCA02	44	Quaternary alluvium	09-09-91	13.64
05S45E23BBAA01	169	Paleocene Tongue River Member of Fort Union Formation	09-09-91	36.99
05S45E23BBAA02	106	Paleocene Tongue River Member of Fort Union Formation	09-09-91	46.48
05S45E23BBAA03	65	Paleocene Tongue River Member of Fort Union Formation	09-09-91	47.36
06S08W26CCCA02	51	Tertiary sediments	09-17-91	27.07
06S07W06AAA 01	107	Tertiary sediments	09-17-91	40.55
06S41E08CCAC01	128	Paleocene Tongue River Member of Fort Union Formation	09-11-91	43.83
06S41E17ADDD01	19	Quaternary alluvium	09-11-91	16.70
06S41E25CDAC01	144	Paleocene Tongue River Member of Fort Union Formation	09-11-91	67.81
06S41E26BBDD01	23	Quaternary alluvium	09-11-91	19.58
06S41E29ADCA01	393	Paleocene Tongue River Member of Fort Union Formation	09-11-91	264.80
06S41E29ADCA02	322	Paleocene Tongue River Member of Fort Union Formation	09-11-91	236.82
06S41E34CDAA01	364	Paleocene Tongue River Member of Fort Union Formation	09-11-91	182.97
06S41E34CDAA02	155	Paleocene Tongue River Member of Fort Union Formation	09-11-91	93.53
06S42E31DBBA01	68	Quaternary alluvium	09-11-91	32.17
06S43E19DDBA02	67	Quaternary alluvium	11-02-90	8.59
			11-07-90	8.59
			02-13-91	9.00
			05-08-91	8.13
			06-26-91	8.32
			08-14-91	8.84
07S08W03BDC 02	40	Quaternary alluvium	09-17-91	14.75
07S08W17DDC 02	50	Tertiary sediments	09-17-91	27.17
07S44E34BAAD01	86	Paleocene Tongue River Member of Fort Union Formation	09-10-91	55.14
07S44E35DCCA01	213	Paleocene Tongue River Member of Fort Union Formation	09-10-91	150.36
07S44E35DCCA02	132	Paleocene Tongue River Member of Fort Union Formation	09-10-91	103.95
07S45E32CADD01	207	Paleocene Tongue River Member of Fort Union Formation	09-11-91	156.60
07S45E32CADD02	42	Paleocene Tongue River Member of Fort Union Formation	09-11-91	29.28
07S45E32DCBA02	18	Quaternary alluvium	09-11-91	8.46
07S49E13ABBB01	--	Upper Cretaceous Fox Hills-Hell Creek aquifer	10-13-91	+9.38
07S49E28DAAC01	452	Paleocene Tullock Member of Fort Union Formation	10-13-91	89.94
07.5S40E32DBDA01	120	Paleocene Tongue River Member of Fort Union Formation	09-11-91	72.05
08S09W01CCCC01	47	Tertiary sediments	07-11-91	24.83

Table 7.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Date of measurement	Water level
08S40E26ACBC01	172	Paleocene Tongue River Member of Fort Union Formation	09-11-91	65.74
08S42E06ADBA01	398	Paleocene Tongue River Member of Fort Union Formation	09-10-91	1.65
08S43E20DABA01	222	Paleocene Tongue River Member of Fort Union Formation	09-10-91	88.93
08S43E21BBDD03	13	Quaternary alluvium	09-10-91	6.22
08S43E21BDBB01	223	Paleocene Tongue River Member of Fort Union Formation	09-10-91	56.46
08S43E21BDBB02	146	Paleocene Tongue River Member of Fort Union Formation	09-10-91	47.58
08S43E23CACA03	29	Quaternary alluvium	09-10-91	14.94
08S43E23CDAA01	78	Paleocene Tongue River Member of Fort Union Formation	09-10-91	50.18
08S43E23CDAA02	329	Paleocene Tongue River Member of Fort Union Formation	09-10-91	167.75
08S43E31BBDA01	131	Paleocene Tongue River Member of Fort Union Formation	09-10-91	128.73
08S43E31BBDA02	257	Paleocene Tongue River Member of Fort Union Formation	09-10-91	234.05
08S44E02BACD01	15	Quaternary alluvium	09-10-91	10.00
08S44E03CBBD01	201	Paleocene Tongue River Member of Fort Union Formation	09-10-91	132.38
08S44E03CBBD02	129	Paleocene Tongue River Member of Fort Union Formation	09-10-91	74.44
08S44E09DABB01	28	Quaternary alluvium	09-10-91	23.44
08S44E12ACDC01	351	Paleocene Tongue River Member of Fort Union Formation	09-10-91	193.60
08S44E12ACDC02	252	Paleocene Tongue River Member of Fort Union Formation	09-10-91	126.57
08S44E12ADBC02	14	Quaternary alluvium	09-10-91	9.98
08S44E14ABAB01	337	Paleocene Tongue River Member of Fort Union Formation	09-10-91	218.03
08S44E14ABAB02	250	Paleocene Tongue River Member of Fort Union Formation	09-10-91	174.54
08S44E14ABAB03	161	Paleocene Tongue River Member of Fort Union Formation	09-10-91	110.36
08S44E19CBBB01	190	Paleocene Tongue River Member of Fort Union Formation	09-10-91	157.78
08S44E19CBBB02	130	Paleocene Tongue River Member of Fort Union Formation	09-10-91	50.41
08S44E19CBCB02	36	Quaternary alluvium	09-10-91	27.89
08S45E16DBCB01	188	Paleocene Tongue River Member of Fort Union Formation	09-11-91	85.31
08S45E16DBCB02	66	Paleocene Tongue River Member of Fort Union Formation	09-11-91	35.73
08S45E34BCBC01	253	Paleocene Tongue River Member of Fort Union Formation	09-11-91	126.28
08S46E17CBCD01	18	Quaternary alluvium	09-09-91	5.30
08S46E18DDAC01	18	Quaternary alluvium	09-09-91	3.73
08S46E27CDAB01	233	Paleocene Tongue River Member of Fort Union Formation	09-09-91	128.30
08S46E27CDAB02	138	Paleocene Tongue River Member of Fort Union Formation	09-09-91	91.48
08S46E32DDAC01	30	Quaternary alluvium	09-09-91	18.46
09S40E20BDAC01	380	Paleocene Tongue River Member of Fort Union Formation	09-11-91	257.48
09S42E01BCAD02	34	Quaternary alluvium	09-10-91	25.16
09S42E11BDAA01	222	Paleocene Tongue River Member of Fort Union Formation	09-10-91	144.48
09S43E04ABDD02	26	Quaternary alluvium	09-10-91	13.63
09S43E07CADB01	165	Paleocene Tongue River Member of Fort Union Formation	09-10-91	61.07
09S43E07CADB02	218	Paleocene Tongue River Member of Fort Union Formation	09-10-91	86.63
09S43E12ADBB02	40	Quaternary alluvium	09-10-91	18.72

Table 7.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Date of measurement	Water level
09S43E21BADA01	229	Paleocene Tongue River Member of Fort Union Formation	09-10-91	94.65
09S43E21BADA02	135	Paleocene Tongue River Member of Fort Union Formation	09-10-91	49.96
09S43E22ACCA01	129	Paleocene Tongue River Member of Fort Union Formation	09-10-91	28.38
09S44E07BBCC03	92	Paleocene Tongue River Member of Fort Union Formation	09-10-91	44.99
09S45E03DABB01	144	Paleocene Tongue River Member of Fort Union Formation	09-11-91	24.22
09S45E03DABB04	65	Paleocene Tongue River Member of Fort Union Formation	09-11-91	29.18
09S45E03DABB05	71	Paleocene Tongue River Member of Fort Union Formation	09-11-91	27.45
09S45E11ADDB01	307	Paleocene Tongue River Member of Fort Union Formation	09-11-91	242.63
09S45E11CCAA01	218	Paleocene Tongue River Member of Fort Union Formation	09-11-91	63.52
09S46E08BACB01	240	Paleocene Tongue River Member of Fort Union Formation	09-09-91	170.61
09S46E09ADCD01	176	Paleocene Tongue River Member of Fort Union Formation	09-09-91	110.57
09S46E09DABA01	110	Paleocene Tongue River Member of Fort Union Formation	09-09-91	95.32
09S46E09DABA02	209	Paleocene Tongue River Member of Fort Union Formation	09-09-91	155.26
09S46E09DBAB02	30	Quaternary alluvium	09-09-91	19.10
09S46E11BACC02	18	Quaternary alluvium	09-09-91	12.46
09S46E11BBAB01	262	Paleocene Tongue River Member of Fort Union Formation	09-09-91	151.40
09S46E11BBAB02	208	Paleocene Tongue River Member of Fort Union Formation	09-09-91	141.88

SPECIAL NETWORKS AND PROGRAMS

Hydrologic Bench-Mark Network is a network of approximately 60 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

National Stream Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in natural or regional water-quality planning and management. The 500 or so sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water-quality assessment and hydrologic research. Stations in this network in this volume are listed below:

05020500	St. Mary River at international boundary
06054500	Missouri River at Toston, Mont.
06089000	Sun River near Vaughn, Mont.
06115200	Missouri River near Landusky, Mont.
06130500	Musselshell River at Mosby, Mont.
06174500	Milk River at Nashua, Mont.
06181000	Poplar River near Poplar, Mont.
06192500	Yellowstone River near Livingston, Mont.
06214500	Yellowstone River at Billings, Mont.
06294700	Bighorn River at Bighorn, Mont.
06308500	Tongue River at Miles City, Mont.
06326500	Powder River near Locate, Mont.
06329500	Yellowstone River near Sidney, Mont.
12353000	Clark Fork below Missoula, Mont.
12355000	Flathead River at Flathead, British Columbia
12363000	Flathead River at Columbia Falls, Mont.

The National Trends Network (NTN) is a network of stations for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the compostion of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoirng network of the National Atmospheric Deposition Program (NADP).

Radiochemical Program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

EXPLANATION OF THE RECORDS

The surface-water and ground-water records published in this report are for water year 1991 that began October 1, 1990, and ended September 30, 1991. 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 7 through 9. 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.

Station Identification Numbers

Each data station, whether streamsite or well, in this report is assigned a unique identification number. This number applies specifically to a given station and to no other. The number usually is assigned when a station is first established and is retained for that station indefinitely. The systems used by the U.S. Geological Survey to assign identification numbers for surface-water stations and for ground-water well sites differ, but both are based on geographic location. Generally, the "downstream-order" system is used for regular surface-water stations, the "latitude-longitude" system is used for surface-water stations where only miscellaneous measurements are made, and the rectangular-grid system is used for wells.

Downstream-Order System

Since October 1, 1950, the order of listing hydrologic-station records in Survey reports is in a downstream direction along the main stream. All stations on a tributary entering upstream from a mainstream station are listed before that station. A station on a tributary that enters between two mainstream stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary with respect to the stream to which it is immediately tributary is indicated by an indention in the "List of Stations" in the front of this report. Each indention represents one rank. This downstream order and system of indention shows which stations are on tributaries between any two stations and the rank of the tributary on which each station is situated.

The station-identification number is assigned according to downstream order. In assigning station numbers, no distinction is made between partial-record stations and other stations; therefore, the station number for apartial-record station indicates downstream-order position in a list made up of both types of stations. Gaps are left in the series of numbers to allow for new stations that may be established; hence, the numbers are not consecutive. The complete eight-digit number for each station, such as 06090300, which appears just to the left of the station name, includes the two-digit Part number "06" plus the six-digit downstream-order number "090300." The Part number designates the major river basin; for example, Part "06" is the Missouri River basin. All records for a drainage basin encompassing more than one State can be arranged in downstream order by assembling pages from the various State reports by station number to include all records in the basin.

Latitude-Longitude System

The identification numbers for miscellaneous surface-water sites are assigned according to the grid system of latitude and longitude. The number consists of 15 digits. The first six digits denote the degrees, minutes, and seconds of latitude, the next seven digits denote degrees, minutes, and seconds of longitude, and the last two digits (assigned sequentially) identify the sites within a 1-second grid. This site-identification number, once assigned, is a pure number and has no locational significance. In the rare instance where the initial determination of latitude and longitude are found to be in error, the station will retain its initial identification number; however, its true latitude and longitude will be listed in the LOCATION paragraph of the station description. (See figure below.)

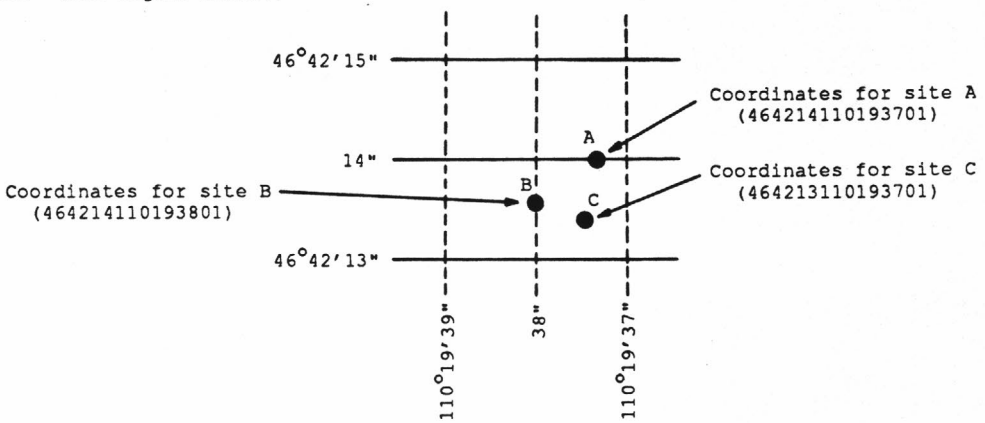

Figure 6.--System for numbering miscellaneous sites (latitude and longitude).

Rectangular-Grid System

In this report, wells are numbered according to geographic position within the rectangular-grid system of land subdivision. The location (local) number consists of as many as 14 characters. The first three characters specify the township and its position north (N) or south (S) of the Montana Base Line. The next three characters specify the range and its position west (W) or east (E) of the Montana Principal Meridian. The next two characters are the section number. The next one to four characters designate the quarter section (160-acre tract), quarter-quarter section (40-acre tract), quarter-quarter-quarter section (10-acre tract), and quarter-quarter-quarter-quarter section (2.5-acre tract), respectively, in which the well is located. The subdivisions of the section are designated A, B, C, and D in a counterclockwise direction, beginning in the northeast quadrant. The last two characters form a sequence number based on the order of inventory. For example, well 30N33W05ABAB01 is the first well inventoried in the NW1/4NE1/4NW1/4NE1/4 sec.5, T.30 N., R.33 W.

Records of Stage and Water Discharge

Records of stage and water discharge may be complete or partial. Complete records of discharge are those obtained using a continuous stage-recording device through which either instantaneous or mean daily discharges may be computed for any time, or any period of time, during the period of record. Complete records of lake or reservoir content, similarly, are those for which stage or content may be computed or estimated with reasonable accuracy for any time, or period of time. They may be obtained using a continuous stage-recording device, but need not be. Because daily mean discharges and end-of-day contents commonly are published for such stations, they are referred to as "daily stations."

Data Collection and Computation

The data obtained at a complete-record gaging station on a stream or canal consist of a continuous record of stage, individual measurements of discharge throughout a range of stages, and notations regarding factors that may affect the relationships between stage and discharge. These data, together with supplemental information, such as weather records, are used to compute daily discharges. The data obtained at a complete-record gaging station on a lake or reservoir consist of a record of stage and of notations regarding factors that may affect the relationship between stage and lake content. These data are used with stage-area and stage-capacity curves or tables to compute water-surface areas and lake storage.

Continuous records of stage are obtained with analog recorders that trace continuous graphs of stage or with digital recorders that punch stage values on paper tapes at selected time intervals. Measurements of discharge are made with current meters using methods adopted by the Geological Survey as a result of experience accumulated since 1880. These methods are described in standard textbooks, in Water-Supply Paper 2175, and in U.S. Geological Survey Techniques of Water-Resources Investigations, Book 3, Chapter A6.

In computing discharge records, results of individual measurements are plotted against the corresponding stages, and stage-discharge relation curves are then constructed. From these curves, rating tables indicating the approximate discharge for any stage within the range of the measurements are prepared. If it is necessary to define extremes of discharge outside the range of the current-meter measurements, the curves are extended using: (1) logarithmic plotting; (2) velocity-area studies; (3) results of indirect measurements of peak discharge, such as slope-area or contracted-opening measurements, and computations of flow over dams or weirs; or (4) step-backwater techniques.

Daily mean discharges are computed by applying the daily mean stages (gage heights) to the stage-discharge curves or tables. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is determined by the shifting-control method, in which correction factors based on the individual discharge measurements and notes of the personnel making the measurements are applied to the gage heights before the discharges are determined from the curves or tables. This shifting-control method also is used if the stage-discharge relation is changed temporarily because of aquatic growth or debris on the control. For some stations, formation of ice in the winter may so obscure the stage-

discharge relations that daily mean discharges must be estimated from other information such as temperature and precipitation records, notes of observations, and records for other stations in the same or nearby basins for comparable periods.

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

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

In computing records of lake or reservoir contents, it is necessary to have available from surveys, curves or tables defining the relationship of stage and content. The application of stage to the stage-content curves or tables gives the contents from which daily, monthly, or yearly changes then are determined. If the stage-content relationship changes because of deposition of sediment in a lake or reservoir, periodic resurveys may be necessary to redefine the relationship. Even when this is done, the contents computed may become increasingly in error as the lapsed time since the last survey increases. Discharges over lake or reservoir spillways are computed from stage-discharge relationships much as other stream discharges are computed.

For some gaging stations, there are periods when no gage-height record is obtained, or the recorded gage height is so faulty that it cannot be used to compute daily discharge or contents. This happens when the recorder stops or otherwise fails to operate properly, intakes are plugged, the float is frozen in the well, or for various other reasons. For such periods, the daily discharges are estimated from the recorded range in stage, previous or following record, discharge measurements, weather records, and comparison with other station records from the same or nearby basins. Likewise, daily contents may be estimated from operator's logs, previous or following record, inflow-outflow studies, and other information. Information explaining how estimated daily-discharge values are identified in station records is included in the next two sections, "Data Presentation" (REMARKS paragraph) and "Identifying Estimated Daily Discharge."

Data Presentation

The records published for each gaging station consist of two parts, the manuscript or station description and the data table for the current water year. The manuscript provides, under various headings, descriptive information, such as station location; period of record; average discharge; historical extremes; 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 to follow clarify information presented under the various headings of the station description.

LOCATION.--Information on locations is obtained from the most accurate maps available. The location of the gage 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 many stations, were determined by methods given in "River Mileage Measurement," Bulletin 14, Revision of October 1968, prepared by the Water Resources Council or were provided by the U.S. Army Corps of Engineers, or Montana Department of Natural Resources and Conservation, Water Resources Division.

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 indicates the period for which there are published records 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 records from it can reasonably be considered equivalent with records from the present station.

REVISED RECORDS.--Previously, if a significant error in published records was discovered, a revision was published in the first report following discovery of the error. This paragraph then served to document for users all the reports in which revisions had been published for the station and the water years to which the revisions applied. However, beginning with the 1983 water year, revisions will no longer be published but appropriate changes will be made in WATSTORE files. All previous revisions are, of course, in WATSTORE, and users are encouraged to obtain all required data from the WATSTORE computer files (see the section, "Access to WATSTORE Data").

Under "Revised Records," a year listed without qualification indicates that daily, monthly, or annual discharges were revised. The qualifications (M), (m), and (P) mean only that the instantaneous maximum, the instantaneous or daily minimum, and flood peaks above the base, respectively, have been revised. A "W" for "WATSTORE" will be shown, replacing the name of the data report in which the revised values would previously have been published, for all revisions made after 1982. For example, the notation for indicating that the 1979 water-year daily values for a particular station in Montana have been revised during the 1983 water year would no longer be "WDR MT-83-1: 1979," but "W 1983: 1979." If the drainage area has been revised, the report in which the most recently revised figure was first published is given.

GAGE.--The type of gage in current use, the datum of the current gage referred to National Geodetic Vertical Datum of 1929 (see glossary), and a condensed history of the types, locations, and datums of previous gages are given under this heading.

REMARKS.--All periods of estimated daily-discharge record will either be identified by date in this paragraph of the station description for water-discharge stations or flagged in the daily-discharge table. (See next section, "Identifying Estimated Daily Discharge.") If a remarks statement is used to identify estimated record, the paragraph will begin with this information presented as the first entry. The paragraph is also used to present information relative to the accuracy of the records, to special methods of computation, to conditions that affect natural flow at the station and, possibly, to other pertinent items. For reservoir stations, information is given on the dam forming the reservoir, the capacity, outlet works and spillway, and purpose and use of the reservoir.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

AVERAGE DISCHARGE.--The discharge value given is the arithmetic mean of the water-year mean discharges. It is computed only for stations having at least 5 water years of complete record, and only water years of complete record are included in the computation. It is not computed for stations where diversions, storage, or other water-use practices cause the value to be meaningless. If water developments significantly altering flow at a station are put into use after the station has been in operation for a period of years, a new average is computed as soon as 5 water years of record have accumulated following the development. The median of yearly mean discharges also is given under this heading for stations having 10 or more water years of record, if the median differs from the average given by more than 10 percent.

EXTREMES FOR PERIOD OF RECORD.--Extremes may include maximum and minimum stages and maximum and minimum discharges or content. Unless otherwise qualified, the maximum discharge or content is the instantaneous maximum corresponding to the highest stage that occurred. The highest stage may have been obtained from a graphic or digital recorder, a crest-stage gage, or by direct observation of a nonrecording gage. If the maximum stage did not occur on the same day as the maximum discharge or content, it is given separately. Similarly, the minimum is the instantaneous minimum discharge, unless otherwise qualified, and was determined and is reported in the same manner as the maximum.

EXTREMES OUTSIDE PERIOD OF RECORD.--Included here is information concerning 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 U.S. Geological Survey.

EXTREMES FOR CURRENT YEAR.--Extremes given here are similar to those for the period of record, except the peak discharge listing may include secondary peaks. For stations meeting certain criteria, all peak discharges and stages occurring during the water year and greater than a selected base discharge are presented under this heading. The peaks greater than the base discharge, excluding the highest one, are referred to as secondary peaks. Peak discharges are not published for canals, ditches, drains, or streams for which the peaks are subject to substantial control by man. The time of occurrence for peaks is expressed in 24-hour local standard time. For example, 12:30 a.m. is 0030, and 1:30 p.m. is 1330. The minimum for the current water year appears below the table of peak data.

REVISIONS.--If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

Although rare, occasionally the records of a discontinued gaging station may need revision. Because, for these stations, there would be no current or, possibly, future station manuscript published 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 offices whose addresses are given on the back of the title page of this report to determine if the published records were ever revised after the station was discontinued. Of course, if the data were obtained by computer retrieval, the data would be current and there would be no need to check because 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 skeleton stage-capacity table when daily contents are given.

The daily table for stream-gaging stations gives mean discharge for each day and is followed by monthly and yearly summaries. In the monthly summary below the daily table, the line headed "TOTAL" gives the sum of the daily figures. The line headed "MEAN" gives the average flow in cubic feet per second during the month. The lines headed "MAX" and "MIN" give the maximum and minimum daily discharges, respectively, for the month. Discharge for the month also is usually expressed in cubic feet per second per square mile (line headed "CFSM"), or in inches (line headed "IN."), or in acre-feet (line headed "AC-FT"). Figures for cubic feet per second per square mile and runoff in inches are omitted if there is extensive regulation or diversion, if the drainage area includes large noncontributing areas, or if the average annual rainfall over the drainage basin is usually less than 20 inches. In the yearly summary below the monthly summary, the figures shown are the appropriate discharges for the calendar and water years. At some stations monthly and (or) yearly observed discharges are adjusted for reservoir storage or diversion, or diversions or reservoir contents are given. These figures are identified by a symbol and corresponding footnote.

Identifying Estimated Daily Discharge

Estimated daily-discharge values published in the water-discharge tables of annual State data reports are identified either by flagging individual daily values with the letter symbol "e" and printing a table footnote, "e Estimated," or by listing the dates of the estimated record in the REMARKS paragraph of the station description.

Accuracy of the Records

The accuracy of streamflow records 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 measurements of stage, measurements of discharge, and interpretation of records.

The accuracy attributed to the records is indicated under "REMARKS." "Excellent" means that about 95 percent of the daily discharges are within 5 percent of their true values; "good," within 10 percent; and "fair," within 15 percent. Records that do not meet the criteria mentioned are rated "poor." Different accuracies may be attributed to different parts of a given record.

Daily mean discharges in this report are given to the nearest hundredth of a cubic foot per second for values less than 1 ft^3/s; to the nearest tenth between 1.0 and 10 ft^3/s; to whole numbers between 10 and 1,000 ft^3/s; and to 3 significant figures for more than 1,000 ft^3/s. The number of significant figures used is based solely on the magnitude of the discharge value. No rounding rules apply to discharges listed for partial-record stations and miscellaneous sites. Listed discharges are those actually computed.

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, figures of cubic feet per second per square mile and of runoff, in inches, are not published unless satisfactory adjustments can be made for diversions, for changes in contents of reservoirs, or for other changes incident to use and control. Evaporation from a reservoir is not included in the adjustments for changes in reservoir contents, unless it is so stated. Even at those stations where adjustments

are made, large errors in computed runoff may occur if adjustments or losses are large in comparison with the observed discharge.

Other Records Available

Information used in the preparation of the records in this publication, such as discharge-measurement notes, gage-height records, temperature measurements, and rating tables is on file in the Montana district office. Also, most of the daily mean discharges are in computer-readable form and have been analyzed statistically. Information on the availability of the unpublished information or on the results of statistical analyses of the published records may be obtained from the office whose address is given 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 the following table. 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 8.--*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	36,37	38				
1900	49	49	51,52				
1901	65,66,75	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	128,130	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				
1930	700	701	707				
1931	715	716	722	1950	1308	1309	1316
1932	730	731	737	Compilation			
1933	745	746	752				
1934	760	761	767	1960	1728	1729	1736
1935	785	786	792	Compilation			

Records of Surface-Water Quality

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because interpretation of records of surface-water quality nearly always requires corresponding discharge data. Records of surface-water quality in this report may 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 continuing-record station is a site where data are collected on a regularly scheduled basis. Frequency may be once 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 continuing or partial-record station where random 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 "continuing records", as used in this report, and "continuous recordings," which refers to a continuous graph or a series of discrete values punched at short intervals on a paper tape. 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 8.

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.

Onsite Measurements and Sample Collection

In obtaining water-quality data, a major concern needs to be assuring that the data obtained represent the in place quality of the water. To assure this, certain measurements, such as water temperature, pH, and dissolved oxygen, need to be made onsite when the samples are taken. To assure that measurements made in the laboratory also represent the in place water, carefully prescribed procedures need to 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 onsite measurements and for collecting, treating, and shipping samples are given in publications on "Techniques of Water-Resources Investigations," Book 1, Chap. D2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4. All of these references are listed under "PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS" which appears at the end of the introductory text. Also, detailed information on collecting, treating, and shipping samples may be obtained from the Geological Survey Montana district office.

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. Most streams must be sampled through several vertical sections to obtain a representative sample needed for an accurate mean concentration and for use in calculating load. Samples for analysis of the water-sediment mixture are collected using modified suspended-sediment samplers. All samples obtained for the National Stream Quality Accounting Network (see definitions) are obtained from at least several verticals.

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, minimum, and mean values for each constituent measured and are based upon hourly punches beginning at 0100 hours and ending at 2400 hours for the day of record. More detailed records (hourly values) may be obtained from the Geological Survey Montana district office whose address is given on the back of the title page of this report.

Water Temperature

Water temperatures are measured at most of the water-quality stations. In addition, water temperatures are taken at time of discharge measurements for water-discharge stations. For stations where water temperatures are taken manually once 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 and those taken manually once daily are on file in the Montana district office.

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 sections.

During periods of rapidly changing flow or rapidly changing concentration, samples may have been 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 were collected periodically at many verticals in the stream cross section. Although data collected periodically may represent conditions only at the time of observations, 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

Sediment samples, samples for indicator bacteria, and daily samples for specific conductance are analyzed locally. All other samples are analyzed in the Geological Survey laboratory in Arvada, Colorado, or the Montana Bureau of Mines and Geology laboratory in Butte, Montana. Methods used in analyzing sediment samples and computing

sediment records are given in TWRI, Book 5, Chap. C1. Methods used by the Geological Survey laboratory are given in TWRI, Book 1, Chap. D2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4.

In March 1989 the National Water-Quality Laboratory discovered a bias in the turbidimetric method for sulfate analysis, indicating that values below 75 mg/L have a median positive bias of 2 mg/L above the true value for the period between 1982 and 1989. Sulfate values in this report have not been corrected for this bias.

Traditionally, dissolved trace-element concentrations have been reported at the microgram per liter (µg/L) level. Recent evidence, mostly from large rivers, indicates that actual dissolved-phase concentrations for a number of trace elements are within the range of 10's to 100's of nanograms per liter (ng/L). Present data above the µg/L level should be viewed with caution. Such data may actually represent elevated environmental concentrations from natural or human causes; however, these data could reflect contamination introduced during sampling, processing, or analysis. To confidently produce dissolved trace-element data with insignificant contamination, the U.S. Geological Survey will begin using new trace-element protocols in the near future.

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, as appropriate, 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 under "Records of Stage and Water Discharge"; same comments apply.

DRAINAGE AREA.--See Data Presentation under "Records of Stage and Water Discharge"; same comments apply.

PERIOD OF RECORD.--This indicates the periods for which there are published water-quality records for the station. 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 Geological Survey by a cooperating organization are identified here.

EXTREMES.--Maximums and minimums are given only for parameters measured daily or more frequently. None are given for parameters measured weekly or less frequently, because the true maximums or minimums may not have been sampled. Extremes, when given, are provided for both the period of record and for the current water year.

REVISIONS.--If errors in published water-quality records are discovered after publication, appropriate updates are made to the Water-Quality File in the U.S. Geological Survey's computerized data system, WATSTORE, and subsequently by monthly transfer of update transactions to the U.S. Environmental Protection Agency's STORET system. Because the usual volume of updates makes it impractical to document individual changes in the State data-report series or elsewhere, potential users of U.S. Geological Survey water-quality data are encouraged to obtain all required data from the appropriate computer file to insure the most recent updates.

Table 9.--*Descriptor values for weather conditions*

0	Cloudless	70	Snow or sleet
1	Partly cloudy	71	Slight snow in flakes, intermittent
2	Cloudy	72	Slight snow in flakes, continuous
3	Overcast	73	Moderate snow in flakes, intermittent
10	Precipitation within sight	74	Moderate snow in flakes, continuous
13	Ugly, threatening sky	75	Heavy snow in flakes, intermittent
40	Fog	76	Heavy snow in flakes, continuous
50	Drizzle	77	Snow and fog
51	Slight drizzle, intermittent	78	Granular snow (frozen drizzle)
52	Slight drizzle, continuous	79	Ice crystals
53	Moderate drizzle, intermittent	80	Showers
54	Moderate drizzle, continuous	81	Slight or moderate rain shower (s)
55	Thick drizzle, intermittent	82	Heavy rain shower (s)
56	Thick drizzle, continuous	83	Slight or moderate snow shower (s)
57	Drizzle and fog	84	Heavy snow shower (s)
58	Slight or moderate drizzle and rain	85	Slight or moderate rain and snow shower (s)
59	Thick drizzle and rain	86	Heavy rain and snow shower (s)
60	Rain	87	Granular snow shower (s)
61	Slight rain, intermittent	88	Slight or moderate hail or rain and hail shower (s)
62	Slight rain, continuous	90	Thunderstorm
63	Moderate rain, intermittent	93	Slight thunderstorm with rain or snow
64	Moderate rain, continuous	94	Slight thunderstorm with hail
65	Heavy rain, intermittent	95	Moderate thunderstorm with rain or snow
66	Heavy rain, continuous	96	Moderate thunderstorm with hail
67	Rain and fog	97	Heavy thunderstorm with rain or snow
68	Slight or moderate mixed rain and snow	99	Heavy thunderstorm with hail
69	Heavy mixed rain and snow		

Remark Codes

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

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)

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 10.--*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	----	1959	1643	1645
1947	1102	----	1960	1743	1745
1948	1132	----	1961	1883	1885
1949	1162	1163	1962	1943	1945
1950	1187	1189	1963	1949	1951
1951	1198	1200	1964	1956	1959
1952	1251	1253	1965	1963	1966
1953	1291	1293	1966	1993	1996
1954	1351	1353	1967	2013	2016
1955	1401	1403	1968	2095	2100
1956	1451	1453	1969	2145	2150
1957	1521	1523	1970	2155	2160
1958	1572	1574			

Records of Ground-Water Levels

Only water-level data from a national network of observation wells are given in this report. These data are intended to provide a sampling and historical record of water-level changes in the Nation's most important aquifers. Locations of the observation wells in this network in Montana are shown in figure 9.

Data Collection and Computation

Measurements of water levels are made in many types of wells under varying conditions, but the methods of measurement are standardized to the extent possible. The equipment and measuring techniques used at each observation well ensure that measurements at each well are of consistent accuracy and reliability. Water-level records are obtained primarily from direct measurements with a steel tape.

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 to water of several hundred feet, the error of 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 to a tenth of a foot or a larger unit.

Publications

Publication of ground-water level data for the United States in water-supply papers was begun by the Geological Survey 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.

Table 11.--*Water-supply paper numbers and parts for ground-water stations for northwestern United States, 1940-1974*

Year	WSP No.	Year	WSP No.	Year	WSP No.
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	1927	1952	1225	1971-74	2161
1946	1075	1953	1269		

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.

ACCESS TO WATSTORE DATA

The U.S. Geological Survey is the principal Federal water-data agency and, as such, collects and disseminates about 70 percent of the water data currently being used by numerous State, local, private, and other Federal agencies to develop and manage our water resources. As part of the U.S. Geological Survey's program of releasing water data to the public, a large-scale computerized system has been developed for the storage and retrieval of water data collected through its activities. The National Water Data Storage and Retrieval System (WATSTORE) was established in 1972 to provide an effective and efficient means for the processing and maintenance of water data collected through the activities of the U.S. Geological Survey and to facilitate release of the data to the public. A variety of useful products, ranging from data tables to complex statistical analyses such as Log Pearson Type III, can be produced using WATSTORE. The system resides on the central computer facilities of the U.S. Geological Survey at its National Center in Reston, Virginia, and consists of related files and data bases.

* Station Header File - Contains descriptive information on over 440,000 sites throughout the United States and its territories where the U.S. Geological Survey collectes or has collected data.

* Daily Values File - Contains over 220 million daily values of streamflows, stages, reservoir contents, water temperatures, specific conductances, sediment concentrations, sediment discharges, and ground-water levels.

* Peak Flow File - Contains approximately 500,000 maximum (peak) streamflow and gage-height values at surface-water sites.

* Water-Quality Data - Contains approximately 2 million analyses of water samples that describe the chemical, physical, biological, and radio-chemical characteristics of both surface and ground water.

* Ground-Water Site Inventory Data Base - Contains inventory data for over 900,000 wells, springs, and other sources of ground water. The data includes site location, geohydrologic characterisitcs, well-construction history, and one-time field measurements such as water temperature.

In 1976, the U.S. Geological Survey opened WATSTORE to the public for direct access. The signing of a Memorandum of Agreement with the Survey is required to obtain direct access to WATSTORE. The system can be accessed either synchronously or asynchronously. The requestor will be expected to pay all computer costs he/she incurs. Direct access may be obtained by contacting:

U.S. Geological Survey
National Water Data Exchange
421 USGS National Center
Reston, Virginia 22092

In addition to providing direct access to WATSTORE, data can be provided in various machine-readable formats on magnetic tape or 5-1/4 inch floppy disk. Information about the availability of specific types of data or products, and user charges, can be obtained locally from each of the Water Resources Division's district offices. (See address on the back of the title page.)

DEFINITION OF TERMS

Terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below. See also table for converting English units to International System (SI) Units on the inside of the back cover.

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

Aquifer is a geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Artesian means confined and is used to describe a well in which the water level stands above the top of the aquifer tapped by the well. A flowing artesian well is one in which the water level is above the land surface.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, while 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.

Fecal coliform bacteria are bacteria that are present in the intestine or feces of warm-blooded animals. They are often 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.

Fecal streptococcal bacteria are bacteria found also in the intestine of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as Gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms which 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.

Non-ideal colony count (K) is a remark code used in reporting bacteria densities when plate counts fall outside of an ideal range. The lower limit of 20 colonies is set as the number below which statistically valid results become increasingly questionable. The upper limit, which differs according to type of bacteria, represents numbers above which interference from colony crowding, deposition of extraneous material, and other factors appear to result in increasingly questionable results.

Bed material is the sediment mixture of which a streambed, lake, pond, reservoir, or estuary bottom is composed.

Bottom material: See Bed material.

Chlorophyll refers to the green pigments of plants. Chlorophyll a and b are the two most common green pigments in plants.

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

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

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

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 salt water.

Cubic feet per second per square mile [$(ft^3/s)/mi^2$] is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

Cubic foot per second (ft^3/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to 7.48 gallons per second or 448.8 gallons per minute or 0.02832 cubic meters per second.

Cubic-foot-per-second day (cfs-day) is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, approximately 1.9835 acre-feet, about 646,000 gallons, or 2,447 cubic meters.

Discharge is the volume of water (or more broadly, volume of fluid plus suspended sediment) that passes a given point within a given period of time.

Instantaneous discharge is the discharge at a particular instant of time.

Mean discharge (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period.

Dissolved refers to that material in a representative water sample which passes through a 0.45 micrometer membrane filter. This is a convenient operational definition used by Federal agencies that collect water data. Determi- nation of "dissolved" constituents are made on subsamples of the filtrate.

Dissolved-solids concentration of water 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 of dissolved solids, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. Therefore, in the mathematical calculation of dissolved-solids concentration, the bicarbonate value, in milligrams per liter, is multiplied by 0.492 to reflect the change.

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

Drainage basin is a part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded surface water.

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

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

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather. It is computed as the sum of equivalents of polyvalent cations and is expressed as the equivalent concentration of calcium carbonate ($CaCO_3$).

Hydrologic Bench-Mark Network is a network of approximately 60 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

Hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as delineated by the Office of Water Data Coordination on the State Hydrologic Unit Maps; each hydrologic unit is identified by an eight-digit number.

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

Less than (<) is a remark code indicating that the analyzed value was found to be less than the numeric value listed. The value associated with the "<" remark indicates the detection limit of the applied laboratory.

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

Micrograms per gram (UG/G, µg/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 liter (UG/L, µg/L) is a unit expressing the concentration of chemical constituents in solution as mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter.

Microsiemens per centimeter at 25 degrees Celsius (US/CM, µS/cm) is a unit for reporting specific electrical conductance.

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

National Geodetic Vertical Datum of 1929 (NGVD of 1929) is a geodetic datum derived from a general adjustment of the first order level nets of both the United States and Canada. It was formerly called "Sea Level Datum of 1929" or "mean sea level" in this series of reports. Although the datum was derived from the average sea level over a period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific Coasts, it does not necessarily represent local mean sea level at any particular place.

National Stream Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in natural or regional water-quality planning and management. The 500 or so sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water-quality assessment and hydrologic research.

The National Trends Network (NTN) is a network of stations for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

Organism is any living entity.

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, acre, or hectare. Periphyton, benthic organisms, and macrophytes are expressed in these terms.

Parameter Code is a 5-digit number used in the U.S. Geological Survey computerized data system, WATSTORE, to uniquely identify a specific constituent. The codes used in WATSTORE are the same as those used in the U.S. Environmental Protection Agency data system, STORET. The Environmental Protection Agency assigns and approves all requests for new codes.

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

Particle size is the diameter, in millimeters (mm), of a particle determined by either sieve or sedimentation methods. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube) 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 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.....	.004 - .062	Sedimentation
Sand.....	.062 - 2.0	Sedimentation or sieve
Gravel.....	2.0 - 64.0	Sieve

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. 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.

Percent composition 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, mass, or volume.

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

pH indicates the degree of acidity or alkalinity of water and is expressed in logarithmic units. The pH value of a solution is the negative logarithm of the hydrogen-ion activity, in moles per liter.

Picocurie (PC, pCi) is one trillionth (1 x 10) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields 3.7 x 10 radioactive disintegrations per second. A picocurie yields 2.22 dpm (disintegrations per minute).

Radiochemical program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

Recoverable from 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.

Return period is the average time interval between occurrences of a hydrological event of a given or greater magnitude, usually expressed in years. May also be called recurrence interval.

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

Sediment is solid material that originates mostly from disintegrated rocks and is transported by, suspended in, or deposited from water; it 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 influenced by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics, land usage, and quantity and intensity of precipitation.

Suspended sediment is the sediment that at any given time is maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid.

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 ft above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L).

Mean concentration is the time-weighted concentration of suspended sediment passing a stream section during a 24-hour day.

Suspended-sediment discharge (tons/day) is the rate at which a quantity of sediment, as measured by dry mass or volume, passes a stream section in a given time. It is calculated in units of tons per day as follows: concentration (mg/L) x discharge (ft^3/s) x 0.0027.

Suspended-sediment load is a general term that refers to the total mass of material in suspension. It is not synonymous with sediment discharge, which is a rate of transport.

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. Waters range in respect to sodium hazard from those which can be used for irrigation on almost all soils to those which are generally unsatisfactory for irrigation.

Solute is any substance that is dissolved in water.

Specific conductance is a measure of the ability of a water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25 degrees Celsius. Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65 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.

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

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.

Surface area of a lake is that area outlined on the latest U.S.G.S. topographic map as the boundary of the lake and measured by a planimeter in acres. In localities not covered by topographic maps, the areas are computed from the best maps available at the time planimetered. All areas shown are those for the stage when the planimetered map was made.

Surficial bed material is the part (0.1 to 0.2 ft) of the bed material that is sampled using U.S. Series Bed-Material Samplers.

Suspended (as pertains to chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is associated with 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 water-suspended sediment sample that is retained on a 0.45 um 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 analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total recoverable concentrations of the constituent.

Suspended, total is the total amount of a given constituent in the part of a representative water-suspended 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. A 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 analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total concentrations of the constituent.

Thermograph is an instrument that continuously records variations of temperature on a chart. The more general term "temperature recorder" is used in the table headings 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 concentration 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 that would be contained in a vessel or reservoir that had received equal quantities of water from the stream each day for the year.

Tons per acre-foot indicates the dry mass of dissolved solids in 1 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) is the quantity, in tons, of a substance in solution or suspension that passes a stream section during a 24-hour period.

Total is the total amount of a given constituent in a representative water-suspended sediment 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 all of the constituent in the sample.)

Total discharge is the total quantity of any individual constituent, as measured by dry mass or volume, that passes through a stream cross-section per unit of time. This term needs to be qualified, such as "total sediment discharge," "total chloride discharge," and so on.

Total in bottom material is the total 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 methodolgy used, is required to judge when the results should be reported as "total in bottom material."

Total load (tons) is the total quantity of any individual constituent, as measured by dry mass or volume, that is dissolved in a specific amount of water (discharge) during a given time. It is computed by multiplying the total discharge, times the mg/L of the constituent, times the factor 0.0027, times the number of days.

Total, recoverable is the amount of a given constituent that is in solution after a representative water-suspended sediment 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, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Turbidity of a sample is the reduction of transparency due to the presence of particulate matter. In this report it is expressed in Nephelometric turbidity units (NTU), obtained from the Nephelometric method for turbidity determination which measures the intensity of light scattered by suspended particles at 90 degrees from the path of an incident light source.

Water year in Geological Survey 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, 1985, is called "water year 1985."

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.

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

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

The U.S. Geological Survey publishes a series of manuals describing procedures for planning and conducting specialized work in water-resources investigations. The materials is grouped under major subject headings called books and is further divided into sections and chapters. For example, Section A of Book 3 (Applications of Hydraulics) pertains to surface water. The chapter, the unit of publication, is limited to a narrow field of subject matter. This format permits flexibility in revision and publication as the need arises.

The reports listed below are for sale by the U.S. Geological Survey, Books and Open-File Reports Section, Federal Center, Box 25425, Denver, Colorado 80225 (authorized agent of the Superintendent of Documents, Government Printing Office). Prepayment is required. Remittance should be sent by check or money order payable to the U.S. Geological Survey. Prices are not included because they are subject to change. Current prices can be obtained by writing to the above address. When ordering or inquiring about prices for any of these publications, please give the title, book number, chapter number, and "U.S. Geological Survey Techniques of Water-Resources Investigations."

1-D1. *Water temperature-influential factors, field measurement, and data presentation,* by H. H. Stevens, Jr., J. F. Ficke, and G. F. Smoot: USGS--TWRI Book 1, Chapter D1. 1975. 65 pages.

1-D2. *Guidelines for collection and field analysis of ground-water samples for selected unstable constituents,* by W. W. Wood: USGS--TWRI Book 1, Chapter D2. 1976. 24 pages.

2-D1. *Application of surface geophysics to ground-water investigations,* by A. A. R. Zohdy, G. P. Eaton, and D. R. Mabey: USGS--TWRI Book 2, Chapter D1. 1974. 116 pages.

2-D2. *Application of seismic-refraction techniques to hydrologic studies,* by F. P. Haeni: USGS--TWRI Book 2, Chapter D2. 1988. 86 pages.

2-E1. *Application of borehole geophysics to water-resources investigations,* by W. S. Keys and L. M. McCary: USGS--TWRI Book 2, Chapter E1. 1971. 126 pages.

2-E2. *Borehole geophysics applied to ground-water investigations,* by W. Scott Keys: USGS--TWRI BOOK 2, Chapter E2. 150 pages.

2-F1. *Application of drilling, coring, and sampling techniques to test holes and wells,* by Eugene Shuter and Warren E. Teasdale: USGS--TWRI Book 2, Chapter F1. 1989. 97 pages.

3-A1. *General field and office procedures for indirect discharge measurements,* by M. A. Benson and Tate Dalrymple: USGS--TWRI Book 3, Chapter A1. 1967. 30 pages.

3-A2. *Measurement of peak discharge by the slope-area method,* by Tate Dalrymple and M. A. Benson: USGS--TWRI Book 3, Chapter A2. 1967. 12 pages.

3-A3. *Measurement of peak discharge at culverts by indirect methods,* by G. L. Bodhaine: USGS--TWRI Book 3, Chapter A3. 1968. 60 pages.

3-A4. *Measurement of peak discharge at width contractions by indirect methods,* by H. F. Matthai: USGS--TWRI Book 3, Chapter A4. 1967. 44 pages.

3-A5. *Measurement of peak discharge at dams by indirect methods,* by Harry Hulsing: USGS--TWRI Book 3, Chapter A5. 1967. 29 pages.

3-A6. *General procedure for gaging streams,* by R. W. Carter and Jacob Davidian: USGS--TWRI Book 3, Chapter A6. 1968. 13 pages.

3-A7. *Stage measurements at gaging stations,* by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A7. 1968. 28 pages.

3-A8. *Discharge measurements at gaging stations,* by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A8. 1969. 65 pages.

3-A9. *Measurement of time of travel in streams by dye tracing,* by F. A. Kilpatrick and J. F. Wilson, Jr.: USGS--TWRI Book 3, Chapter A9. 1989. 27 pages.

3-A10. *Discharge ratings at gaging stations,* by E. J. Kennedy: USGS--TWRI Book 3, Chapter A10. 1984. 59 pages.

3-A11. *Measurement of discharge by moving-boat method,* by G. F. Smoot and C. E. Novak: USGS--TWRI Book 3, Chapter A11. 1969. 22 pages.

3-A12. *Fluorometric procedures for dye tracing,* by J. F. Wilson, Jr., E. D. Cobb, and F. A. Kilpatrick: USGS--TWRI Book 3, Chapter A12. 1986. 41 pages.

3-A13. *Computation of continuous records of streamflow,* by E. J. Kennedy: USGS--TWRI Book 3, Chapter A13. 1983. 53 pages.

3-A14. *Use of flumes in measuring discharge,* by F. A. Kilpatrick and V. R. Schneider: USGS--TWRI Book 3, Chapter A14. 1983. 46 pages.

3-A15. *Computation of water-surface profiles in open channels,* by Jacob Davidian: USGS--TWRI Book 3, Chapter A15. 1984. 48 pages.

3-A16. *Measurement of discharge using tracers,* by F. A. Kilpatrick and E. D. Cobb: USGS--TWRI Book 3, Chapter A16. 1985. 52 pages.

3-A17. *Acoustic velocity meter systems,* by Antonius Laenen: USGS--TWRI Book 3, Chapter A17. 1985. 38 pages.

3-A18. *Determination of stream reaeration coefficients by use of tracers,* by F. A. Kilpatrick, R. E. Rathburn, N. Yotsukura, G. W. Parker, and L. L. DeLong: USGS--TWRI Book 3, Chapter A18. 1989. 52 pages.

3-A19. *Levels of streamflow gaging stations,* by E. J. Kennedy: USGS--TWRI Book 3, Chapter A19. 1990. 27 pages.

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS--Continued

3-B1. *Aquifer-test design, observation, and data analysis,* by R. W. Stallman: USGS--TWRI Book 3, Chapter B1. 1971. 26 pages.

3-B2. *Introduction to ground-water hydraulics, a programmed text for self-instruction,* by G. D. Bennett: USGS--TWRI Book 3, Chapter B2. 1976. 172 pages.

3-B3. *Type curves for selected problems of flow to wells in confined aquifers,* by J. E. Reed: USGS--TWRI Book 3, Chapter B3. 1980. 106 pages.

3-B4. *Regression modeling of ground-water flow,* by Richard L. Cooley and Richard L. Naff: USGS--TWRI Book 3, Chapter B4. 1990. 232 pages.

3-B5. *Definition of boundary and initial conditions in the analysis of saturated ground-water flow systems-An introduction,* by O. L. Franke, T. E. Reilly, and G. D. Bennett: USGS--TWRI Book 3, Chapter B5. 1987. 15 pages.

3-B6. *The principle of superposition and its application in ground-water hydraulics,* by T. E. Reilly, O. L. Franke, and G. D. Bennett: USGS--TWRI Book 3, Chapter B6. 1987. 28 pages.

3-C1. *Fluvial sediment concepts,* by H. P. Guy: USGS--TWRI Book 3, Chapter C1. 1970. 55 pages.

3-C2. *Field methods for measurement of fluvial sediment,* by H. P. Guy and V. W. Norman: USGS--TWRI Book 3, Chapter C2. 1970. 59 pages.

3-C3. *Computation of fluvial-sediment discharge,* by George Porterfield: USGS--TWRI Book 3, Chapter C3. 1972. 66 pages.

4-A1. *Some statistical tools in hydrology,* by H. C. Riggs: USGS--TWRI Book 4, Chapter A1. 1968. 39 pages.

4-A2. *Frequency curves,* by H. C. Riggs: USGS--TWRI Book 4, Chapter A2. 1968. 15 pages.

4-B1. *Low-flow investigations,* by H. C. Riggs: USGS--TWRI Book 4, Chapter B1. 1972. 18 pages.

4-B2. *Storage analyses for water supply,* by H. C. Riggs and C. H. Hardison: USGS--TWRI Book 4, Chapter B2. 1973. 20 pages.

4-B3. *Regional analyses of streamflow characteristics,* by H. C. Riggs: USGS--TWRI Book 4, Chapter B3. 1973. 15 pages.

4-D1. *Computation of rate and volume of stream depletion by wells,* by C. T. Jenkins: USGS--TWRI Book 4, Chapter D1. 1970. 17 pages.

5-A1. *Methods for determination of inorganic substances in water and fluvial sediments,* by M. J. Fishman and L. C. Friedman: USGS--TWRI Book 5, Chapter A1. 1989. 545 pages.

5-A2. *Determination of minor elements in water by emission spectroscopy,* by P. R. Barnett and E. C. Mallory, Jr.: USGS--TWRI Book 5, Chapter A2. 1971. 31 pages.

5-A3. *Methods for the determination of organic substances in water and fluvial sediments,* edited by R. L. Wershaw, M. J. Fishman, R. R. Grabbe, and L. E. Lowe: USGS--TWRI Book 5, Chapter A3. 1987. 80 pages.

5-A4. *Methods for collection and analysis of aquatic biological and microbiological samples,* by L. J. Britton and P. E. Greeson, editors: USGS--TWRI Book 5, Chapter A4. 1989. 363 pages.

5-A5. *Methods for determination of radioactive substances in water and fluvial sediments,* by L. L. Thatcher, V. J. Janzer, and K. W. Edwards: USGS--TWRI Book 5, Chapter A5. 1977. 95 pages.

5-A6. *Quality assurance practices for the chemical and biological analyses of water and fluvial sediments,* by L. C. Friedman and D. E. Erdmann: USGS--TWRI Book 5, Chapter A6. 1982. 181 pages.

5-C1. *Laboratory theory and methods for sediment analysis,* by H. P. Guy: USGS--TWRI Book 5, Chapter C1. 1969. 58 pages.

6-A1. *A modular three-dimensional finite-difference ground-water flow model,* by M. G. McDonald and A. W. Harbaugh: USGS--TWRI Book 6, Chapter A1. 1988. 586 pages.

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, Chapter C1. 1976. 116 pages.

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, Chapter C2. 1978. 90 pages.

7-C3. *A model for simulation of flow in singular and interconnected channels,* by R. W. Schaffrannek, R. A. Baltzer, and D. E. Goldberg: USGS--TWRI Book 7, Chapter C3. 1981. 110 pages.

8-A1. *Methods of measuring water levels in deep wells,* by M. S. Garber and F. C. Koopman: USGS--TWRI Book 8, Chapter A1. 1968. 23 pages.

8-A2. *Installation and service manual for U.S. Geological Survey manometers,* by J. D. Craig: USGS--TWRI Book 8, Chapter A2. 1983. 57 pages.

8-B2. *Calibration and maintenance of vertical-axis type current meters,* by G. F. Smoot and C. E. Novak: USGS--TWRI Book 8, Chapter B2. 1968. 15 pages.

Table 12.--*Discontinued streamflow-gaging and water-quality stations*

The following continuous-record streamflow-gaging and water-quality stations have been discontinued or converted to partial-record stations. Daily surface-water records and water-quality data for each station were collected and published for the water years shown below. Parentheses indicate former station name. Some stations have not been assigned station numbers. [--, no data]

Station number	Station name	Drainage area (square miles)	Period of record	
			Surface water	Water quality
	Part 5--Hudson Bay Basin			
05010000	Belly River at international boundary	74.8	1947-64	
05010500	North Fork Belly River at international boundary	10.1	1947-55	
05010700	Mountain View Irrigation District Canal near Mountain View, Alberta	--	1935-78	
05011000	Belly River near Mountain View, Alberta	121	1912-78	
05011500	Waterton River near international boundary	61.0	1947-64	
05012000	Street Creek at international boundary	6.0	1948-55	
05012500	Boundary Creek at international boundary	21.0	1948-64	
05013000	Waterton River near Waterton Park, Alberta	238	1908-33,1948-78	
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	177	1902-15	
05013900	Grinnell Creek at Grinnell Glacier, near Many Glacier	1.1	1959-71	
05014000	Grinnell Creek near Many Glacier	3.32	1949-78	
05014500	Swiftcurrent Creek at Many Glacier	31.4		1964,1966-69, 1971
05015000	Canyon Creek near Many Glacier	7.2	1918-37	
05016500	Swiftcurrent Creek near Babb	100	1902-10	
05017000	Lower St. Mary Lake near Babb	276	1929-55	
05017500	St. Mary River near Babb	278		1965
05018000	St. Mary Canal at intake, near Babb	--	1918-50	
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	279	1929-50	
05020000	Kennedy Creek near Babb	60.6	1905-06	
	Part 6--Missouri River Basin			
06007000	Tom Creek near Lakeview	6.43	1988-89	
06010000	Red Rock River near Lakeview	237	1933-37	
06010500	Red Rock River at Metzel Fork, near Monida	264	1925-29	
06010600	Red Rock River at Brundage Bridge, near Lakeview	277	1988-89	
06011000	Red Rock River at Kennedy Ranch, near Lakeview	323	1936-67	
06011500	Red Rock River above Lima Reservoir, near Monida	431	1911,1914-18, 1925,1930	
06013000	Red Rock River at Lima	602	1907-11	
06013500	Big Sheep Creek below Muddy Creek, near Dell	278	1936,1946-53, 1977-79	1977-79
06014000	Red Rock River near Dell	1,421	1942-67	
06014500	Red Rock River at Red Rock	1,548	1951-52,1974-83	
06015000	Horse Prairie Creek near Grant	325	1946-53	
06015400	Beaverhead River near Grant	2,322	1962-83	1966-68
06015500	Grasshopper Creek near Dillon	348	1921-33,1946-54, 1955-58,1960-61	1986
06016000	Beaverhead River at Barretts	2,737		1949-51,1965-78, 1986
06016500	Rattlesnake Creek near Dillon	23.9	1946-49	
06017000	Beaverhead River at Dillon	2,895	1951-52,1963-71	
06017500	Blacktail Deer Creek near Dillon	312	1946-54,1955-66	
06017600	Blacktail Deer Creek at Dillon	--		1986
06018000	Beaverhead River near Dillon	3,484	1951-52,1963-83	
06018500	Beaverhead River near Twin Bridges (at Blaine)	3,619		1950-51,1962-81, 1986
06019000	Ruby River above Warm Springs Creek, near Alder	145	1948-53	
06020000	Ruby River at damsite, near Alder	592	1911-14,1935-37	
06021000	Ruby River near Alder	614	1929-39,1946-61	
06021500	Ruby River at Laurin	650	1946-61	
06022000	Ruby River below Ramshorn Creek, near Sheridan	843	1946-53	
06022500	Ruby River near Sheridan	863	1946-51	
06023000	Ruby River near Twin Bridges	935	1940-43,1946-65, 1979-81	1965,1979-81, 1986
06023500	Big Hole River near Jackson	44.0	1948-54	
06024000	Miner Creek near Jackson	17.6	1948-54	
06024500	Trail Creek near Wisdom	72.6	1948-54,1966-72	
06024580	Big Hole River near Wise River	1,611	1979-81	1980-81
06024590	Wise River near Wise River	214	1973-85	
06025000	Big Hole River near Dewey	1,990	1910-13	
06025700	Willow Creek diversions to Birch Creek, near Glen	--	1946-53,1955-66	
06025800	Willow Creek near Glen	35.6	1962-66	1962-65
06026000	Birch Creek near Glen	36.0	1946-53,1955-76	1958-62
06026210	Big Hole River near Glen	2,655		1966-68
06026400	Big Hole River near Twin Bridges	2,762	1979-81	1967,1980-81, 1986
06026500	Jefferson River near Twin Bridges	7,632	1940-43,1958-72	1957-62,1965-72
06027000	Jefferson River near Silver Star	7,683	1910-16,1920-39	
06027200	Jefferson River at Silver Star	7,683	1972-74	1973-74
06027500	Beall Creek near Waterloo	5.63	1941-42	

Table 12.--*Discontinued streamflow-gaging and water-quality stations*--Continued

Station number	Station name	Drainage area (square miles)	Period of record	
			Surface water	Water quality
	Part 6--Missouri River Basin--Continued			
06028000	Big Pipestone Creek near Whitehall	108	1910-11	
06028500	Little Pipestone Creek near Whitehall	30.7	1935-40	
06028700	Big Pipestone Creek at Whitehall	--		1986
06029000	Whitetail Creek near Whitehall	30.8	1949-54,1955-68	
06029500	Little Whitetail Creek near Whitetail	91.0	1911	
06030000	Whitetail Creek at Whitehall	179	1911	
06030500	Boulder River above Rock Creek, near Basin	19.4	1936,1946-53, 1955-57	
06031000	Rock Creek at CCC Camp, near Bernice	9.87	1936	
06031500	Boulder River at Basin	219	1921-23	
06032000	Boulder River near Basin	296	1919-20	
06032500	Muskrat Creek near Boulder	6.09	1912-14	
06033500	North Fork Little Boulder River near Boulder	18.8	1926-27	
06033900	Boulder River near Cardwell	--		1986
06034000	South Boulder River near Jefferson Island	27.5	1926-33	
06034300	South Boulder River near Cardwell	--		1986
06034500	Jefferson River at Sappington	9,277	1895-1905,1938-69	
06035500	Norwegian Creek near Harrison	22.4	1938-43,1946-51	
06036500	Willow Creek near Willow Creek	165	1919-33,1946-53, 1955-57	1986
06036650	Jefferson River near Three Forks	9,532		1980-81,1986-87
06037700	South Fork Madison River above Denny Creek, near West Yellowstone	--		1987-88
06038800	Madison River at Kirby Ranch, near Cameron	1,065		1960
06039000	West Fork Madison River near Lakeview	11.9	1936	
06039200	West Fork Madison River near Cameron	220	1965-67	1986,1988
06039500	Madison River at Lyon	1,346	1928-32	
06040000	Madison River near Cameron	1,669	1952-63,1968-70	1988
06040010	Blaine Spring Creek near Cameron	3.42	1971-72	
06040300	Jack Creek near Ennis	51.5	1973-86	1980
06040400	Meadow Creek near McAllister	--		1986
06041300	Warm Springs Creek near Norris	72.5		1986
06041500	Madison River near Norris	2,288	1890-93,1910	
06041700	Cherry Creek near Norris	--		1986
06042000	Madison River below Cherry Creek, near Norris	2,387	1897-1905	
06042500	Madison River near Three Forks	2,511	1893-97,1928-32, 1941-50	
06042600	Madison River at Three Forks	--		1986-87,1990
06043000	Taylor Creek near Grayling	98.0	1946-54,1955-57, 1966-67	
06043500	Gallatin River near Gallatin Gateway	825		1986
06044000	Gallatin River near Salesville	833	1895-1905,1910-13, 1921-23	
06044100	Wilson Creek near Gallatin Gateway	5.33	1951-53	
06044200	West Fork Wilson Creek near Gallatin Gateway	3.81	1951-53	
06044300	Big Bear Creek near Gallatin Gateway	13.2	1951-53	
06044400	Little Bear Creek near Gallatin Gateway	3.87	1951-53	
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	1951-53	
06045400	Baker Creek near Manhattan	--	1951-53	
06045500	Gallatin River near Belgrade	965	1950-54	
06046000	Gallatin River near Manhattan	970	1950-54	
06046100	Ridgley Creek near Manhattan	--	1951-53	
06046300	Camp Creek near Belgrade	34.5	1951-53	
06046400	Randall Creek near Manhattan	--	1951-53	
06046500	Rocky Creek near Bozeman	49.0	1951-53	
06047000	Bear Canyon near Bozeman	17.0	1951-53	
06047500	Sourdough Creek near Bozeman	28.2	1951-53	
06048000	East Gallatin River at Bozeman	148	1939-61	
06048500	Bridger Creek near Bozeman	62.5	1946-69,1971-72, 1987	
06048600	Lyman Creek near Bozeman	1.75	1951-53	
--	Churn Creek near Bozeman	--	1953	
06048800	Deer Creek near Bozeman	--	1953	
06048900	East Gallatin River near Belgrade	--	1951-53	
06049000	Middle Cottonwood Creek near Bozeman	4.25	1951-53	
06050100	Hyalite Creek near Belgrade	--	1951-52	
06050200	Bostwick Creek near Belgrade	5.04	1951-53	
06050400	Thompson Creek near Belgrade	--	1951-53	
06050450	Ben Hart Creek near Belgrade	--	1951-53	
06050500	Ross Creek near Belgrade	1.25	1951-53	
06050700	Truman Creek near Belgrade	2.94	1951-53	
06051000	Reese Creek near Belgrade	21.5	1951-53	
06051200	Bear Creek near Belgrade	4.30	1951-53	
06051300	Foster Creek near Belgrade	--	1953	
06051500	Dry Creek at Andrus Ranch, near Manhattan	96.2	1952-53	
06051700	Reynolds (Quagle) Creek near Manhattan	--	1952-53	
06052000	Dry Creek at Brownell Ranch, near Manhattan	104	1951	

Table 12.--*Discontinued streamflow-gaging and water-quality stations*--Continued

Station number	Station name	Drainage area (square miles)	Period of record	
			Surface water	Water quality
	Part 6--Missouri River Basin--Continued			
06052050	Story Creek near Manhattan	--	1951-53	
06052100	Cowan Creek near Manhattan	--	1951-53	
06052200	Gibson Creek near Manhattan	--	1951-53	
06052300	Bull Run Creek near Manhattan	--	1951-53	
06052500	Gallatin River at Logan	1,795		1951-52,1956-57, 1965,1979-86
06053000	Sixteenmile Creek at Ringling	79.0	1950-55	
06053400	Sixteenmile Creek near Toston	--		1986
06053500	Broadwater East Canal near Toston	--	1941-49	
06054000	Broadwater West Canal near Toston	--	1941-49	
06055000	Crow Creek near Townsend	48.6	1912-13	
06055500	Crow Creek near Radersburg	76.6		1988-91
06056500	Deep Creek near Townsend	65.4	1910-15	
06057000	Missouri River near Townsend	15,343	1891-1904	
06057400	Beaver Creek above Weasel Creek near Winston	--		1988-91
06057500	Lake Sewell near Helena	15,894	1936-53	
06058000	Missouri River at Canyon Ferry	15,894	1889	
06058502	Missouri River below Canyon Ferry Dam, near Helena	15,904		1968-87
06058900	Prickly Pear Creek below Anderson Gulch Jefferson City	14.0		1988-91
06059000	Dutchman Creek near Alhambra	9.78	1921-24	
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	
06061500	Prickly Pear Creek near Clancy	192		1950
06061900	McClellan Creek near East Helena	33.2		1988-91
06062000	Prickly Pear Creek at East Helena	251	1908-13	
06062500	Tenmile Creek near Rimini	32.7		1981
06063000	Tenmile Creek near Helena	102	1908-54	1948,1950-51
06063500	Sevenmile Creek at Birdseye	31.9	1908-13	
06064000	Sevenmile Creek near Helena	--	1908	
06065500	Missouri River below Hauser Lake Dam, near Helena	16,876	1922-42	
06067000	Little Prickly Pear Creek above Deadman Creek, near Marysville	20.1	1909-11	
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	
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	1909-24	
06071080	Sieben Ranch ditch below Clark Creek, near Wolf Creek	--		1962-67
06071100	Little Prickly Pear Creek at Sieben Ranch, near Wolf Creek	270	1962-67	1962-67
06071130	Little Prickly Pear Creek above Medicine Rock Creek, near Wolf Creek	--		1962-67
06071180	Medicine Rock Creek near Wolf Creek	--		1962-65,1967
06071200	Lyons Creek near Wolf Creek	29.9		1962-67
--	Little Prickly Pear Creek above Sheep Creek, near Wolf Creek	--		1964
06071240	Sheep Creek near Wolf Creek	--		1962,1964-67
06071290	Wolf Creek at Wolf Creek	--		1962-67
06071300	Little Prickly Pear Creek at Wolf Creek	381	1962-67	1962-67
06071500	Missouri River at Craig	17,739	1890-92	
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	
06073500	Dearborn River near Craig	325	1946-69	
06074000	Missouri River at Cascade	18,493	1902-15,1953	
06074500	Smith River near White Sulphur Springs	30.7	1923-31,1934-36	
06075500	Smith River above Fivemile Creek, near White Sulphur Springs	73.2	1934-43	
06076000	Newland Creek near White Sulphur Springs	6.74	1946-54	
06076500	Newland Creek near damsite, near White Sulphur Springs	44.8	1950-57	
06077000	Sheep Creek near White Sulphur Springs	42.8	1941-72	1980
06077500	Smith River near Eden	1,594	1951-69	
06078000	Smith River at Truly	2,006	1905-07,1929-32	
06079000	South Fork Sun River near Augusta	252	1911-12	
06080000	Sun River near Augusta	609	1889-91,1904-40	1972
--	Willow Creek Feeder Canal	--	1967-68	
06080700	Spring Valley Canal below Spring Valley drop, near Fairfield	--	1967-68	
06080800	Spring Valley Canal above Upper Turnbull drop, near Fairfield	--	1967-68	
--	Greenfield Canal below drop, near Fairfield	--	1950-51	
06080900	Sun River below diversion dam, near Augusta	609	1967-80	1968-79
06081000	Floweree Big Canal near Augusta	--	1912	
06081500	Willow Creek near Augusta	96.1	1905-25	
06082200	Sun River below Willow Creek, near Augusta	827	1967-74	
06082500	Smith Creek near Augusta	25.0	1906-13	
06083500	Ford Creek near Augusta	19.4	1906-13	
06084000	Smith Creek below Ford Creek, near Augusta	74.0	1946-52	
06084500	Elk Creek at Augusta	157	1905-25	
06085000	Crown Butte Canal at Riebling	--	1912	
06085500	Crown Butte Canal near Simms	--	1912	
06085800	Sun River at Simms	1,320	1953,1964,1966-79	

Table 12.--*Discontinued streamflow-gaging and water-quality stations*--Continued

Station number	Station name	Drainage area (square miles)	Period of record	
			Surface water	Water quality
	Part 6--Missouri River Basin--Continued			
06086000	Sun River at Fort Shaw	1,417	1912-28	
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	
06087850	Sun River above Muddy Creek, near Vaughn	1,526		1972
06088000	Muddy Creek near Power	137	1935-40,1982-83	
06088100	Spring Coulee near Power	30.4	1982-83	
06088200	Tank Coulee near Power	31.0	1982-83	
06088300	Muddy Creek near Vaughn	282	1968-87	1968-82
06088500	Muddy Creek at Vaughn	314		1967-68,1972-82
06090000	Missouri River at Great Falls	22,294	1890,1894-95, 1910-11	
06090100	Missouri River at Black Eagle Dam	--		1951
06090500	Belt Creek near Monarch	368	1951-82	1977-81
06090600	Belt Creek near Belt	700	1905-07	
06090610	Belt Creek near Portage	799	1980-83	1981-83
06090700	Highwood Creek near Highwood	57.8	1905-06	
06090720	Highwood Creek near Portage	122	1980-83	1981-83
06090800	Missouri River at Fort Benton	24,740		1965,1969-73, 1980-86
06091000	Two Medicine River near East Glacier	51.1	1912-13,1918-24, 1962-64	
06091500	Two Medicine River at Midvale	--	1902-03	
06091700	Two Medicine River below South Fork, near Browning	250		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	--		1955-56
06092000	Two Medicine River near Browning	317	1907-25,1951-77	1955-56
06092500	Badger Creek near Browning	133	1951-73	
06093200	Badger Creek below Four Horns Canal, near Browning	152		1988-89
06093300	Badger Canal near Dupuyer	--		1955-56
06093500	Badger Creek near Family	239	1907-25	
06093600	Two Medicine River near Cut Bank	--		1982-84
06094500	Birch Creek at Swift Dam, near Dupuyer	75.3	1913-29	
06095000	Birch Creek near Dupuyer	105	1907-37	
06096000	Birch Creek at Nelson's Ranch, near Dupuyer	111	1914-26	
06096500	Birch Creek at Hall's Ranch, near Dupuyer	122	1913-20	
06097000	Birch Creek at Robare	128	1914-26	
06097200	Blacktail Creek near Dupuyer	--		1982-84
06097500	Dupuyer Creek at Dupuyer	65.7	1908-13	
06098000	Dupuyer Creek near Valier	137	1912-37	
06098100	Birch Creek near Valier	471	1978-83	1978-83
06098500	Cut Bank Creek near Browning	123	1918-25	
06099500	Marias River near Shelby	3,242		1947-53
06100000	Dry Fork Marias River near Valier	131	1911-15	
06100500	Dry Fork Marias River at Fowler	314	1921-31	
06101000	Willow Creek near Devon	310	1921-25	
06101200	Willow Creek near Galata	839	1977-82	
06101560	Pondera Coulee near Chester	598	1976-85	
06102000	Marias River near Brinkman	6,425	1922-56	
06102050	Marias River near Loma	6,995	1960-72	
06102500	Teton River near Farmington	105	1947-55	
06103000	Teton River at Strabane	128	1904-06,1908-25	
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	1955-57
06105000	Deep Creek at Frazer's Ranch, near Choteau	37.7	1912	
06105500	Willow Creek near Choteau	88.2	1912-17	
06106000	Deep Creek near Choteau	223	1911-25	
06106200	Priest Butte Lake drain near Choteau	--		1955-57
06106500	Muddy Creek near Bynum	71.1	1912-25	
06107000	North Fork Muddy Creek near Bynum	61.3	1912-25	
06107500	Muddy Creek near Agawam	274	1917	
06108000	Teton River near Dutton	1,308		1954-57
06108500	Teton River near Fort Benton	1,989	1929-32	
06109000	Missouri River at Loma	34,221	1935-53	
06109750	Middle Fork Judith River below Lost Fork, near Utica	108	1972-75	
06109775	Middle Fork Judith River at Ranger Station, near Utica	--		1964
06109780	Middle Fork Judith River near Utica	160	1972-79	
06109800	South Fork Judith River near Utica	58.7	1958-79	
06110000	Judith River near Utica	328	1920-75	
06111000	Ross Fork Creek near Hobson	337	1946-54,1955-62	
06111500	Big Spring Creek near Lewistown	20.9	1932-57	
06111750	Big Spring Creek below Casing Creek, at Lewistown	140		1967-68
06111850	Big Spring Creek at Hanover	260		1967-68
06112000	Cottonwood Creek near Lewistown	45.6	1946-51	
06112100	Cottonwood Creek near Moore	47.7	1957-63	
06112500	Sage Creek at Windham	58.6	1920-22	
06113000	Judith River near Lewistown	1,939	1910-11	
06113500	Judith River near Winifred	2,160	1929-32	

Table 12.--*Discontinued streamflow-gaging and water-quality stations*--Continued

Station number	Station name	Drainage area (square miles)	Period of record	
			Surface water	Water quality
	Part 6--Missouri River Basin--Continued			
06114000	Wolf Creek at Neubert Ranch, near Stanford	79.2	1920-26	
06114500	Wolf Creek near Stanford	112	1950-53,1955-62	
06115000	Missouri River at Power Plant Ferry, near Zortman	40,763	1934-68	
06115500	North Fork Musselshell River near Delpine	31.4	1940-79	
06116000	North Fork Musselshell River at Delpine	48.6	1909-12,1922-32	
06116900	Checkerboard Creek near Delpine	21.1	1909-15	
06117000	Checkerboard Creek at Delpine	23.6	1922-32	
06117500	Spring Creek near Martinsdale	32.5	1922-24	
06118000	North Fork Musselshell River at Martinsdale	233	1907-14	
06118500	South Fork Musselshell River above Martinsdale	287	1942-79	
06119500	South Fork Musselshell River near Martinsdale	300	1907-15,1930-32	
06120000	Big Elk Creek at Twodot	98.3	1953-56	
06121000	American Fork near Harlowton	94.6	1907-14,1924-32	
06121500	Lebo Creek near Harlowton	59.1	1907-14,1924-32	
06122000	American Fork below Lebo Creek, near Harlowton	166	1946-67	
06123000	Musselshell River at Shawmut	1,496	1902-07	
06123500	Musselshell River near Ryegate	1,979	1946-79	
06124000	Careless Creek near Living Springs	21.2	1920-23	
06124500	West Careless Creek near Living Springs	23.5	1920-21	
06125000	Roberts Creek at Hedgesville	322	1920-23	
06125500	Careless Creek at Wallum	471	1934-42	
06125700	Big Coulee Creek near Lavina	232	1957-72	
06126450	Rehder Creek near Klein	23.1		1978-81
06126470	Halfbreed Creek near Klein	53.2	1978-86,1987-91	1978-81,1984
06126500	Musselshell River near Roundup	4,023		1978-81
06127150	East Parrot Creek near Roundup	20.2		1978-81
06127160	West Parrot Creek near Roundup	20.5		1978-81
06127300	Fattig Creek near Delphia	22.9		1978-81
06127600	Musselshell River near Mosby	5,941	1963-66	1963-66
06127900	Flatwillow Creek near Flatwillow	188	1911-32,1934-56	
06128200	Flatwillow Creek near Winnett	642	1921-32,1948-52	
06129000	Box Elder Creek near Winnett	684	1930-33,1934-38, 1958-72	
06129500	McDonald Creek at Winnett	421	1930-32,1934-45, 1953-56	
06130000	Flatwillow Creek near Mosby	1,855	1964-66	1964-66
06130680	Big Dry Creek at Jordan	521		1976-77
06130700	Sand Creek near Jordan	317	1957-67	
06130935	Crow Rock Creek near Cohagen	213		1978-80
06130950	Little Dry Creek near Van Norman	1,224	1980	1976-77
06131000	Big Dry Creek near Van Norman	2,554		1978,1981
06131120	Timber Creek near Van Norman	287	1982-85,1988	1976-79
06131200	Nelson Creek near Van Norman	100	1976-85	1976-79
06132000	Missouri River below Fork Peck Dam	57,556		1964,1975-87
06132500	Milk River near international boundary, near Browning	287	1905-31	1964
06132700	Milk River near Del Bonita	325	1962-65	
06133000	Milk River at western crossing of international boundary	397		1973,1984-86
06134000	North Milk River near international boundary	91.6		1965,1973-74, 1981,1984-86
06134500	Milk River at Milk River, Alberta	1,036		1965
06134850	Milk River near Writing-on-Stone Provincial Park	1,690	1978-83	
06134950	Milk River near Pendant D'Oreille	2,330	1978-83	
06135000	Milk River at eastern crossing of international boundary	2,588		1965-66,1973-74, 1984-86
06135500	Sage Creek at Q Ranch, near Wild Horse, Alberta	175	1935-83	1965
06136000	Sage Creek at international boundary	220	1946-84	
06136700	Milk River below Fresno Dam, near Havre	3,400	1952-53	1950
06137000	Milk River above Havre	3,826	1928-33	
06137400	Big Sandy Creek at reservation boundary, near Rocky Boy	24.7		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		1977-81,1983-84
06137575	Boxelder Creek at Box Elder	67.1		1983
06137580	Sage Creek near Whitlash	7.26	1976-82, 1985-90	
06138000	Sage Creek near Kremlin	914	1946-51	
06138300	Sage Creek near Box Elder	985		1983-84
06138500	Big Sandy Creek near Box Elder	1,629	1927-39	
06138570	Big Sandy Creek above Gravel Coulee, near Laredo	1,639		1982-84
06139000	Big Sandy Creek near Laredo	1,752	1918-20	
06139500	Big Sandy Creek near Havre	1,805		1986-90
06139900	Beaver Creek at reservation boundary, near Rocky Boy	16.1		1982-84
06140000	Beaver Creek near Havre	87.4	1918-21	
06140500	Milk River at Havre	5,844		1964-72
06141000	Boxelder Creek near Havre	23.7	1919-22	
06141500	Boxelder Creek at P.X. Ranch, near Havre	33.3	1918	
06142000	Clear Creek near Bearpaw	69.6	1918-22	
06142500	Fort Belknap Canal near Chinook	--	1903-21	
06143000	Milk River at Lohman	6,166	1918-26,1934-51	

Table 12.--*Discontinued streamflow-gaging and water-quality stations*--Continued

Station number	Station name	Drainage area (square miles)	Period of record	
			Surface water	Water quality
	Part 6--Missouri River Basin--Continued			
06144000	Paradise Valley Canal near headgate, near Chinook	--	1906-08,1920-21	
06144100	Walburger Coulee near Govenlock, Saskatchewan	--	1963-79	
06144250	Lodge Creek at Alberta boundary	342	1951-62,1963-67	
06144300	Lodge Creek below Spangler Project, near Govenlock, Saskatchewan	--	1963-66	
06144400	Middle Creek near Battle Creek, Saskatchewan	177	1963-72	
06144500	Lodge Creek at international boundary	753	1910-52	
06145000	McRae Creek at international boundary	59.0	1927-52	
06145500	Lodge Creek below McRae Creek, at international boundary	825		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	
06148000	Battle Creek above Cypress Lake west inflow canal, near West Plains, Saskatchewan	270	1939-66	
06149500	Battle Creek at international boundary	997		1964,1972-74, 1987-89
06150000	Woodpile Coulee near international boundary	60.2	1927-77	
06150500	East Fork Battle Creek near international boundary	89.5	1927-76	
06152000	Cook Canal near Chinook	--	1905-19	
06152500	Matheson Canal near Chinook	--	1905-22,1928-49, 1951-60	
06153000	Paradise Valley Canal near Chinook	--	1903-19	
06153500	Harlem Canal near Zurich	--	1904-21	
06154100	Milk River near Harlem	9,822		1960-69
06154150	White Bear Creek below Fifteenmile Creek, near Dodson	--		1982-84
06154390	Peoples Creek near Cleveland	--		1982-84
06154400	Peoples Creek near Hays	220		1960-61,1963
06154500	Peoples Creek near Dodson	670	1918-22,1951-73, 1982-88	1982-88
--	Milk River above Dodson Dam	--	1952	
06155005	Dodson North Canal near Malta	--		1973
06155010	Dodson North Canal near Malta	--		1973
06155500	Milk River at Malta	11,762	1902-22,1952	
06155510	Milk River near Malta	--		1973
--	Milk River near Saco	--	1952	
06156000	Whitewater Creek near international boundary	458	1927-80	1977-80
06158000	Frenchman River above Eastend Reservoir, near Ravenscrag, Saskatchewan	601	1912-18,1937-67	
06160500	Frenchman River at Morrison's, near Eastend, Saskatchewan	800	1937-55	
06160600	Frenchman River below Eastern Irrigation Project, near Eastend, Saskatchewan	832	1937-55,1962-75	
06161000	Frenchman River at 50-mile, near Bracken, Saskatchewan	1,248	1914-31,1935-55	
06163400	Denniel Creek near Val Marie, Saskatchewan	251	1963-77	
06163500	Frenchman River below Val Marie, Saskatchewan	1,725	1937-53,1963-76	
06164000	Frenchman River at international boundary	2,120		1964,1972-73, 1987-89
06164500	Frenchman Canal near Saco	--	1921,1928-68	
06164590	Beaver Creek near Zortman	10.1		1984
06164615	Little Warm Creek at reservation boundary, near Zortman	6.31		1983-90
06164620	Little Warm Creek near Lodge Pole	--		1982-83
06164630	Big Warm Creek near Zortman	8.58	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	
06165000	Beaver Creek near Malta	1,010	1917-21	
06165500	Beaver Creek overflow near Bowdoin	--	1903-13	
06166000	Beaver Creek below Guston Coulee, near Saco (Beaver Creek near Bowdoin)	1,208		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	1,238		1982-85
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	
06169000	Horse Creek at international boundary	73.5	1914-62	
06169600	South Creek tributary near Opheim	2.15	1983-87	
06169700	South Creek tributary No. 2 near Opheim	1.62	1983-87	
06169800	South Creek tributary No. 3 near international boundary	.32	1983-87	
06170000	McEachern Creek at international boundary	182	1924-77	1978-80
06170050	Rock Creek below McEachern Creek, near international boundary	650	1983-87	
06170080	Starbuck Coulee near international boundary	4.16	1983-87	
06170200	Willow Creek near Hinsdale	283	1965-73	
06170500	Rock Creek Canal near Hinsdale	--	1918-20	
06171000	Rock Creek near Hinsdale	1,313	1906-07,1912-20	
06171500	Milk River at Hinsdale	20,897	1908-14,1952	
06172000	Milk River near Vandalia	20,926	1915-25,1928-39, 1952	
06172000	Milk River at Vandalia	20,944	1970-73,1983-86	1970-73
06172200	Buggy Creek near Tampico (Lime Creek)	105	1958-67	

Table 12.--*Discontinued streamflow-gaging and water-quality stations*--Continued

Station number	Station name	Drainage area (square miles)	Period of record	
			Surface water	Water quality
	Part 6--Missouri River Basin--Continued			
06172310	Milk River at Tampico	21,078		1974-77
--	Milk River at Glasgow	--	1952	
06172500	Sheepshed Reservoir	11.3	1955-67	
06173000	Halfway Reservoir	16.2	1955-62	
06173500	Burnett Northwest Reservoir	5.0	1954-59,1960-67	
06174000	Willow Creek near Glasgow	538	1954-87	1954-64
06174200	Milk River near Glasgow	23,200	1952	1969-73
06174550	Middle Fork Porcupine Creek near Baylor	--		1982-83
06174700	West Fork Porcupine Creek near Baylor	--		1982-83
06175000	Porcupine Creek at Nashua	725		1982-89
06175400	Frazer Reservoir outlet near Frazer	--		1959-74
06175500	Little Porcupine Creek at Frazer	280	1909-16,1918-19	
06175505	Little Porcupine Creek below diversion, at Frazer	--		1982-84
06175540	Prairie Elk Creek near Oswego	352	1975-85	1976-79
06175580	Sand Creek near Wolf Point	--		1976-77
06176000	Wolf Point ditch at Wolf Point	--	1909-10	
06176500	Wolf Creek near Wolf Point	251		1982-84
06177000	Missouri River near Wolf Point	82,290		1948-51,1961-62, 1965-68,1970-73, 1979-85
06177025	Tule Creek near Poplar	--		1982,1984
06177150	Redwater River at Brockway	216		1980,1982-83
06177400	McCune Creek near Circle	29.9	1982-85	
06177500	Redwater River at Circle	547		1975-85
06177520	Horse Creek near Circle	101		1977-79
06177650	Redwater River near Richey	1,071	1982-86	1982-85
06177700	Cow Creek tributary near Vida	1.71	1982-85	
06177825	Redwater River near Vida	1,974	1975-85	1976-85
06178150	Poplar River near Scobey	572		1975-80
06179000	East Fork Poplar River near Scobey	722	1935-40,1975-79	
06179500	West Fork Poplar River at international boundary	139	1931-53	1976-83
06180000	West Fork Poplar River near Richland	428	1935-49	
06180200	West Fork Poplar River near Four Buttes	--		1975-76
06180500	Poplar River near Bredette	2,940	1934-47	1980
06181500	Big Muddy Creek at international boundary	29.0	1949-52	
06182000	Beaver Creek near international boundary	185	1949-53	
06182500	Big Muddy Creek at Daleview	279	1947-72	
06183000	Big Muddy Creek at Plentywood	850	1948-53	
06183500	Big Muddy Creek at Reserve	1,044	1920-25,1950-53	
06183750	Lake Creek near Dagmar	101	1985-89	
06183800	Cottonwood Creek near Dagmar	126	1985-89	
06183850	Sand Creek near Dagmar	122	1985-89	
06183900	Wolf Creek near Reserve	--		1982-84
06184000	Wolf Creek near Medicine Lake	165	1918-19	
06184400	Smoke Creek near Flaxville	--		1982-84
06184500	Smoke Creek near Poplar	283	1918	
06185000	Big Muddy Creek near Culbertson	2,447	1908-22	
06185110	Big Muddy Creek near mouth, near Culbertson	2,684		1982-89
06185150	Hardscrabble Creek near Culbertson	121		1981-83
06185500	Missouri River near Culbertson	91,557		1946,1965-86
	Part 6--Yellowstone River Basin			
06186000	Yellowstone Lake at Bridge Bay, Yellowstone National Park	1,006	1921-86	
06186500	Yellowstone River at Yellowstone Lake outlet, Yellowstone National Park	1,006		1984-85
06187000	Yellowstone River near Canyon Hotel, Yellowstone National Park	1,157	1913-51	
06187500	Tower Creek at Tower Falls, Yellowstone National Park	50.4	1922-43	
06187550	Yellowstone River at Tower Junction, Yellowstone National Park	1,342	1984-86	1984-85
06187950	Soda Butte Creek near Lamar Ranger Station, YNP	99		1989
06188500	East Fork Blacktail Deer Creek near Mammoth, Yellowstone National Park	10.3	1938-41	
06189000	Blacktail Deer Creek near Mammoth, YNP	14.3		1989
06189500	Bear Creek at Jardine	40.8	1946-49	
06190000	Lupine Creek near Mammoth, Yellowstone National Park	4.67	1938-41	
06190500	Gardner River at Mammoth, Yellowstone National Park	200	1922-39	
06191800	Big Creek near Emigrant	60.9	1973-79,1983-85	
06192000	Mill Creek near Pray	148	1951-56	
06193000	Shields River near Wilsall	87.8	1935-57	
06193500	Shields River at Clyde Park	543	1921-23,1929-32, 1934-67	1965
06194000	Brackett Creek near Clyde Park	57.9	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	
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	
06197020	Big Timber Creek near mouth, near Big Timber	--		1965

Table 12.--*Discontinued streamflow-gaging and water-quality stations*--Continued

Station number	Station name	Drainage area (square miles)	Period of record	
			Surface water	Water quality
	Part 6--Yellowstone River Basin--Continued			
06197500	Boulder River near Contact	226	1910-16,1929, 1950-69,1970-74, 1981-83	1971-73
06198000	East Fork Boulder River near McLeod	85.6	1907-10,1982-83	
06198500	West Fork Boulder River near Bruffeys	91.6	1904-10	
06199000	West Boulder River at McLeod	135	1907-14	
06199500	Boulder River near McLeod	476	1912-14	
06200000	Boulder River at Big Timber	523		1965
06200400	Sweet Grass Creek near Melville	46.3	1907-12	
06200500	Sweet Grass Creek above Melville	54.4	1913-25,1937-69	
06201000	Sweet Grass Creek below Melville	143	1907-24,1937-43, 1946-52	
06201500	Sweet Grass Creek near Greycliff	367	1941-42	
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	
06202530	Stillwater River above West Fork, near Nye	--		1971-73
06202597	Castle Creek near Nye	--		1973
06202598	West Fork Stillwater River below Castle Creek, near Nye	122		1971-73
06202600	Stillwater River at Nye	337	1969-77	1970
06202610	Stillwater River at Beehive	371		1971-73
06203000	East Rosebud Creek near Roscoe	105	1920-21	
06203500	East Rosebud Creek at Roscoe	125	1921-24	
06204300	Butcher Creek near Absarokee	39.6	1960-62	1960
06204500	Rosebud Creek near Absarokee	394	1935-69	
06204700	Rosebud Creek at Absarokee	401	1910-14	
06205200	Yellowstone River at Laurel	8,189		1974-79
06205450	Clarks Fork Yellowstone River at Montana-Wyoming State line, near Cooke City	--		1975-77
06207500	Clarks Fork Yellowstone River near Belfry	1,154		1966-88
06207510	Big Sand Coulee at Wyoming-Montana State line	134	1973-81	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	1969-75
06207700	North Fork Bluewater Creek near Bridger	--		1961-70
06207800	Bluewater Creek near Bridger	28.1	1960-70	1960-70
06207850	Bluewater Creek at Sanford Ranch	43.9		1960-70
06207870	Bluewater Creek near Fromberg	46.6		1960-70
06207900	Bluewater Creek at Fromberg	53.2	1961-64	1960-70,1980
06208000	Clarks Fork Yellowstone River at Fromberg	1,940	1905-14	
06208400	Elbow Creek near Joliet	48.6	1984	1984
06208500	Clarks Fork Yellowstone River at Edgar	2,032		1972-73
06208800	Clarks Fork Yellowstone River near Silesia	2,093	1970-87	1977-84
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	
06209500	Rock Creek near Red Lodge	124	1932-82,1985-86	
06210000	West Fork Rock Creek below Basin Creek, near Red Lodge	63.1	1937-57	
06210500	West Fork Rock Creek, near Red Lodge	66.9	1932-44	
06213000	Red Lodge Creek near Boyd	234	1932-37	
06213500	Rock Creek at Joliet	539	1946-53	
06214000	Rock Creek near Rockvale	569	1920-22,1952-40, 1984-90	
06214050	Clarks Fork Yellowstone River near Laurel	2,783		1969-73
06214100	Yellowstone River near Laurel	11,060		1969-72
06215000	Pryor Creek above Pryor	39.6	1921-25,1967-74	1987-90
06215500	Lost Creek near Pryor	9.72	1921-24	
06216500	Pryor Creek near Billings	440	1911-24,1938-54	
06217000	Pryor Creek at Huntley	606	1904-17	
06217500	Yellowstone River at Huntley	12,840	1908-16	1951-52,1971-81
06217750	Fly Creek at Pompey's Pillar	285	1969-81	1969-81
06217950	Buffalo Creek near Custer	221	1980-83	
06218000	Yellowstone River at Junction (at Custer)	14,427	1906-08	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	
06286370	Big Bull Elk Creek near St Xavier	35.0	1965-68	
06286390	Black Canyon Creek near St. Xavier	52.0	1965-66	
06286395	Black Canyon Creek below Three Springs Creek, near St. Xavier	75.0	1966-68	
06286500	Bighorn Canal below wasteway, near St. Xavier	--	1947-52	
06287000	Bighorn River near St. Xavier	19,667		1963-81
06287500	Soap Creek near St. Xavier	98.3	1911-14,1939-53, 1968-72	
06287700	Soap Creek near mouth, near St. Xavier	111	1914-24	
06288000	Rotten Grass Creek near St. Xavier	147	1911-22,1968-73	
06288200	Beauvais Creek near St. Xavier	100	1967-78	1967-78
06288500	Bighorn River near Hardin	20,722	1904-25,1928-33	1951,1963-74, 1987-89

Table 12.--*Discontinued streamflow-gaging and water-quality stations*--Continued

Station number	Station name	Drainage area (square miles)	Period of record	
			Surface water	Water quality
	Part 6--Yellowstone River Basin--Continued			
06288960	Little Bighorn River near Parkman, Wyoming	137	1970-72	
06288990	West Fork Little Bighorn River near Parkman, Wyoming	38.2	1970-72,1983-87	
06289500	Little Bighorn River near Wyola	251	1912-24	
06290500	Little Bighorn River below Pass Creek, near Wyola	428		1970-75,1977
06292000	Lodge Grass Creek near Wyola	88.9	1921-24	
06292500	Lodge Grass Creek near Lodge Grass	143	1912-16,1921-24	
06293000	Lodge Grass Creek at Lodge Grass	170	1916-20	
06293500	Little Bighorn River near Crow Agency	1,181	1912-24,1928-33, 1938-60	
06293900	Little Bighorn River at Crow Agency	1,190	1905-06	
06294000	Little Bighorn River near Hardin	1,294		1970-79, 1987-89
06294600	East Cabin Creek tributary near Hardin	8.63	1982-85	
06294690	Tullock Creek near Bighorn	446	1975-82	
06294700	Bighorn River at Bighorn	22,885	1945-81	
06294840	Yellowstone River at Myers	37,680		1974-77
06294920	East Fork Sarpy Creek near Colstrip	--		1981-83
06294940	Sarpy Creek near Hysham	453	1973-84	1975-84
06294950	Starved to Death Creek near Sanders	36.9	1980-85	
06294980	East Fork Armells Creek near Colstrip	97.3		1975-85
06294991	West Fork Armells Creek near Forsyth	48.2		1975-77
06295000	Yellowstone River at Forsyth	40,339		1974-82
06295100	Rosebud Creek near Kirby	35.5	1982-85,1988	
06295110	Rosebud Creek at Kirby	116		1978-79
06295113	Rosebud Creek at reservation boundary, near Kirby	123		1980-84
06295250	Rosebud Creek near Colstrip	799		1975-85
06295350	Greenleaf Creek near Colstrip	30.5		1975-76
06295380	Cow Creek near Colstrip	27.2		1980-85
06295400	Rosebud Creek above Pony Creek, near Colstrip	961		1975-78
06295420	Snider Creek near Brandenberg	11.9		1978-81
06295500	Rosebud Creek near Rosebud	1,193	1938-43	1975-77
06296000	Rosebud Creek near Forsyth	1,279	1947-54	
06296100	Snell Creek near Hathaway	10.5	1982-85	
06296120	Yellowstone River near Miles City	42,847		1969-84
06306000	Tongue River near Acme, Wyoming	894	1939-57	
06306100	Squirrel Creek near Decker	33.6	1975-86	1976-85
06306250	Prairie Dog Creek near Acme, Wyoming	358	1971-79	
06306500	Tongue River near Decker	1,585	1928-38	
06306800	Deer Creek near Decker	38.3		1975-77
06306900	Spring Creek near Decker	34.7		1978-82
06306950	South Fork Leaf Rock Creek near Kirby (Leaf Rock Creek near Kirby)	4.53	1982-85	
06307510	Fourmile Creek near Birney	22.3		1975-76
06307525	Prairie Dog Creek above Jack Creek, near Birney	6.57	1979-82	1978-83
06307528	Prairie Dog Creek near Birney	19.6	1979-84	1978-83
06307530	Bull Creek near Birney	45.8		1975-76
06307540	Hanging Woman Creek at State line, near Otter	90.2		1980-83
06307545	Waddle Creek near Otter	51.0		1980-83
06307550	Trail Creek near Otter	17.4		1980-83
06307560	East Trail Creek near Otter	31.3	1976-81	1977-81
06307563	Corral Creek near Otter	26.5		1980-83
06307567	Horse Creek near Birney	16.0		1980-83
06307570	Hanging Woman Creek below Horse Creek, near Birney	321		1978-83,1986-87
06307610	Tongue River below Hanging Woman Creek, near Birney	2,533		1974-79
06307615	Cook Creek near Birney	62.6		1975-77
06307665	Otter Creek near Otter	40.9		1978-84
06307670	Bear Creek at Otter	90.4		1975-77
06307717	Otter Creek below Fifteenmile Creek, near Otter	453	1982-86	1982-85
06307725	Otter Creek above Tenmile Creek, near Ashland	466		1978-81
06307730	Threemile Creek near Ashland	51.5		1975-76
06307735	Home Creek near Ashland	58.7		1977-83
06307737	East Fork Otter Creek near Ashland	--		1983-84
06307800	Tongue River near Ashland	3,830	1956-73	
06307810	Beaver Creek near Ashland	92.3		1974-76
06307830	Tongue River below Brandenberg Bridge, near Ashland	4,062	1973-84	1974-81
06307840	Liscom Creek near Ashland	47.6		1975-77
06307890	Foster Creek near Volborg	116		1975-77
06308000	Tongue River near Miles City	4,539	1929-33	
06308080	Pumpkin Creek near Sonnette	70.7		1976-77
06308160	Pumpkin Creek near Loesch	170		1976-79
06308170	Little Pumpkin Creek near Volborg	101		1976-77
06308190	Pumpkin Creek near Volborg	386		1976-85
06308400	Pumpkin Creek near Miles City	697	1972-85,1987	1976-85
06309000	Yellowstone River at Miles City	48,253		1948-52,1965, 1974-75,1977-83
06309075	Sunday Creek near Miles City	714	1975-84	
06309079	Muster Creek near Kinsey	28.5		1978-80
06309083	Yellowstone River near Shirley	49,100		1970
06309145	Custer Creek near Kinsey	151		1978-80
06324410	Powder River below Fence Creek, near Moorhead	--		1974
06325000	Little Powder River at Biddle	1,541	1938-43	

Table 12.--*Discontinued streamflow-gaging and water-quality stations*--Continued

Station number	Station name	Drainage area (square miles)	Period of record	
			Surface water	Water quality
	Part 6--Yellowstone River Basin--Continued			
06325500	Little Powder River near Broadus	1,974	1947-53,1957-72	
06325550	Little Powder River at mouth, near Broadus	--		1988-90
06325650	Powder River near Powderville	--		1988-90
06326000	Powder River near Mizpah	12,132	1928-33	1989
06326050	Mizpah Creek at Olive	124		1976-77
06326200	Mizpah Creek near Volberg	510		1976-78,1989
06326300	Mizpah Creek near Mizpah	797	1975-86	1976-84,1989-90
06326507	Locate Creek near Ismay	62.5		1980-83
06326520	Powder River at mouth, near Terry	13,512		1978,1980-82, 1989
06326530	Yellowstone River near Terry	63,447		1974-83
06326600	O'Fallon Creek near Ismay	669		1978-84
06326850	O'Fallon Creek at Mildred	1,396	1975-78	
06326952	Clear Creek near Lindsay	101	1982-85,1988	
06326953	Clear Creek near Hoyt	138		1978-80
06326995	Upper Sevenmile Creek near Lindsey	137		1978-80
06327000	Upper Sevenmile Creek near Glendive	--	1921-22	
06327500	Yellowstone River at Glendive	66,788	1898-1911,1932-34	
06327850	Glendive Creek near Glendive	300		1978-81
06328000	Deer Creek near Glendive	198	1921-22	1978-80
06328200	Lower Sevenmile Creek near Bloomfield	25.2	1982-86	
06328500	Lower Yellowstone Canal at Lower Yellowstone Dam, at Intake	--		1971
06328690	Lower Yellowstone Project main canal drain, near Cartwright, North Dakota	--		1971
06329000	Cottonwood Creek near Intake	85.3		1978-81
06329200	Burns Creek near Savage	233	1958-67,1975-84, 1986	1976-79,1984, 1986
06329400	Sears Creek near Crane	26.9		1971
06329520	Fox Creek near Lambert	183		1981-83
06329540	Lone Tree Creek near Sidney	39.4		1981-83
06333500	Little Missouri River at Alzada	671	1904-07	1949-50
06333850	North Creek near Alzada	.68	1951	
06333900	North Creek spreader diversion near Alzada	1.29	1952-56	
06334000	Little Missouri River near Alzada	904	1911-25,1928-32, 1935-69	
06334630	Boxelder Creek near Webster	1,092	1959-73	1972-73
06336447	Duck Creek near Wibaux	46.5	1978-85	1979
06336500	Beaver Creek at Wibaux	351	1938-69,1979-83	1979-84
06336510	Upper Hay Creek tributary No.2 near Wibaux	4.1		1979,1981
06336515	Hay Creek near Wibaux	11.4		1978-81
06336545	Little Beaver Creek near Wibaux	96.2	1978-81	1979-80
	Part 12--Kootenai River Basin			
12300000	Kootenay River at Newgate, British Columbia	7,660	1931-72	1949,1965
12300200	Young Creek near Rexford	36.0	1973-75	
12300500	Fortine Creek near Trego	112	1947-53	
12301000	Grave Creek near Fortine	64.9	1923-24	
12301300	Tobacco River near Eureka	440		1971-85
12301500	Kootenai River near Rexford	8,420	1929-41,1968-71	1967-72
12301550	Pinkham Creek near Rexford	75.7	1973-81	
12301600	Lake Koocanusa below Pinkham Creek, near Rexford	--		1972-76
12301810	Big Creek near Rexford	137	1972-81	
12301850	Kootenai River at Worland Bridge, near Libby	8,892	1961-71	1962-71
12301921	Libby Dam near Libby	--		1964
12301990	Fisher River above Wolf Creek, near Libby	768		1967-70
12301999	Wolf Creek near Libby	216	1967-77	1967-70
12302000	Fisher River near Jennings	780	1951-69	1963-69
12302055	Fisher River near Libby	838		1967-85
12302500	Granite Creek near Libby	23.6	1933-34,1936-44, 1960-69	
12303000	Kootenai River at Libby	10,240	1911-91	1969-73,1978
12303400	Ross Creek near Troy	23.8		1971,1976-78
12303430	Stanley Creek near Troy	12.8		1976-78
12303490	Lake Creek near Troy	188		1976-78
12304000	Callahan Creek at Troy	85.8	1911-12,1914-16	
12304200	Yaak River near Yaak	493	1957-62	
12304500	Yaak River near Troy	766		1963-73,1975-85
	Part 12--Pend Oreille River Basin			
12323200	Blacktail Creek near Butte	14.7	1984-88	
12323500	German Gulch Creek near Ramsay	40.6	1955-69	
12323750	Silver Bow Creek at Warm Springs	483	1972-79	1971
12324000	Racetrack Creek near Anaconda	30	1911-13	
12324100	Racetrack Creek below Granite Creek, near Anaconda	39.5	1914-17,1957-73	
12324300	Clark Fork near Garrison	1,139	1961-62	
12324600	Clark Fork at Garrison	1,550		1969-71
12324660	Gold Creek at Goldcreek	64.1	1964-66	
12326000	Trout Creek above main canal, near Philipsburg	4.09	1946-49	
12326500	Trout Creek near Southern Cross	34.8	1946-51	

Table 12.--*Discontinued streamflow-gaging and water-quality stations*--Continued

Station number	Station name	Drainage area (square miles)	Period of record	
			Surface water	Water quality
	Part 12--Pend Oreille River Basin--Continued			
12327000	Trout Creek near Philipsburg	34.9	1939-43,1945-46	
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
12329000	Flint Creek above Maxville Siding, at Maxville	207	1939-41	
12330100	Flint Creek below Boulder Creek, near Maxville	--		1971
12330500	Flint Creek near Maxville	325	1946-49	
12331000	Flint Creek near Hall	325	1939	
12331500	Flint Creek near Drummond	490	1948-49	
12331600	Clark Fork at Drummond	2,378	1967-68,1971-83	1971-74
12331900	Clark Fork near Clinton	2,629	1980-90	1979-83
12333000	East Fork Rock Creek near Philipsburg	30.3	1935-43	
12333500	Rock Creek near Quigley	749	1922-27	
12334000	Ranch Creek near Quigley	42.7	1922-27	
12334500	Rock Creek below Ranch Creek, near Quigley	794	1910-12	
12334600	Blackfoot River near Lincoln	15.1	1969-70	1969-70
12334650	Blackfoot River below Alice Creek, near Lincoln	96.9	1971-75	1971-75
12334700	Blackfoot River below 7-Up Pete Creek, near Lincoln	255		1973
12334800	Blackfoot River at Dalton Mountain Road, near Lincoln	399		1973
12334900	Blackfoot River at Blackfoot Canyon Campground, near Lincoln	437		1973
12335000	Blackfoot River near Helmville	481	1940-54	
12335500	Nevada Creek above reservoir, near Finn	116		1980
12336000	Nevada Creek near Finn	144	1934-39	
12337000	Nevada Creek near Helmville	165	1946-49	
12337500	Douglas Creek near Helmville	84.8	1946-47	
12338000	North Fork Blackfoot River near Ovando	228	1921-23	
12338500	Blackfoot River near Ovando	1,274	1940-63	
12338690	Monture Creek near Ovando	140	1973-83	
12339000	Blackfoot River at Clearwater	1,550	1921-23	
12339500	Clearwater River at Clearwater	391	1921-23	
12339800	Blackfoot River near Potomac	2,046	1957-65	
12341000	Rattlesnake Creek at Missoula	79.7	1899-1901,1958-67	
12341500	Clark Fork at Missoula	6,084	1898-1907	
12343000	West Fork Bitterroot River near Darby	552	1910-17	
12343400	East Fork Bitterroot River near Conner	381	1956-72	
12343500	East Fork Bitterroot River at Conner	405	1910-16,1937-57	
12345000	Rock Creek near Darby	55.4	1946-53,1957-59	
12345500	Rock Creek Canal near Darby	--	1946,1948-53	
12345850	Sleeping Child Creek near Hamilton	65.2	1973-77	
12346000	Bitterroot River near Grantsdale	1,414	1902-07	
12346500	Skalkaho Creek near Hamilton	87.8	1949-53,1957-79	1980
12347000	Skalkaho Creek at Brennan's ranch, near Hamilton	96.2	1920-24	
12347500	Blodgett Creek near Corvallis	25.9	1947-69	
12348000	Blodgett Creek near Hamilton	28.3	1938-43	
12348200	Bitterroot River near Corvallis	1,711	1959-63	1959-63
12348500	Willow Creek near Corvallis	22.4	1920-24,1957-66	
12349000	Willow Creek at Anfinson Ranch, near Corvallis	23.2	1938-43	
12349500	Fred Burr Creek near Victor	17.7	1947-51	
12350000	Bear Creek near Victor	26.8	1938-55,1957-59	
12350500	Kootenai Creek near Stevensville	28.9	1949-53,1957-63	
12351000	Burnt Fork Bitterroot River near Stevensville	74.0	1920,1922-24, 1938-62	
12351200	Bitterroot River near Florence	2,354	1957-66	
12351400	Eightmile Creek near Florence	20.6	1957-63	
12351500	Lolo Creek near Lolo	231	1911-15	
12352000	Lolo Creek above Sleeman Creek, near Lolo	250	1951-60	
12352980	Bitterroot River at Maclay Bridge, near Missoula	2,850		1970-73
12353280	Ninemile Creek near Huson	170	1973-83	
12353300	Clark Fork near Alberton	9,272	1959-63	1969-71
12353500	Clark Fork at Tarkio	9,882	1945-49	
12353820	Dry Creek near Superior	46.3	1982-86	
12354000	St. Regis River near St. Regis	303	1910-17,1958-75	
12355100	Starvation Creek near Flathead, British Columbia	16.4	1986-87	
12355150	Tuchuck Creek near Flathead, British Columbia	10.1	1986-88	
12355350	Big Creek at Big Creek Ranger Station, near Columbia Falls	82.1		1980
12355600	Middle Fork Flathead River at Schafer Ranger Station, near Essex	--		1970
12355700	Middle Fork Flathead River near Essex	408	1957-61	
12355900	Middle Fork Flathead River above Bear Creek, near Essex	--		1970
12356000	Skyland Creek near Essex	8.09	1946-52	
12356500	Bear Creek near Essex	20.4	1946-52	
12357000	Middle Fork Flathead River at Essex	510	1940-53,1956-64	
12357500	Middle Fork Flathead River at West Glacier	943	1911-23,1929-33, 1943-48	
12358000	McDonald Creek at Apgar	175	1912-14	
12358500	Middle Fork Flathead River near West Glacier	1,128		1949-50,1970
12358900	South Fork Flathead River above Harrison Creek, near Hungry Horse	--		1970
12359000	South Fork Flathead River at Spotted Bear Ranger Station, near Hungry Horse	958	1948-57,1959-67	1964
12359500	Spotted Bear River near Hungry Horse	184	1949-56	1963

Table 12.--*Discontinued streamflow-gaging and water-quality stations*--Continued

Station number	Station name	Drainage area (square miles)	Period of record	
			Surface water	Water quality
	Part 12--Pend Oreille River Basin--Continued			
12359800	South Fork Flathead River above Twin Creek, near Hungry Horse	1,160		1965-81
12360000	Twin Creek near Hungry Horse	47.0	1948-56,1965-67	1965-67
12360500	Lower Twin Creek near Hungry Horse	22.4	1948-56	
12360600	Soldier Creek near Hungry Horse	4.77	1965-67	1965-67
12361000	Sullivan Creek near Hungry Horse	71.3	1948-56,1959-76	1963-66
12361500	Graves Creek near Hungry Horse	27.0	1948-56,1965-67	1965-67
12361600	Canyon Creek near Hungry Horse	5.8	1965-67	1965-67
12361700	Goldie Creek near Hungry Horse	3.29	1965-67	
12361880	Wounded Buck Creek near Hungry Horse	13.6	1965-67	
12361950	Hungry Horse Creek near Hungry Horse	23.3	1969-72	
12361960	Emery Creek near Hungry Horse	26.4	1965-67	1965-67
12363500	Flathead River near Kalispell	--		1968-69
12363920	Stillwater River at Olney	146	1973-82	
12364000	Logan Creek at Tally Lake, near Whitefish	183	1931-34,1936-42, 1945-47	
12364500	Logan Creek near Whitefish	199	1931	
12365000	Stillwater River near Whitefish	524		1977-83
12365500	Stillwater River near Kalispell	338	1907,1922, 1928-31	
12365800	Swift Creek near Whitefish	78.0	1973-81	1977-81
12366000	Whitefish River near Kalispell	170		1977-83
12367000	Ashley Creek near Kila	44.2	1916	
12367500	Ashley Creek near Kalispell	201	1931-50,1972-74	1969-70
12367800	Ashley Creek below Kalispell	--		1969-70
12368500	Flathead River at Therriault Ferry, near Kalispell	--	1934-45	
12369000	Flathead River near Bigfork	--		1969-71
12370900	Teepee Creek near Polson	2.17	1983-87	1983-85
12371100	Hell Roaring Creek near Polson	6.22	1917-32	
12371550	Flathead Lake at Polson	7,086		1969-71
12372000	Flathead River near Polson	7,096		1977-83
12373000	Little Bitterroot River near Marion	31.8	1910-16	
12374000	Little Bitterroot River near Hubbart	134	1909-16	
12374250	Mill Creek above Bassoo Creek, near Niarada	19.6		1983-85
12374500	Little Bitterroot River near Niarada	223	1908-10,1916-17	
12374800	Cromwell Creek near Niarada	14.3		1983-85
12375900	South Crow Creek near Ronan	7.57		1983-85
12376000	Crow Creek near Ronan	46.1	1907-17	
12376500	Mud Creek near Ronan	30.4	1908-11	
12377000	Crow Creek at Lozeaus ranch, near Ronan	139	1911-16	
12377150	Mission Creek above reservoir, near St. Ignatius	12.4		1983-86
12377500	Dry Creek near St. Ignatius	24.7	1908-16	
12378000	Mission Creek near St. Ignatius	74.8	1907-17	
12378500	Post Creek at Fitzpatrick's ranch, near Ronan	28.4	1907-11	
12379000	Post Creek at Deschamp's ranch, near Ronan	29.7	1911	
12379500	Post Creek near St. Ignatius	47.6	1912-17	
12381000	Jocko River above South Fork, near Jocko	14.9	1912-16	
12381400	South Fork Jocko River near Arlee	56.0	1983	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	
12383500	Big Knife Creek near Arlee (Big Knife Creek above Big Knife Canal, near Jocko)	6.88		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	
12387450	Valley Creek near Arlee	15.3		1983-85
12387500	Valley Creek near Ravalli	64.1	1909-10	
12388000	Jocko River at Ravalli	348	1907-11	
12388500	Revais Creek near Dixon	35.0	1911-19	
12388650	Camas Creek near Hot Springs	4.46	1983-87	1983-85
12389000	Clark Fork near Plains	19,958		1969-77
12389200	Thompson River near Marion	104		1975-76
12389300	Thompson River above Little Thompson River, near Thompson Falls	321		1975-76
12389400	Little Thompson River near Thompson Falls	129		1975-76
12389450	West Fork Thompson River near Thompson Falls	35.7		1975-76
12389500	Thompson River near Thompson Falls	642		1975-79
12390500	Prospect Creek near Thompson Falls	145	1911	
12391000	Clark Fork at Thompson Falls	21,113	1952-59	1969-73
12391500	Bull River near Heron	--		1971
12391550	Bull River near Noxon	139	1973-82	1977-79

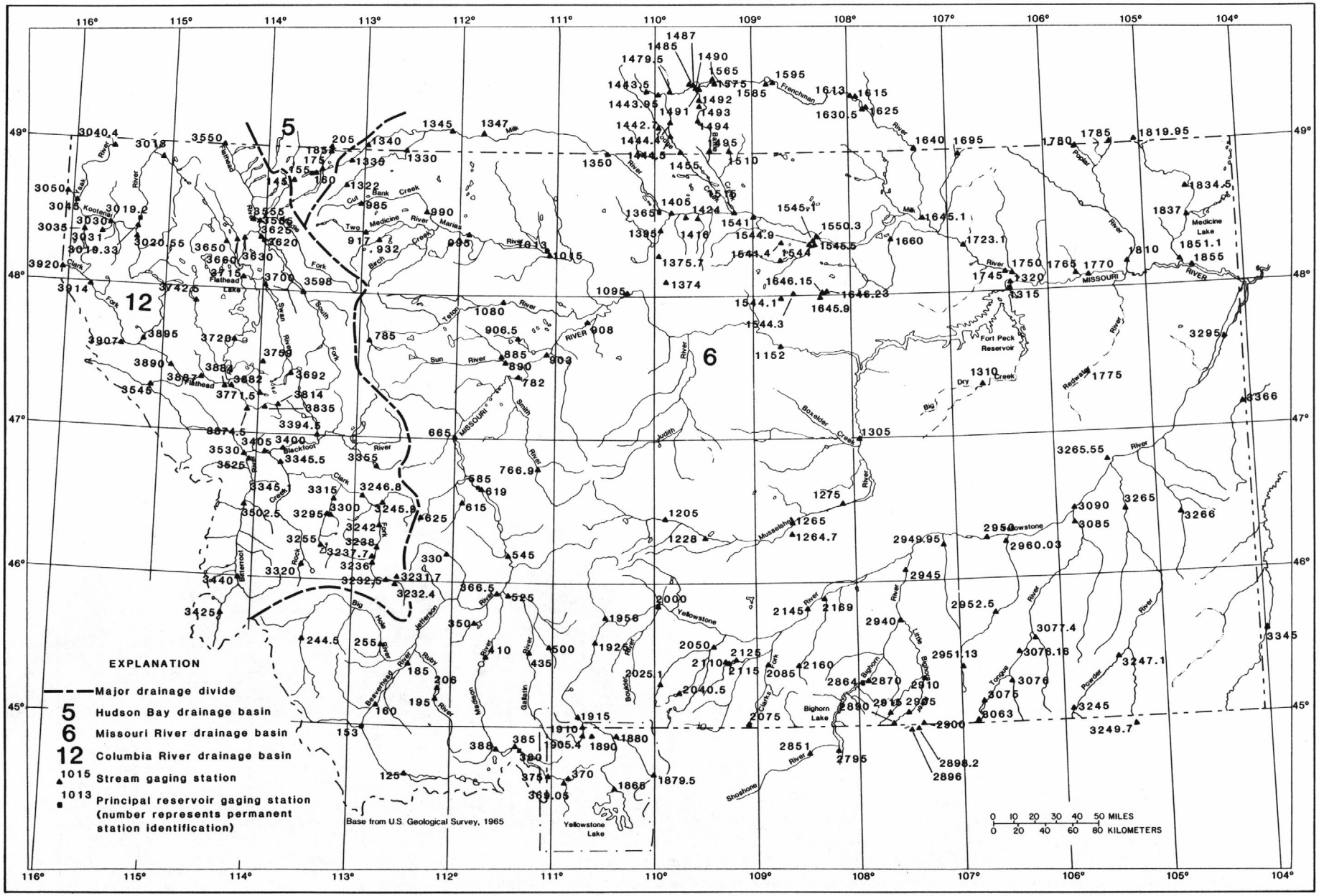

Figure 7.--Location of surface-water gaging stations, water year 1991.

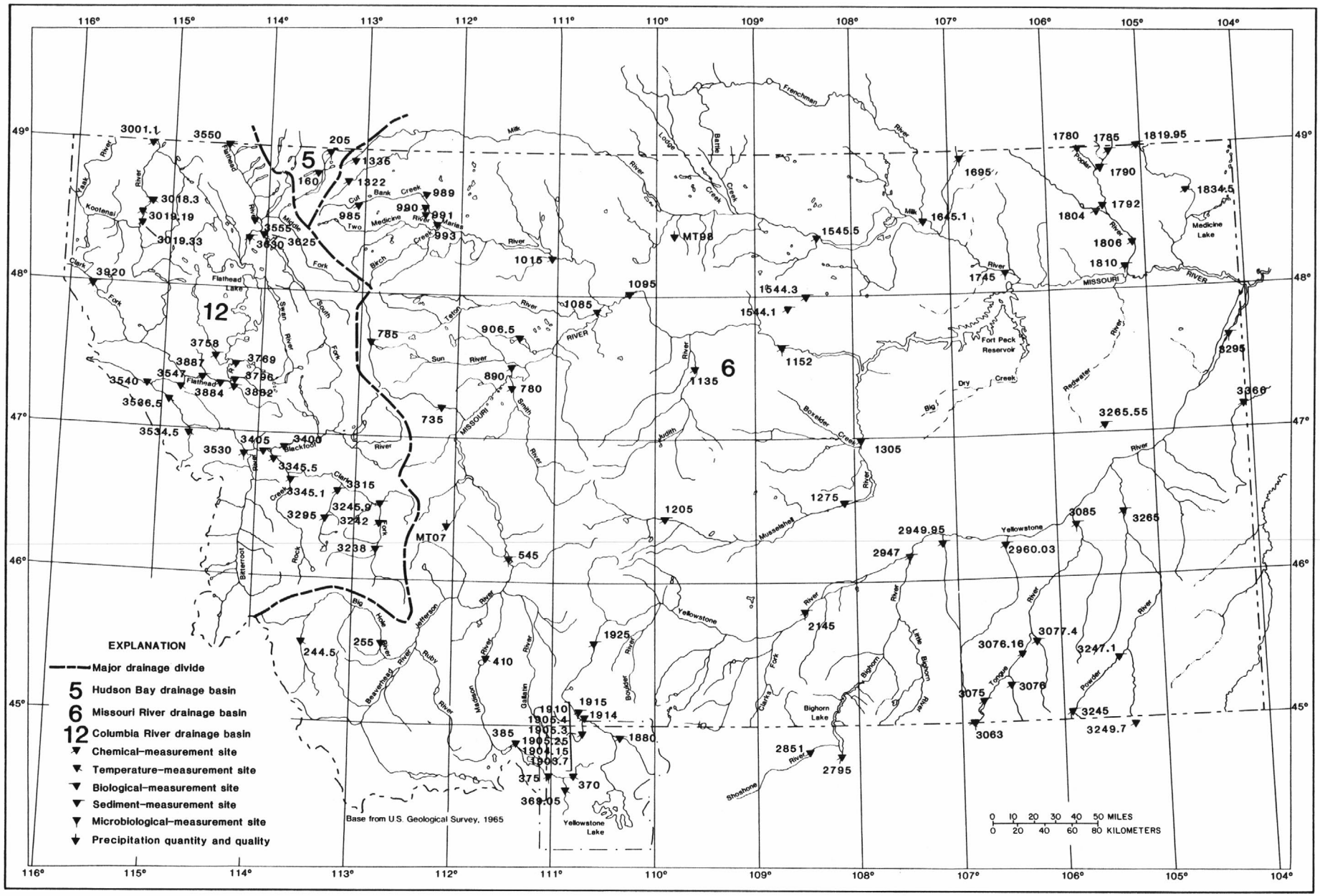

Figure 8.--Location of water-quality stations, water year 1991.

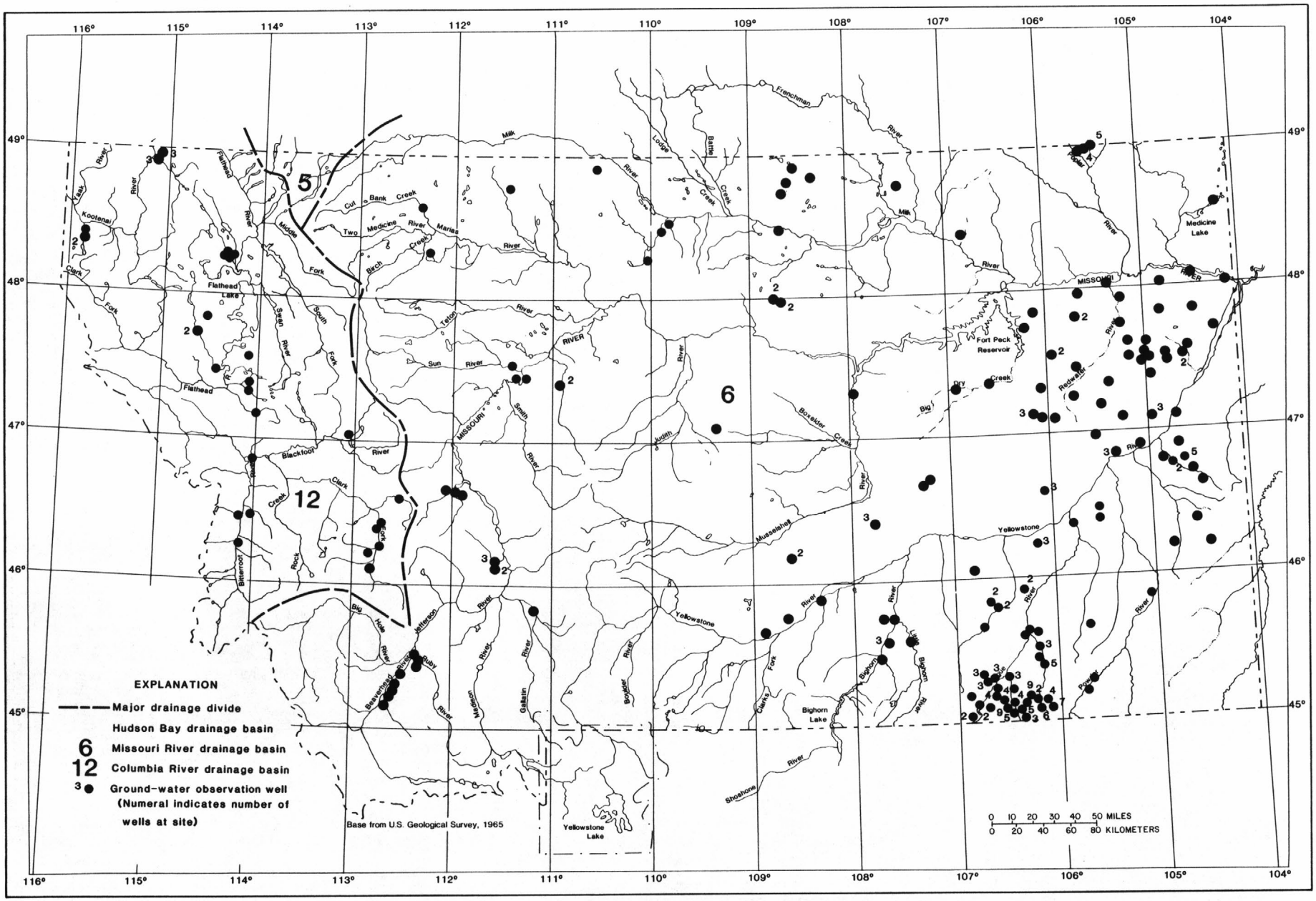

Figure 9.--Location of ground-water observation wells, water year 1991.

STATION RECORDS, SURFACE WATER AND WATER QUALITY

SASKATCHEWAN RIVER BASIN

05014500 SWIFTCURRENT CREEK AT MANY GLACIER, MT

(Hydrologic bench-mark station)

LOCATION.--Lat 48°47'57", long 113°39'21", in SE1/4 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^2.

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. Datum of gage is 4,876.78 ft above National Geodetic Vertical Datum of 1929. Prior to May 23, 1916, nonrecording gage on left bank of lake opposite present gage and at present datum, and May 23, 1916, to June 15, 1918, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Dec. 22 to Jan. 22, Mar. 5 to Apr. 1, and May 8-11. Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--35 years, (1917-19, 1958-91), 143 ft^3/s, 62.85 in/yr, 103,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,700 ft^3/s, June 8, 1964, gage height, 10.00 ft, from floodmarks, from rating curve extended above 1,100 ft^3/s, on basis of computation of peak flow over dam; no flow Nov. 14-16, 1976, result of pumping operation.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 680 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 5	1500	744	3.99	June 12	0400	1,240	5.13
May 19	1900	*1,500	*5.68	June 21	0430	1,340	5.35
June 4	0330	814	4.16	July 1	0730	837	4.21

Minimum daily discharge, 11 ft^3/s, Feb. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	32	357	85	e27	12	24	e22	97	574	799	212	76
2	38	273	80	e26	11	25	30	87	733	675	211	72
3	38	199	73	e27	14	26	37	80	800	617	185	70
4	101	160	51	e27	18	30	54	74	765	663	173	67
5	606	138	57	e26	27	e27	162	67	623	661	169	63
6	499	111	54	e25	31	e26	252	73	580	560	173	59
7	291	94	52	e27	29	e27	208	107	564	456	178	56
8	196	91	50	e29	27	e28	171	e170	683	397	173	56
9	155	115	57	e30	26	e28	125	e220	724	373	176	60
10	181	375	78	e35	25	e30	99	e190	709	374	173	57
11	179	522	80	e40	26	e25	88	e210	920	347	173	53
12	151	377	66	e44	27	e25	73	245	1110	336	167	48
13	138	274	55	e43	29	e26	62	503	693	371	153	46
14	114	237	49	e41	28	e26	58	553	464	398	136	56
15	100	194	40	e40	30	e27	56	467	349	409	126	56
16	100	146	37	e37	35	e26	53	445	301	389	113	52
17	94	130	33	e37	35	e25	51	448	295	389	109	52
18	85	124	35	e35	34	e28	49	671	270	373	111	50
19	75	77	34	e31	33	e32	47	1280	276	295	119	46
20	69	100	32	e28	40	e29	53	1170	807	247	124	41
21	71	80	32	e27	34	e27	71	873	1230	237	126	44
22	62	77	e34	e24	33	e26	107	886	927	237	123	47
23	59	97	e34	25	32	e25	160	816	710	237	122	42
24	62	126	e35	24	29	e22	221	679	619	244	114	38
25	56	112	e31	23	28	e18	231	682	540	245	106	36
26	92	107	e28	21	26	e17	194	600	528	252	97	36
27	117	104	e26	19	26	e17	163	474	561	245	81	35
28	119	99	e22	19	25	e18	139	420	580	228	84	34
29	122	76	e20	15	---	e18	124	434	518	220	72	34
30	121	92	e23	13	---	e19	108	502	626	217	71	36
31	264	---	e30	12	---	e20	---	494	---	206	74	---
TOTAL	4387	5064	1413	877	770	767	3268	14017	19079	11697	4224	1518
MEAN	142	169	45.6	28.3	27.5	24.7	109	452	636	377	136	50.6
MAX	606	522	85	44	40	32	252	1280	1230	799	212	76
MIN	32	76	20	12	11	17	22	67	270	206	71	34
AC-FT	8700	10040	2800	1740	1530	1520	6480	27800	37840	23200	8380	3010
CFSM	4.51	5.38	1.45	.90	.88	.79	3.47	14.4	20.3	12.0	4.34	1.61
IN.	5.20	6.00	1.67	1.04	.91	.91	3.87	16.61	22.60	13.86	5.00	1.80

CAL YR 1990 TOTAL 55448 MEAN 152 MAX 655 MIN 16 AC-FT 110000 CFSM 4.84 IN. 65.69
WTR YR 1991 TOTAL 67081 MEAN 184 MAX 1280 MIN 11 AC-FT 133100 CFSM 5.85 IN. 79.47

e Estimated

SASKATCHEWAN RIVER BASIN

05015500 LAKE SHERBURNE AT SHERBURNE, MT
(International gaging station)

LOCATION.--Lat 48°49'42", long 113°31'16", in SE1/4SE1/4SE1/4 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^2.

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. Datum of gage is 4,709.45 ft above National Geodetic Vertical Datum of 1929. 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 datum 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 U.S. Bureau of Reclamation.

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, 65,210 acre-ft, July 3, gage height, 88.24 ft; minimum, 10,980 acre-ft, May 9, gage height, 44.49 ft.

MONTHEND GAGE HEIGHT AND CONTENTS AT 2400, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

Date	Gage height (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	49.77	15,770	--
Oct. 31	52.97	18,890	+3,120
Nov. 30	66.69	34,010	+15,120
Dec. 31	70.48	38,670	+4,660
CAL YR 1990			+8,600
Jan. 31	72.80	41,740	+3,070
Feb. 28	74.12	43,560	+1,820
Mar. 31	69.39	37,300	-6,260
Apr. 30	48.20	14,300	-23,000
May 31	70.01	38,070	+23,770
June 30	87.38	63,740	+25,670
July 31	87.18	63,400	-340
Aug. 31	73.67	42,940	-20,460
Sept. 30	49.40	15,420	-27,520
WTR YR 1991			-350

SASKATCHEWAN RIVER BASIN

05016000 SWIFTCURRENT CREEK AT SHERBURNE, MT

(International gaging station)

LOCATION.--Lat 48°49'49", long 113°30'59", in NW1/4SW1/4SW1/4 sec.36, T.36 N., R.15 W., Glacier County, Hydrologic Unit 10010002, Blackfeet 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^2.

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. Datum of gage is 4,730.26 ft above National Geodetic Vertical Datum of 1929. Prior to Aug. 10, 1920, nonrecording gages at two sites within 1,000 ft of present site at different datums. Aug. 10, 1920, to May 17, 1921, nonrecording gage at present site and May 18, 1921, to Sept. 30, 1975, water-stage recorder at present site, all at datum 9.45 ft lower. Several observations of water temperature and specific conductance were made during the year.

REMARKS.-- Estimated daily discharges: Feb. 1 to Mar. 2 and Oct. 31. Water-discharge records good except those for estimated daily discharges, which are fair. Flow regulated by Lake Sherburne (see preceding page).

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

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,420 ft^3/s, June 25, 1969, gage height, 7.63 ft; maximum gage height, 8.00 ft, July 13, 1990; no flow at times when gates in dam are closed.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,340 ft^3/s, June 22, gage height, 7.11 ft; minimum daily, 0.10 ft^3/s, Oct. 15, 17, 18, 30, 31.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1		e.20	e37	372	409	450	575	382	574	.16		
2		e.20	e39	444	387	480	703	436	569	.14		
3		e.20	40	516	384	485	860	469	565	.14		
4		e.20	40	514	380	593	976	468	560	.14		
5		e.20	40	509	375	655	970	467	558	.15		
6		e.20	40	507	372	635	958	515	603	.14		
7		e.20	39	504	369	434	896	547	626	.14		
8		e.20	39	502	367	338	608	545	619	.14		
9		e.20	39	520	368	341	558	544	613	.14		
10		e.20	39	530	367	449	558	542	611	3.1		
11		e.20	38	596	369	571	500	541	605	1.1		
12		e8.2	38	625	372	694	441	539	599	.39		
13		e14	38	618	379	698	383	488	592	.13		
14		e25	38	612	400	531	385	455	585	.12		
15		e34	64	606	483	191	443	454	579	.10		
16		e34	84	597	476	97	474	452	571	.12		
17		e34	84	590	329	98	482	452	563	.10		
18		e34	83	581	191	68	485	449	557	.10		
19		e34	82	573	550	90	476	502	550	.12		
20		e34	82	564	648	710	475	533	542	.11		
21		e34	143	557	604	1320	474	557	535	.15		
22		e36	178	551	489	1250	473	568	550	.18		
23		e36	176	589	257	547	401	590	577	.13		
24		e36	209	626	118	270	334	605	582	.13		
25		e36	327	665	89	399	308	602	571	.13		
26		e36	389	659	88	613	291	598	560	.13		
27		e36	387	649	198	650	291	594	455	.14		
28		e36	384	639	251	651	291	591	310	.14		
29		---	382	629	153	614	291	586	238	.14		
30		---	380	508	179	555	349	581	76	.10		
31		---	376	---	340	---	383	577	---	e.10		
TOTAL		539.40	4354	16952	10741	15477	16092	16229	16095	8.25		
MEAN		19.3	140	565	346	516	519	524	536	.27		
MAX		36	389	665	648	1320	976	605	626	3.1		
MIN		.20	37	372	88	68	291	382	76	.10		
AC-FT		1070	8640	33620	21300	30700	31920	32190	31920	16		

e Estimated

SASKATCHEWAN RIVER BASIN

05016000 SWIFTCURRENT CREEK AT SHERBURNE, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1990 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT							
30...	0830	E0.50	--	--	280	5.0	2.0
FEB							
28...	1050	36	--	--	129	-15.0	0.0
MAR							
12...	1420	38	--	--	140	3.0	1.0
21...	1320	180	--	--	143	9.0	1.0
MAY							
02...	1030	386	100	71	135	-0.5	2.0
JUN							
14...	1115	696	25	1	120	6.0	11.0
21...	1045	1310	--	--	116	11.0	9.0
AUG							
14...	1300	453	80	1	--	18.0	16.0

DATE	TIME	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)
MAY											
02...	1030	8.2	73	18	6.7	1.0	0.0	0.3	71	4.8	0.5
JUN											
14...	1115	8.1	60	15	5.4	1.0	0.1	0.2	58	3.2	0.1
AUG											
14...	1300	8.0	59	15	5.2	2.4	0.1	0.3	58	2.3	0.7

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)
MAY											
02...	<0.1	3.1	78	0.11	81.0	<0.01	0.16	<0.01	<0.01	<1	<0.5
JUN											
14...	0.1	2.9	64	0.09	119	<0.01	0.16	0.10	<0.01	<1	<0.5
AUG											
14...	0.1	2.0	63	0.08	76.8	0.01	<0.05	<0.01	<0.01	1	<0.5

DATE	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
MAY										
02...	<10	<1	<1	<1	17	1	4	1	<1	5
JUN										
14...	<10	<1	<1	1	11	<1	<1	<1	<1	5
AUG										
14...	<10	<1	1	2	5	2	2	1	<1	6

SASKATCHEWAN RIVER BASIN

05017500 ST. MARY RIVER NEAR BABB, MT

LOCATION.--Lat 48°50'00", long 113°25'08", in NW1/4NW1/4SE1/4 sec.34, T.36 N., R.14 W., Glacier County, Hydrologic Unit 10010002, Blackfeet 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^2.

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. Datum of gage is 4,468.13 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1915, water-stage recorder or nonrecording gages at several sites about 3.8 mi downstream at different datums. Oct. 1, 1915, to Sept. 30, 1925, water-stage recorder or nonrecording gages at several sites within 1.5 mi downstream at different datums.

REMARKS.--No estimated daily discharges this year. 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. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--57 years (1901-2, 1910-25, 1950-91), 774 ft^3/s, 560,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,500 ft^3/s, June 9, 1964, gage height, 12.96 ft, from highwater mark in well, from rating curve extended above 6,100 ft^3/s on basis of slope-area measurement of peak flow; minimum daily, 27 ft^3/s, Jan. 3-5, 1953 and Nov. 30, 1987.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,740 ft^3/s, May 22, gage height, 6.47 ft; minimum daily, 57 ft^3/s, Dec. 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	688	380	382	63	125	187	486	1140	2370	3100	1310	921
2	695	452	357	64	124	184	501	1050	2550	3230	1320	902
3	692	505	348	66	123	183	555	982	2800	3340	1310	887
4	733	539	344	72	124	191	617	948	3030	3450	1290	868
5	868	545	321	82	125	192	705	905	3250	3560	1270	856
6	1100	537	309	106	128	190	809	878	3390	3570	1260	843
7	1240	525	303	133	127	184	856	874	3300	3460	1270	859
8	1270	494	293	161	125	180	891	865	3110	3150	1270	855
9	1270	477	277	185	124	173	918	896	3020	2810	1260	871
10	1200	495	252	203	124	170	949	916	3020	2580	1250	858
11	967	557	240	211	122	169	1010	952	3190	2420	1250	849
12	824	624	229	222	123	167	1050	1030	3880	2250	1300	830
13	721	714	222	230	127	164	1040	1150	4220	2120	1270	815
14	646	714	217	232	130	160	1030	1340	3960	2050	1190	816
15	587	729	209	230	139	160	1030	1540	3310	2040	1130	815
16	547	716	199	229	149	165	1010	1720	2670	2070	1080	796
17	517	674	162	222	157	173	980	1830	2240	2090	1040	794
18	489	646	140	219	161	180	948	1980	1920	2100	1020	778
19	457	601	119	221	163	179	920	3060	1690	2050	1000	763
20	426	551	103	210	176	182	909	4300	2240	1950	1010	740
21	403	514	96	201	180	189	907	4690	3850	1830	1030	751
22	376	495	95	194	182	218	914	4670	4450	1750	1040	746
23	349	492	90	182	185	231	945	4360	4290	1670	1060	745
24	328	492	82	170	188	245	1020	3920	3720	1550	1070	750
25	315	530	74	164	188	288	1110	3550	3350	1470	1060	740
26	300	517	68	157	186	359	1180	3250	3230	1420	1040	726
27	294	493	64	151	186	412	1230	2950	3140	1370	1020	711
28	296	464	59	151	187	448	1260	2720	3090	1330	993	623
29	302	455	59	143	---	463	1270	2490	3040	1300	970	551
30	311	420	60	134	---	470	1240	2290	3000	1280	943	465
31	326	---	57	130	---	480	---	2280	---	1300	930	---
TOTAL	19537	16347	5830	5138	4178	7336	28290	65526	94320	69660	35256	23524
MEAN	630	545	188	166	149	237	943	2114	3144	2247	1137	784
MAX	1270	729	382	232	188	480	1270	4690	4450	3570	1320	921
MIN	294	380	57	63	122	160	486	865	1690	1280	930	465
AC-FT	38750	32420	11560	10190	8290	14550	56110	130000	187100	138200	69930	46660

CAL YR 1990 TOTAL 295412 MEAN 809 MAX 3180 MIN 57 AC-FT 585900
WTR YR 1991 TOTAL 374942 MEAN 1027 MAX 4690 MIN 57 AC-FT 743700

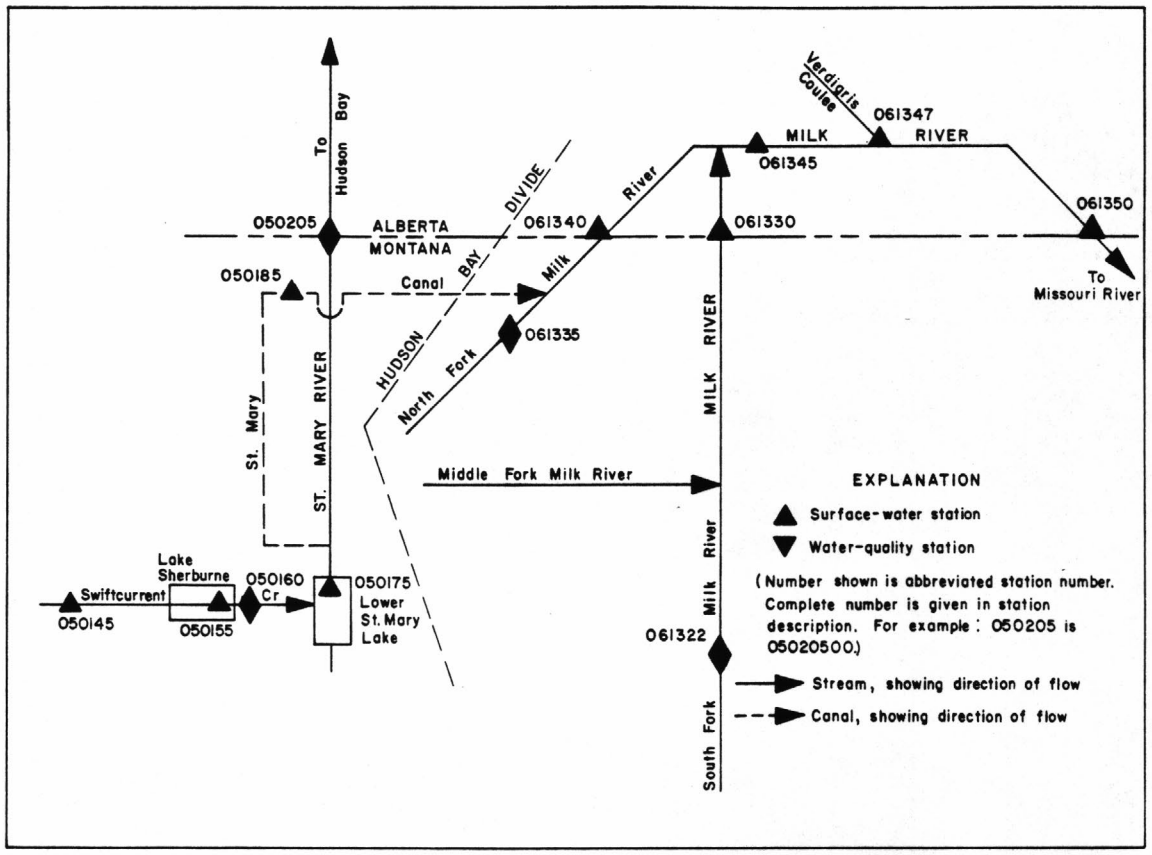

Figure 10.--Schematic diagram showing diversion from St. Mary River in Part 5 to Milk River in Part 6.

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", in NE1/4SW1/4SW1/4 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 above National Geodetic Vertical Datum of 1929, from topographic map. Prior to June 14, 1951, water-stage recorder at several sites 0.8 mi downstream at different datums.

REMARKS.--No estimated daily discharges this year. 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. U.S. Bureau of Reclamation satellite telemeter of 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^3/s, June 19, 28, 1936; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	231	668	651	555	640	598	119		
2			.00	378	663	653	554	643	596	14		
3			.00	468	660	643	553	648	596	.00		
4			.00	526	658	617	551	646	597	.00		
5			.00	558	655	623	551	646	596	.00		
6			.00	534	654	577	549	637	577	.00		
7			.00	555	654	591	550	621	538	.00		
8			.00	581	622	633	606	621	538	.00		
9			.00	598	530	630	626	621	542	.00		
10			.00	605	456	629	619	620	550	.00		
11			.00	620	457	634	614	621	550	.00		
12			.00	622	461	646	610	625	549	.00		
13			.00	625	460	650	635	621	552	.00		
14			.00	626	463	646	634	617	548	.00		
15			.00	632	585	634	634	613	536	.00		
16			.00	638	637	620	640	610	535	.00		
17			.00	642	665	608	652	609	533	.00		
18			.00	660	669	599	654	606	532	.00		
19			.00	683	550	594	653	606	531	.00		
20			92	700	560	618	650	605	529	.00		
21			63	697	571	497	648	605	530	.00		
22			57	689	597	465	645	605	529	.00		
23			62	692	641	509	643	606	528	.00		
24			95	695	627	507	639	606	528	.00		
25			166	672	618	538	636	606	526	.00		
26			101	673	612	508	634	606	526	.00		
27			75	673	606	497	633	603	506	.00		
28			143	672	611	519	631	603	416	.00		
29			189	672	632	564	633	600	376	.00		
30			189	672	649	561	638	600	258	.00		
31			193	---	651	---	638	599	---	.00		
TOTAL			1425.00	18289	18542	17661	19108	19115	15846	133.00		
MEAN			46.0	610	598	589	616	617	528	4.29		
MAX			193	700	669	653	654	648	598	119		
MIN			.00	231	456	465	549	599	258	.00		
AC-FT			2830	36280	36780	35030	37900	37910	31430	264		

SASKATCHEWAN RIVER BASIN

05020500 ST. MARY RIVER AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°00'12", long 113°18'48", in SW1/4 sec.5, T.1, R.25 W., fourth meridian, in Alberta, Hydrologic Unit 10010002, on right bank 0.4 mi north of international boundary, 2.5 mi downstream from Boundary Creek, 7.5 mi southwest of Kimball, Alberta, and 11.5 mi northeast of Babb, MT.

DRAINAGE AREA.--465 mi^2.

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1308: 1902, 1908-12. WSP 1508: 1902, 1908-9. W 1983: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 4,116.04 ft, levels by Prairie Farm Rehabilation Administration. Prior to Jan. 1, 1913, nonrecording gages at two sites within 0.3 mi of present site at different datums. Jan. 1, 1913, to Oct. 25, 1955, water-stage recorder at several sites about 8 mi downstream from present site at various datums. Oct. 26, 1955, to Mar. 23, 1965, water-stage recorder at site 200 ft upstream at datum 2 ft higher. Mar. 24, 1965, to Sept. 8, 1975, water-stage recorder at site 100 ft upstream at same datum.

REMARKS.--Estimated daily discharges: Dec. 18 to Feb. 25 and Mar. 2-4. Water-discharge records good except those for estimated daily discharges, which are fair. Since 1917, St. Mary Canal has diverted water from the river near Babb, MT, to North Fork Milk River. Some regulation by Lake Sherburne on Swiftcurrent Creek. U.S. Bureau of Reclamation satellite telemeter at station.

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

AVERAGE DISCHARGE.--14 years (1902-16), prior to operation of St. Mary Canal, 1,003 ft^3/s, 726,700 acre-ft/yr; 75 years (1916-91), 683 ft^3/s, 494,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,000 ft^3/s, June 5, 1908, gage height, 12.75 ft, from flood-marks, site and datum then in use, from rating curve extended above 6,000 ft^3/s; minimum daily, 16 ft^3/s, Nov. 29, 1936.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,950 ft^3/s, June 21, gage height, 8.22 ft; minimum daily, 70 ft^3/s, Dec. 29-31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	134	453	474	e75	e150	220	345	735	2240	3150	818	364
2	161	523	447	e80	e155	e210	215	609	2460	3230	823	352
3	151	582	447	e85	e155	e220	164	534	2760	3300	809	338
4	181	626	420	e90	e160	e230	172	503	3010	3410	779	316
5	378	620	396	e110	e165	247	297	455	3210	3490	750	305
6	731	610	386	e140	e170	237	447	426	3400	3460	745	316
7	820	625	377	e165	e165	236	432	414	3280	3320	773	366
8	861	598	364	e190	e160	232	441	468	3060	2950	765	365
9	962	573	338	e210	e155	220	440	615	2960	2570	753	383
10	1100	604	322	e230	e155	219	454	684	2920	2340	735	358
11	982	651	300	e240	e160	213	475	736	3130	2180	740	350
12	905	734	281	e250	e170	209	558	870	3840	1990	803	337
13	850	833	270	e260	e175	208	564	1010	4090	1820	787	322
14	770	832	260	e260	e180	204	569	1230	3800	1730	705	346
15	706	835	277	e260	e190	202	561	1290	3100	1710	635	342
16	648	823	262	e260	e195	207	520	1460	2440	1720	579	326
17	615	780	219	e250	e200	217	468	1600	2010	1700	534	319
18	577	747	e160	e250	e200	216	406	1940	1660	1700	499	306
19	552	698	e120	e250	e210	178	355	4150	1430	1650	473	285
20	511	650	e110	e240	e220	186	339	5160	3170	1540	472	262
21	486	599	e100	e230	e225	200	366	5390	5590	1420	480	273
22	461	581	e110	e220	e230	233	399	5230	5380	1330	490	281
23	434	575	e110	e210	e230	247	446	4730	4930	1250	504	270
24	404	590	e100	e200	e230	219	545	4250	4110	1130	506	268
25	387	603	e90	e190	e225	152	668	3790	3700	1040	504	262
26	384	609	e85	e180	230	232	723	3390	3520	974	492	249
27	369	582	e80	e180	225	413	763	3000	3380	921	472	259
28	370	546	e75	e170	216	361	795	2690	3270	874	447	289
29	371	529	e70	e160	---	330	831	2420	3120	829	420	246
30	381	494	e70	e160	---	347	828	2200	3070	792	395	293
31	402	---	e70	e150	---	368	---	2130	---	804	381	---
TOTAL	17044	19105	7190	5945	5301	7413	14586	64109	98040	60324	19068	9348
MEAN	550	637	232	192	189	239	486	2068	3268	1946	615	312
MAX	1100	835	474	260	230	413	831	5390	5590	3490	823	383
MIN	134	453	70	75	150	152	164	414	1430	792	381	246
AC-FT	33810	37890	14260	11790	10510	14700	28930	127200	194500	119700	37820	18540

CAL YR 1990 TOTAL 253969 MEAN 696 MAX 3020 MIN 70 AC-FT 503700
WTR YR 1991 TOTAL 327473 MEAN 897 MAX 5590 MIN 70 AC-FT 649500

e Estimated

SASKATCHEWAN RIVER BASIN

05020500 ST. MARY RIVER AT INTERNATIONAL BOUNDARY--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1978 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: February 1978 to September 1981.
WATER TEMPERATURE: February 1978 to September 1979.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1978-81): Maximum daily, 317 microsiemens, Mar. 30, 31, 1981; minimum daily, 141 microsiemens, June 14, 1979.
WATER TEMPERATURE (water years 1978-79): Maximum, 21.0°C, Aug.23, 1979; minimum, 0.0°C, on many days during winter.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRESSURE (MM OF HG) (00025)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)
OCT											
29...	1720	377	10	1	178	6.0	5.0	655	11.8	108	K5
DEC											
12...	1515	296	30	1	175	-6.0	0.0	655	11.9	95	<1
JAN											
23...	0930	216	--	--	195	-15.0	0.0	--	--	--	--
FEB											
27...	1545	222	--	--	191	2.0	1.0	--	--	--	--
MAR											
13...	0910	194	0	0	210	-2.0	0.0	653	13.2	106	<1
APR											
17...	0900	468	50	1	210	1.0	2.0	663	12.4	103	K1
MAY											
01...	1705	732	--	--	225	6.0	6.0	--	--	--	--
22...	1840	5020	--	--	178	20.0	9.5	--	--	--	--
JUN											
12...	1500	3880	10	2	158	13.0	12.0	651	10.8	118	44
21...	1345	5770	--	--	191	17.0	10.0	--	--	--	--
AUG											
13...	1700	809	25	1	172	23.0	20.5	656	7.8	101	21
SEP											
04...	1500	304	--	--	182	25.0	17.0	--	--	--	--

DATE	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BICARBONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CARBONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STANDARD UNITS) (00400)	TURBIDITY (NTU) (00076)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)
OCT											
29...	K2	112	0	92	8.0	1.4	98	25	8.5	1.8	0.1
DEC											
12...	<1	113	0	92	7.7	1.0	96	25	8.1	1.7	0.1
MAR											
13...	<1	123	0	100	7.7	2.0	110	28	9.4	2.4	0.1
APR											
17...	K2	133	0	109	8.1	4.4	120	28	11	3.8	0.2
JUN											
12...	44	88	0	72	8.2	67	81	21	6.9	1.5	0.1
AUG											
13...	K14	--	--	84	8.4	1.6	90	23	7.9	1.7	0.1

SASKATCHEWAN RIVER BASIN

05020500 ST. MARY RIVER AT INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRATE TOTAL (MG/L AS N) (00620)
OCT											
29...	0.3	95	5.7	0.1	<0.1	3.0	95	100	0.13	96.7	--
DEC											
12...	0.4	96	4.7	0.2	0.2	2.9	104	99	0.14	83.1	--
MAR											
13...	0.5	103	7.1	0.8	<0.1	3.0	113	112	0.15	59.2	--
APR											
17...	0.5	106	9.0	1.3	<0.1	3.2	127	123	0.17	160	--
JUN											
12...	0.4	78	4.8	0.1	0.1	2.9	77	82	0.10	807	0.046
AUG											
13...	0.4	91	5.0	0.3	<0.1	2.8	102	92	0.14	223	--

DATE	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)
OCT											
29...	<0.01	<0.01	<0.100	<0.100	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	10
DEC											
12...	<0.01	<0.01	<0.100	<0.100	0.02	0.02	<0.01	<0.01	<0.01	<0.01	--
MAR											
13...	<0.01	0.01	0.067	0.083	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	30
APR											
17...	<0.01	<0.01	0.076	0.079	0.01	<0.01	0.03	0.02	<0.01	<0.01	--
JUN											
12...	0.05	<0.01	0.096	0.100	0.08	0.03	0.12	0.11	0.06	<0.01	20
AUG											
13...	<0.01	<0.01	<0.050	<0.050	<0.01	0.01	0.01	<0.01	<0.01	<0.01	<10

DATE	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)
OCT											
29...	<1	130	<0.5	5	<1	<3	2	<3	1	<4	2
MAR											
13...	<1	120	<0.5	<1	<1	<3	1	4	<1	<4	1
JUN											
12...	<1	96	<0.5	<1	<1	<3	2	16	<1	<4	3
AUG											
13...	<1	120	<0.5	1	<1	<3	1	5	<1	<4	2

DATE	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT											
29...	0.1	<10	<1	<1	<1.0	65	<6	5	4	4.1	94
DEC											
12...	--	--	--	--	--	--	--	--	3	2.4	87
MAR											
13...	<0.1	<10	<1	<1	<1.0	76	<6	11	4	2.1	76
APR											
17...	--	--	--	--	--	--	--	--	6	7.6	90
JUN											
12...	0.2	<10	1	<1	<1.0	54	<6	6	241	2520	73
AUG											
13...	<0.1	<10	<1	<1	<1.0	66	<6	4	4	8.7	91

MISSOURI RIVER MAIN STEM

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

LOCATION.--Lat 44°39'22", long 112°22'14", in NE1/4SE1/4SE1/4 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^2.

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, June 1974 to September 1982, April 1985 to current year (seasonal records only). No winter records 1974-1982. 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, above National Geodetic Vertical Datum of 1929, estimated from spillway elevation based on Montana Department of Natural Resources and Conservation datum. Prior to Oct. 1, 1978, at datum 1.00 ft higher. See WSP 1709 for history of nonrecording gage changes prior to May 8, 1939.

REMARKS.--Estimated daily discharges: Oct. 24-31. 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. Several observations of water temperature and specific conductance were made during the year. U.S. Bureau of Reclamation satellite telemeter at station.

AVERAGE DISCHARGE.--48 years (1912-18, 1926-33, 1935, 1937-38, 1940-69), 143 ft^3/s, 103,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 2,500 ft^3/s, May 15, 1933, gage height, 6.40 ft, estimated by damtender, released to prevent failure of dam; no flow at times.

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

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 668 ft^3/s, June 13, gage height, 3.63 ft; minimum daily, 7.6 ft^3/s, Sept. 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10						9.6	23	229	412	306	19
2	10						9.5	24	234	386	309	19
3	10						9.5	23	338	385	309	19
4	10						9.5	23	408	385	290	19
5	10						9.5	24	407	382	282	20
6	10						10	24	407	381	282	20
7	10						9.5	24	407	379	282	20
8	10						9.6	24	444	378	280	20
9	10						9.7	24	462	376	112	20
10	10						9.9	26	464	374	26	19
11	10						9.9	26	512	372	26	21
12	10						10	26	563	375	26	20
13	10						10	26	636	380	25	19
14	10						10	25	659	378	25	19
15	10						10	25	656	378	25	19
16	10						10	25	654	378	25	19
17	10						10	25	650	378	25	19
18	10						10	25	616	377	24	20
19	10						11	25	592	377	23	20
20	10						11	25	590	376	23	13
21	10						11	26	588	375	22	8.5
22	10						11	35	586	374	21	8.6
23	10						11	78	580	375	21	8.2
24	e10						11	129	553	372	21	8.5
25	e10						13	129	521	356	21	8.6
26	e10						12	148	480	351	21	8.7
27	e10						12	184	458	336	21	7.6
28	e10						12	183	437	322	21	9.5
29	e10						19	189	417	314	21	9.5
30	e10						24	229	416	314	21	9.5
31	e10						---	229	---	309	19	---
TOTAL	310						334.2	2051	14964	11405	2955	471.2
MEAN	10.0						11.1	66.2	499	368	95.3	15.7
MAX	10						24	229	659	412	309	21
MIN	10						9.5	23	229	309	19	7.6
AC-FT	615						663	4070	29680	22620	5860	935

e Estimated

MISSOURI RIVER MAIN STEM

06015300 CLARK CANYON RESERVOIR NEAR GRANT, MT

LOCATION.--Lat 45°00'06", long 112°51'27", in SE1/4SW1/4 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^2.

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. Datum of gage is referenced to National Geodetic Vertical Datum of 1929 (levels by U.S. 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). Usable capacity, 255,600 acre-ft between elevation 5,455.00 ft, invert of outlet works, and 5,560.40 ft, top of flood control. Dead storage, 1,509 acre-ft, below elevation 5,455.00 ft. Normal operating level, 177,500 acre-ft at elevation 5,546.00 ft. Minimum operating level, 1,450 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 U.S. 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, 38,200 acre-ft, Aug. 23, 1989, elevation, 5,508.67 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents at 2400, 118,900 acre-ft, June 13, elevation, 5,534.07 ft; minimum, 50,040 acre-ft, Oct. 1, elevation, 5,513.91 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	5,514.32	51,060	---
Oct. 31	5,516.93	57,860	+6,800
Nov. 30	5,520.81	69,120	+11,260
Dec. 31	5,523.57	78,030	+8,910
CAL YR 1990			+4,520
Jan. 31	5,525.73	85,550	+7,520
Feb. 28	5,527.74	92,980	+7,430
Mar. 31	5,530.06	102,000	+9,020
Apr. 30	5,531.64	108,500	+6,500
May 31	5,532.65	112,800	+4,300
June 30	5,531.30	107,100	-5,700
July 31	5,524.30	80,520	-26,580
Aug. 31	5,517.70	59,990	-20,530
Sept. 30	5,519.41	64,900	+4,910
WTR YR 1991			+13,840

MISSOURI RIVER MAIN STEM

06016000 BEAVERHEAD RIVER AT BARRETTS, MT

LOCATION.--Lat 45°06'59", long 112°44'59", in SE1/4SW1/4SE1/4 sec.19, T.8 S., R.9 W., Beaverhead County, Hydrologic Unit 10020002, on left bank 1.4 mi upstream from Barretts, 2.2 mi downstream from Grasshopper Creek, 8.9 mi southwest of Dillon, and at river mile 2,469.2.

DRAINAGE AREA.--2,737 mi^2.

PERIOD OF RECORD.--August 1907 to September 1986, October 1986 to current year. (seasonal records only). Monthly discharge only for some periods, published in WSP 1309. Prior to October 1963, published as "at Barratts".

REVISED RECORDS.--WSP 1279: 1908(M), 1910-12(M), 1929(M), 1935-36. WSP 1559: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 5,268.17 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 19, 1934, nonrecording gages at same site and datum.

REMARKS.--Estimated daily discharges: Mar. 1-5. 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 90,000 acres above station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--79 years (1908-1986), 441 ft^3/s, 319,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,720 ft^3/s, June 20, 1908, gage height, 6.1 ft; minimum recorded, 69 ft^3/s, Jan. 30, 1939, result of freezeup.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 1,090 ft^3/s, June 22, gage height, 2.46 ft; minimum daily, 103 ft^3/s, Sept. 24, 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	112					e115	132	120	460	651	778	298
2	112					e115	139	114	471	565	782	291
3	115					e115	142	104	539	545	782	271
4	106					e115	142	108	732	561	771	240
5	107					e115	142	113	793	550	747	232
6	111					115	149	115	704	544	724	231
7	110					112	143	114	746	582	688	231
8	110					111	129	112	628	626	646	234
9	110					115	121	122	572	638	668	239
10	110					115	119	123	571	674	623	239
11	110					120	115	133	606	717	595	222
12	111					116	107	142	653	766	579	196
13	112					118	120	138	751	762	561	179
14	113					118	113	139	821	795	548	189
15	114					118	115	169	911	818	566	192
16	118					120	117	196	944	859	527	189
17	116					121	117	202	935	894	508	167
18	117					119	121	209	951	957	502	145
19	117					121	121	229	987	985	455	132
20	117					128	121	246	1010	976	427	126
21	115					128	127	241	1030	964	409	111
22	117					127	128	242	1080	942	419	109
23	121					126	122	284	1040	945	418	109
24	119					124	124	324	1020	954	409	103
25	119					122	132	344	923	929	402	103
26	119					120	131	369	871	924	390	104
27	121					123	126	447	883	888	374	104
28	121					122	120	446	798	876	351	108
29	121					119	118	424	701	871	331	123
30	121					121	121	418	666	790	323	120
31	124					125	---	459	---	781	304	---
TOTAL	3566					3699	3774	6946	23797	24329	16607	5337
MEAN	115					119	126	224	793	785	536	178
MAX	124					128	149	459	1080	985	782	298
MIN	106					111	107	104	460	544	304	103
AC-FT	7070					7340	7490	13780	47200	48260	32940	10590

e Estimated

MISSOURI RIVER MAIN STEM

06018500 BEAVERHEAD RIVER NEAR TWIN BRIDGES, MT

LOCATION.--Lat 45°23'01", long 112°27'07", in SW1/4NW1/4SE1/4 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 2,340.4.

DRAINAGE AREA.--3,619 mi^2.

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. Datum of gage is 4,809.15 ft above National Geodetic Vertical Datum of 1929. Prior to Feb. 17, 1949, nonrecording gage at bridge 0.5 mi upstream at different datum. Feb. 17, 1949, to June 28, 1951, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Dec. 19 to Jan. 4. Records good except those for estimated daily discharges, which are poor. 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. U.S. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--56 years, 415 ft^3/s, 300,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 3,130 ft^3/s, June 12, 1944, gage height, 6.76 ft, site and datum then in use; maximum gage height, 7.88 ft, June 25, 1984; minimum discharge observed, 7.0 ft^3/s, May 25, 1940.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 368 ft^3/s, Dec. 13, gage height, 4.71 ft; maximum gage height, 4.77 ft, June 6; minimum discharge, 29 ft^3/s, June 20, gage height, 3.12 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	95	252	269	e230	212	234	265	155	61	228	91	148
2	73	262	270	e230	238	244	272	168	51	182	77	167
3	73	257	268	e220	251	257	267	177	43	152	85	162
4	59	259	286	e210	256	256	252	178	53	130	110	136
5	54	275	293	215	283	260	229	175	153	129	114	106
6	56	274	273	197	275	245	211	185	320	119	119	119
7	59	267	279	196	270	243	204	173	283	115	116	113
8	77	257	286	202	262	244	190	170	291	121	107	131
9	92	268	290	214	258	243	184	165	207	115	68	123
10	100	271	284	216	258	248	155	169	171	98	62	142
11	97	271	288	229	254	252	142	215	118	88	71	160
12	117	269	274	241	261	251	152	209	88	92	66	132
13	133	261	284	249	250	252	168	193	73	84	59	122
14	130	256	278	248	245	257	172	195	73	63	54	131
15	130	267	237	254	252	258	173	176	55	71	64	146
16	143	273	244	255	263	255	189	158	53	63	94	201
17	147	283	259	251	257	254	207	139	64	56	98	228
18	139	304	266	263	246	252	209	129	49	65	112	245
19	140	317	e120	259	251	251	208	164	34	76	108	272
20	170	318	e100	236	256	250	182	166	32	92	90	267
21	212	317	e120	217	255	256	163	178	42	106	62	239
22	228	308	e130	224	255	257	159	127	69	82	64	225
23	244	326	e150	252	252	251	144	83	104	64	66	225
24	255	327	e160	245	249	255	138	57	123	46	72	210
25	240	328	e180	202	250	248	153	62	170	45	69	221
26	229	331	e190	197	251	260	179	58	141	51	76	231
27	224	301	e200	194	251	255	172	53	118	51	91	210
28	224	285	e180	210	249	252	163	62	158	56	139	200
29	220	290	e150	151	---	251	151	52	144	73	143	250
30	219	291	e170	143	---	244	146	47	152	109	146	255
31	217	---	e200	171	---	257	---	52	---	90	147	---
TOTAL	4596	8565	6978	6821	7110	7792	5599	4290	3493	2912	2840	5517
MEAN	148	285	225	220	254	251	187	138	116	93.9	91.6	184
MAX	255	331	293	263	283	260	272	215	320	228	147	272
MIN	54	252	100	143	212	234	138	47	32	45	54	106
AC-FT	9120	16990	13840	13530	14100	15460	11110	8510	6930	5780	5630	10940

CAL YR 1990 TOTAL 63032 MEAN 173 MAX 389 MIN 28 AC-FT 125000
WTR YR 1991 TOTAL 66513 MEAN 182 MAX 331 MIN 32 AC-FT 131900

e Estimated

RUBY RIVER BASIN

06019500 RUBY RIVER ABOVE RESERVOIR, NEAR ALDER, MT

LOCATION.--Lat 45°10'31", long 112°08'52", in SW1/4SW1/4SW1/4 sec.31, T.7 S., R.4 W., Madison County, Hydrologic Unit 10020003, on left bank at Puller Hot Springs, 0.4 mi upstream from Cottonwood Creek, 6 mi upstream from Ruby Dam, 10.5 mi south of Alder, and at river mile 54.4.

DRAINAGE AREA.--538 mi^2.

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. Datum of gage is 5,440.2 ft above National Geodetic Vertical Datum of 1929 (river-profile survey). Prior to Oct. 1, 1938, nonrecording gage at bridge 1,500 ft downstream at datum 5.2 ft lower. Oct. 1, 1938, to Aug. 5, 1955, water-stage recorder at site 500 ft downstream at datum 0.5 ft lower.

REMARKS.--Estimated daily discharges: Dec. 1-3, 6, 7, Dec. 15 to Jan. 14, Jan. 20-22, Jan. 25 to Feb. 2. Records good except those for estimated daily discharges, which are fair. Diversion for irrigation of about 3,000 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--53 years, 179 ft^3/s, 129,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,810 ft^3/s, May 16, 1984, gage height, 6.24 ft; minimum daily, 35 ft^3/s, Jan. 23, 1962.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 640 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 25	1100	846	4.24	Aug. 26	2100	*2,040	*5.52
June 6	1230	1,480	5.03				

Minimum daily discharge, 60 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	99	110	e98	e90	e82	86	94	97	437	210	75	94
2	97	108	e90	e88	e82	85	98	105	588	193	78	97
3	101	97	e92	e85	84	86	103	103	680	178	86	97
4	100	112	94	e82	84	85	104	100	765	162	97	96
5	98	115	95	e80	84	87	108	100	967	159	96	96
6	111	111	e93	e82	84	81	117	109	1340	138	92	94
7	116	98	e92	e84	85	82	116	132	1050	142	91	97
8	108	106	95	e86	85	85	105	144	852	138	88	101
9	103	118	92	e86	85	83	100	192	710	132	88	120
10	106	118	94	e88	85	86	103	175	662	132	82	128
11	108	113	98	e88	85	92	99	172	638	128	74	124
12	108	111	95	e90	86	84	94	182	651	126	75	121
13	112	112	93	e90	86	86	96	177	552	123	74	118
14	111	114	94	e88	85	86	94	201	481	119	72	135
15	110	111	e92	85	87	86	99	230	405	117	70	148
16	112	99	e92	84	90	86	100	231	363	106	71	138
17	110	108	e94	85	90	84	99	266	343	96	70	133
18	110	114	e90	85	87	85	99	385	308	96	71	130
19	120	106	e80	86	86	87	100	401	290	93	69	130
20	115	112	e70	e84	88	90	101	380	277	89	69	130
21	107	94	e60	e82	88	89	112	468	267	88	68	127
22	112	101	e65	e84	87	90	114	496	253	91	71	127
23	111	108	e70	85	87	88	119	581	237	90	73	127
24	107	110	e75	85	86	88	126	642	227	93	75	126
25	113	108	e75	e80	86	88	137	702	218	97	71	126
26	111	109	e80	e75	85	90	123	716	228	89	303	123
27	110	94	e85	e80	86	88	112	500	224	82	149	121
28	109	94	e75	e75	85	88	109	411	214	83	117	121
29	109	99	e65	e70	---	88	103	376	208	77	108	132
30	108	101	e75	e75	---	87	101	372	211	76	93	128
31	108	---	e85	e80	---	90	---	382	---	76	93	---
TOTAL	3360	3211	2643	2587	2400	2686	3185	9528	14646	3619	2809	3585
MEAN	108	107	85.3	83.5	85.7	86.6	106	307	488	117	90.6	119
MAX	120	118	98	90	90	92	137	716	1340	210	303	148
MIN	97	94	60	70	82	81	94	97	208	76	68	94
AC-FT	6660	6370	5240	5130	4760	5330	6320	18900	29050	7180	5570	7110

CAL YR 1990 TOTAL 53923 MEAN 148 MAX 823 MIN 60 AC-FT 107000
WTR YR 1991 TOTAL 54259 MEAN 149 MAX 1340 MIN 60 AC-FT 107600

e Estimated

RUBY RIVER BASIN

06020600 RUBY RIVER BELOW RESERVOIR, NEAR ALDER, MT

LOCATION.--Lat 45°14'32", long 112°06'36", in SE1/4SE1/4NE1/4 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^2.

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

REVISED RECORDS.--1985 (M).

GAGE.--Water-stage recorder. Datum of gage is 5,286.63 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--No estimated daily discharges this year. Records good. Flow regulated by Ruby River Reservoir (station number 06020500). Diversions for irrigation of about 3,500 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--28 years, 213 ft^3/s, 154,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,010 ft^3/s, May 16, 1984, gage height, 8.52 ft, from flood-mark; minimum, 1.4 ft^3/s, Dec. 5, 1974, dam closure, result of discharge measurement; minimum daily, 16 ft^3/s, Jan. 5-9, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,280 ft^3/s, June 6, gage height, 5.90 ft; minimum daily, 19 ft^3/s, on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	244	56	43	31	24	19	21	93	414	320	214	248
2	233	56	43	31	24	19	21	94	493	316	269	247
3	231	56	38	31	24	19	21	94	619	316	335	261
4	229	56	35	30	24	19	21	94	709	313	341	270
5	227	47	35	31	24	19	21	94	829	306	337	268
6	225	46	35	29	24	19	21	94	1150	291	332	268
7	214	46	35	28	24	19	21	96	1150	283	327	267
8	193	46	35	28	24	19	21	96	977	281	326	265
9	193	46	35	28	24	19	21	108	806	282	323	265
10	153	47	35	28	24	19	21	113	709	272	319	251
11	132	47	35	27	24	19	21	113	661	264	315	243
12	91	47	35	27	24	19	21	113	617	265	313	234
13	71	47	35	27	24	19	21	113	578	277	332	210
14	72	48	35	27	21	19	26	113	509	285	343	210
15	73	48	35	27	19	19	30	113	437	302	341	194
16	74	48	35	27	19	19	30	127	368	304	336	184
17	74	48	34	27	19	19	30	137	352	317	315	184
18	74	49	34	27	19	19	30	159	351	325	304	183
19	76	50	34	28	19	19	30	159	337	329	295	183
20	76	50	33	27	19	19	30	159	324	355	287	182
21	76	50	33	24	19	19	31	160	352	367	275	180
22	77	50	33	24	20	19	31	215	371	369	276	179
23	77	51	33	24	19	19	36	241	370	370	277	178
24	77	51	33	23	19	19	39	251	362	370	276	177
25	74	51	33	23	19	19	39	437	302	372	275	188
26	71	51	32	23	19	19	40	637	218	367	239	198
27	71	49	31	23	19	20	40	599	238	363	63	200
28	72	43	31	23	19	20	40	488	261	357	64	198
29	73	43	31	23	---	21	58	417	298	338	167	196
30	63	43	31	23	---	21	82	380	320	287	248	196
31	55	---	31	24	---	21	---	376	---	265	247	---
TOTAL	3741	1466	1066	823	600	597	915	6483	15482	9828	8711	6507
MEAN	121	48.9	34.4	26.5	21.4	19.3	30.5	209	516	317	281	217
MAX	244	56	43	31	24	21	82	637	1150	372	343	270
MIN	55	43	31	23	19	19	21	93	218	264	63	177
AC-FT	7420	2910	2110	1630	1190	1180	1810	12860	30710	19490	17280	12910

CAL YR 1990 TOTAL 58890 MEAN 161 MAX 484 MIN 19 AC-FT 116800
WTR YR 1991 TOTAL 56219 MEAN 154 MAX 1150 MIN 19 AC-FT 111500

BIG HOLE RIVER BASIN

06024450 BIG HOLE RIVER BELOW BIG LAKE CREEK, AT WISDOM, MT

LOCATION.--Lat 45°37'07", long 113°27'25", in SW1/4SW1/4NE1/4 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^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1988 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 6,040 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Oct. 31. Seasonal water-discharge records good except those above 1,500 ft^3/s, which are fair. Diversions for irrigation of about 66,900 acres upstream from station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,300 ft^3/s, June 7, 1991, gage height, 6.09 ft, from rating curve extended above 1,700 ft^3/s; no flow many days in August and September 1988.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 4,300 ft^3/s, June 7, gage height, 6.09 ft, from rating curve extended above 1,700 ft^3/s; minimum, 10 ft^3/s, Sept. 4, gage height, 2.44 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	38							318	789	858	85	16
2	37							290	488	573	75	15
3	36							232	434	415	70	14
4	34							217	557	357	63	11
5	33							201	1310	368	60	12
6	38							262	3470	375	61	11
7	43							374	3830	346	60	12
8	44							453	2650	421	56	14
9	44							578	2000	398	52	16
10	45							471	1640	403	49	18
11	44							405	1290	420	39	21
12	45							569	1140	372	33	27
13	49							524	1120	334	29	28
14	52							620	997	340	27	29
15	54							1000	822	365	26	32
16	56							685	622	323	26	32
17	58							688	506	274	23	30
18	57							958	404	234	37	28
19	59							1040	353	213	38	28
20	66							844	512	202	32	28
21	67							802	557	186	25	27
22	87							697	414	165	20	25
23	110							678	360	159	20	25
24	96							756	377	191	21	25
25	91							816	509	181	20	25
26	89							837	455	169	18	25
27	86							806	456	145	16	26
28	86							921	631	126	19	25
29	84							687	527	111	19	35
30	81							566	821	97	19	48
31	e80							960	---	89	17	---
TOTAL	1889							19255	30041	9210	1155	708
MEAN	60.9							621	1001	297	37.3	23.6
MAX	110							1040	3830	858	85	48
MIN	33							201	353	89	16	11
AC-FT	3750							38190	59590	18270	2290	1400

e Estimated

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).

INSTRUMENTATION.--Temperature recorder since April 27, 1988.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum, 24.5°C, July 22, 1988, July 6, 1989, June 25, 30, 1990.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 21.0°C July 28.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT					
30...	0840	81	100	7.5	4.5
APR					
19...	1145	299	104	8.5	4.5
MAY					
07...	0850	362	89	9.5	6.0
21...	1245	798	75	13.0	10.0
JUN					
05...	1055	1230	86	12.0	9.5
11...	1500	1210	88	20.0	17.0
JUL					
02...	0930	596	114	18.0	14.5
24...	1100	204	88	21.0	16.0
SEP					
05...	1200	13	120	20.0	14.0

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	14.5	7.5	11.0									
2	11.0	7.0	9.0									
3	9.0	5.0	7.0									
4	13.5	7.5	10.0									
5	10.0	7.5	9.0									
6	8.5	5.0	6.5									
7	6.0	1.5	4.5									
8	7.0	2.0	4.5									
9	8.5	2.5	5.5									
10	8.5	5.0	6.5									
11	7.5	1.5	4.5									
12	7.5	3.5	5.0									
13	7.0	3.5	5.0									
14	5.5	3.0	4.5									
15	6.5	2.0	4.0									
16	5.5	3.5	5.0									
17	6.0	1.0	3.5									
18	4.5	2.0	3.5									
19	4.5	3.0	3.5									
20	4.5	1.5	3.0									
21	4.0	.5	2.5									
22	6.5	2.5	4.5									
23	6.5	2.5	4.0									
24	6.5	1.5	4.0									
25	8.0	2.5	5.0									
26	8.0	4.0	6.0									
27	7.0	2.5	5.0									
28	7.5	3.0	5.0									
29	8.5	5.0	6.5									
30	---	---	---									
31	---	---	---									
MONTH	14.5	.5	5.5									

BIG HOLE RIVER BASIN

06024450 BIG HOLE RIVER BELOW BIG LAKE CREEK AT WISDOM, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1										9.5	4.0	6.5
2										5.0	2.0	3.5
3										6.0	1.0	3.0
4										8.0	2.5	5.0
5										9.5	3.0	6.5
6										9.5	5.5	7.5
7										9.5	6.0	8.0
8										9.0	6.5	7.5
9										7.0	4.0	5.0
10										4.0	2.5	3.5
11										8.0	3.0	5.5
12										8.5	6.0	7.0
13										11.5	7.0	9.0
14										10.0	7.5	9.0
15										12.5	7.5	9.5
16										---	---	---
17										---	---	---
18										---	---	---
19										---	---	---
20										---	---	---
21										14.0	7.0	10.0
22										---	---	---
23										---	---	---
24										---	---	---
25										---	---	---
26										---	---	---
27										---	---	---
28										---	---	---
29										---	---	---
30										---	---	---
31										---	---	---
MONTH										14.0	1.0	6.5
		JUNE			JULY			AUGUST			SEPTEMBER	
1	---	---	---	17.5	13.0	15.0	20.0	17.5	19.0	16.5	15	15.5
2	---	---	---	18.5	14.5	16.5	19.5	15.5	17.5	16.0	15	15.5
3	---	---	---	19.0	15.5	17.5	20.0	16.0	18.0	16.0	14	14.5
4	---	---	---	19.0	16.5	18.0	20.5	17.0	18.5	15.0	14	14.5
5	---	---	---	19.5	16.5	18.0	20.0	18.0	19.0	---	---	---
6	---	---	---	19.0	16.0	17.5	19.0	16.5	18.0	---	---	---
7	---	---	---	18.5	15.0	17.0	19.0	16.0	17.5	---	---	---
8	---	---	---	19.5	16.0	17.5	19.5	16.0	17.5	---	---	---
9	---	---	---	19.0	16.0	17.5	20.0	17.0	18.5	---	---	---
10	---	---	---	19.0	15.5	17.5	20.0	17.5	18.5	---	---	---
11	---	---	---	19.0	15.5	17.5	19.5	17.0	18.0	---	---	---
12	17.0	14.0	16.0	20.0	16.0	18.0	19.0	16.5	17.0	---	---	---
13	16.5	13.0	15.0	19.5	17.0	18.5	17.5	16.0	16.5	---	---	---
14	14.5	11.5	13.0	18.5	16.0	17.0	17.0	15.5	16.5	---	---	---
15	15.0	10.5	12.5	19.5	15.5	17.5	17.0	15.5	16.0	---	---	---
16	15.0	13.0	14.0	20.0	16.5	18.5	16.0	15.0	15.5	---	---	---
17	15.0	11.5	13.5	19.5	16.5	18.0	17.0	16.0	16.5	---	---	---
18	16.0	12.0	14.0	19.0	16.5	18.0	17.0	16.0	16.5	---	---	---
19	15.5	13.5	14.5	19.5	16.0	17.5	17.0	16.0	16.5	---	---	---
20	16.0	13.0	14.5	20.0	16.0	18.0	17.5	16.0	16.5	---	---	---
21	16.5	13.0	14.5	20.5	17.0	19.0	17.0	16.0	16.5	---	---	---
22	17.0	14.5	15.5	20.5	16.5	18.5	17.0	15.5	16.0	---	---	---
23	16.0	13.5	14.5	20.0	17.5	18.5	16.5	16.0	16.0	---	---	---
24	13.5	11.5	12.5	20.0	16.5	18.0	17.0	16.0	16.5	---	---	---
25	13.5	10.5	12.0	19.5	17.0	18.5	17.0	16.0	16.0	---	---	---
26	14.0	12.0	13.0	20.0	16.5	18.0	16.5	15.0	15.5	---	---	---
27	15.0	12.5	14.0	20.5	16.5	18.5	16.5	15.5	16.0	---	---	---
28	15.5	13.0	14.0	21.0	17.0	19.0	16.5	15.5	16.0	---	---	---
29	15.0	13.0	14.0	20.5	17.5	19.0	16.5	14.5	15.0	---	---	---
30	16.0	12.5	14.0	20.5	17.5	19.0	15.5	14.5	15.0	---	---	---
31	---	---	---	20.5	17.0	18.5	16.5	15.0	15.5	---	---	---
MONTH	17.0	10.5	14.0	21.0	13.0	18.0	20.5	14.5	17.0	16.5	14	15.0

BIG HOLE RIVER BASIN

06025500 BIG HOLE RIVER NEAR MELROSE, MT

LOCATION.--Lat 45°31'36", long 112°42'03", in SE1/4SE1/4SW1/4 sec.34, T.3 S., R.9 W., Madison County, Hydrologic Unit 10020004, on left bank 50 ft downstream from bridge, on U.S. Highway 91, 0.1 mi downstream from Rock Creek, 7 mi south of Melrose, and at river mile 31.1.

DRAINAGE AREA.--2,476 mi^2.

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. Datum of gage is 5,032.87 ft above National Geodetic Vertical Datum of 1929. 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 datum.

REMARKS.--Estimated daily discharges: Dec. 19 to Mar 4. Water-discharge records good. Diversions for irrigation of about 136,000 acres upstream from station.

AVERAGE DISCHARGE.--68 years, 1,136 ft^3/s, 823,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 23,000 ft^3/s, June 14, 1927, when Wise River Reservoir dam failed (gage height, 14.0 ft, from floodmark, site and datum then in use), from rating curve extended above 8,000 ft^3/s; maximum discharge unaffected by dam failure, 14,300 ft^3/s, June 10, 1972, gage height, 8.04 ft; minimum observed, 49 ft^3/s, Aug. 17, 1931, gage height, 0.70 ft, site and datum then in use.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 10,600 ft^3/s, June 7, gage height, 6.88 ft; minimum, 88 ft^3/s, Dec 20, gage height, 0.80 ft, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	295	453	323	e230	e240	e330	462	771	3040	2870	424	173
2	284	448	300	e300	e250	e300	574	791	3010	2650	407	169
3	283	410	280	e280	e260	e320	722	763	3160	2210	390	162
4	287	408	336	e270	e270	e340	820	713	3640	1890	369	163
5	290	467	374	e250	e270	310	972	677	4980	1730	360	157
6	293	455	353	e230	e260	296	1180	680	7160	1580	371	151
7	296	397	337	e250	e260	307	1230	753	9710	1450	359	151
8	297	355	321	e270	e260	318	1110	942	9670	1320	353	159
9	313	453	307	e290	e250	287	915	1180	7710	1230	336	201
10	303	548	340	e310	e250	303	796	1280	6590	1190	322	211
11	309	525	403	e320	e240	299	706	1250	6250	1160	307	235
12	306	511	347	e340	e240	271	620	1230	6200	1120	301	268
13	315	486	364	e350	e250	297	552	1350	5630	1040	287	268
14	305	494	336	e340	e260	300	574	1470	4920	1000	275	264
15	314	484	288	e320	e280	302	617	1750	4150	1020	260	267
16	340	429	253	e300	e300	308	614	2050	3570	998	242	273
17	367	363	245	e280	e290	314	601	1960	3180	911	223	275
18	365	412	256	e300	e270	307	591	2610	2800	818	226	278
19	391	501	e130	e330	e260	329	631	3280	2540	752	220	278
20	396	480	e110	e300	e280	343	765	3290	2880	706	217	272
21	377	388	e100	e270	e300	367	958	3100	3260	684	218	258
22	412	296	e120	e250	e330	384	1060	3050	2960	650	202	252
23	442	372	e150	e240	e320	402	1170	3100	2640	617	197	264
24	437	499	e170	e230	e300	399	1310	3320	2490	595	183	264
25	440	533	e200	e220	e280	384	1350	3820	2500	616	179	259
26	436	498	e220	e210	e320	390	1270	4000	2490	622	175	256
27	430	348	e240	e200	e350	339	1060	3730	2470	612	182	248
28	426	293	e250	e220	e350	364	888	3430	2440	578	197	249
29	429	267	e200	e200	---	370	781	3170	2550	531	191	248
30	439	397	e150	e180	---	353	741	2880	2590	484	193	250
31	447	---	e180	e220	---	391	---	2970	---	450	178	---
TOTAL	11064	12970	7983	8300	7790	10324	25640	65360	127180	34084	8344	6923
MEAN	357	432	258	268	278	333	855	2108	4239	1099	269	231
MAX	447	548	403	350	350	402	1350	4000	9710	2870	424	278
MIN	283	267	100	180	240	271	462	677	2440	450	175	151
AC-FT	21950	25730	15830	16460	15450	20480	50860	129600	252300	67610	16550	13730

CAL YR 1990 TOTAL 255901 MEAN 701 MAX 3130 MIN 100 AC-FT 507600
WTR YR 1991 TOTAL 325962 MEAN 893 MAX 9710 MIN 100 AC-FT 646500

e Estimated

06025500 BIG HOLE RIVER NEAR MELROSE, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1956-57, 1960-64, 1977 to current year.
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 22, 1977.
EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum, 24.0°C, June 25, 1988; minimum, 0.0°C on many days during winter periods 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, 23.0°C, July 24; minimum, 0.0°C on many days during winter period.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT					
30...	1245	390	198	19.0	7.0
DEC					
17...	1145	224	237	0.5	0.0
FEB					
12...	1020	239	216	9.0	0.0
MAR					
27...	1530	330	189	6.0	5.0
MAY					
07...	1230	740	146	14.0	9.0
21...	1640	3040	91	24.0	11.0
JUN					
05...	1500	5050	86	17.0	9.5
07...	1220	9980	99	20.0	12.5
11...	1300	--	86	22.0	14.5
JUL					
24...	0800	599	183	20.0	16.5
SEP					
05...	0830	152	268	14.0	13.5

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	14.0	10.0	12.0	6.0	3.5	5.5	.0	0	.0	.5	0	0
2	13.0	9.0	10.5	4.0	2.0	3.0	.0	0	.0	.5	0	0
3	10.5	7.0	9.0	3.0	.5	2.0	.0	0	.0	.0	0	0
4	13.0	9.0	10.5	4.5	2.5	3.5	.5	0	.0	.0	0	0
5	13.0	9.5	11.0	4.0	3.0	3.5	.0	0	.0	.0	0	0
6	9.5	7.5	9.0	3.0	1.0	2.0	.0	0	.0	.0	0	0
7	8.5	5.0	7.0	1.0	.0	.5	.0	0	.0	.0	0	0
8	8.0	4.0	6.0	3.0	1.0	2.0	.5	0	.0	.0	0	0
9	8.5	4.5	6.5	4.5	2.0	3.0	.5	0	.0	.0	0	0
10	10.0	7.0	8.0	6.0	3.0	4.5	.5	0	.0	.5	0	0
11	8.0	4.5	6.5	5.5	2.0	4.0	.5	0	.5	.5	0	0
12	8.5	5.0	6.5	5.0	2.5	3.5	.0	0	.0	.0	0	0
13	8.0	6.0	7.0	4.0	2.0	3.0	.0	0	.0	.5	0	0
14	6.0	5.0	5.5	4.5	2.5	3.0	.0	0	.0	.5	0	0
15	6.5	3.5	5.0	3.5	1.5	2.5	.0	0	.0	.5	0	0
16	6.5	5.0	6.0	2.0	.0	1.0	.0	0	.0	.0	0	0
17	6.0	3.0	4.5	2.5	.0	1.0	.0	0	.0	.0	0	0
18	6.0	3.5	5.0	2.5	1.0	2.0	.0	0	.0	.5	0	0
19	7.0	5.0	5.5	2.5	.0	1.5	.0	0	.0	.0	0	0
20	6.0	3.5	4.5	2.5	1.0	2.0	.0	0	.0	.0	0	0
21	6.0	2.5	4.0	1.5	.0	1.0	.0	0	.0	.0	0	0
22	7.5	5.0	6.0	2.5	.5	1.5	.0	0	.0	.5	0	0
23	6.5	4.0	5.0	3.5	1.0	2.5	.0	0	.0	.5	0	0
24	6.0	2.5	4.5	4.5	2.0	3.0	.0	0	.0	.0	0	0
25	7.5	3.0	5.5	3.5	2.5	3.0	.0	0	.0	.0	0	0
26	8.5	5.0	6.5	3.0	.0	2.0	.0	0	.0	.0	0	0
27	7.5	4.0	6.0	.0	.0	.0	.0	0	.0	.5	0	0
28	8.0	4.0	6.0	.5	.0	.0	.0	0	.0	.0	0	0
29	9.0	5.5	7.0	.5	.0	.0	.0	0	.0	.0	0	0
30	8.0	5.0	6.5	.5	.0	.5	.0	0	.0	.5	0	0
31	7.0	5.0	6.0	---	---	---	.5	0	.0	.0	0	0
MONTH	14.0	2.5	6.5	6.0	.0	2.0	.5	0	.0	.5	0	0

BIG HOLE RIVER BASIN

06025500 BIG HOLE RIVER NEAR MELROSE, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	.5	0	.0	.5	.0	.0	9.0	4.0	6.5	10.5	5.5	8.0
2	.5	0	.0	.5	.0	.0	6.5	4.0	5.5	7.5	4.0	6.0
3	.5	0	.5	1.5	.0	.5	6.0	2.5	4.5	6.5	3.0	5.0
4	.5	0	.5	4.0	1.0	2.5	4.5	3.0	4.0	8.0	3.5	6.0
5	.5	0	.0	4.0	.0	2.5	5.5	3.5	4.5	9.5	4.5	7.5
6	.5	0	.5	1.0	.0	.5	4.5	2.0	3.5	10.5	7.0	8.5
7	.5	0	.0	1.0	.0	.5	3.0	1.0	2.0	11.5	8.0	9.5
8	.5	0	.0	4.0	.0	1.5	3.5	.0	2.0	10.5	8.5	9.5
9	.5	0	.0	3.5	.0	2.0	4.5	1.5	3.0	9.5	7.0	8.5
10	.5	0	.0	4.0	.5	2.0	4.5	1.5	3.0	7.0	5.5	6.0
11	.5	0	.5	4.5	1.5	2.5	2.0	.5	1.0	9.0	5.0	7.0
12	.5	0	.0	4.5	.5	2.0	4.0	.0	1.5	9.5	6.0	8.0
13	.5	0	.0	3.5	1.0	2.0	7.0	1.0	3.5	12.0	7.5	10.0
14	.5	0	.0	5.0	1.0	2.5	6.5	2.0	4.5	10.0	9.0	10.0
15	.5	0	.0	6.0	2.5	4.0	5.5	3.0	4.5	12.0	8.0	10.0
16	.5	0	.0	5.0	2.0	3.5	4.5	2.0	3.5	14.0	9.5	11.5
17	.5	0	.0	4.0	2.0	3.0	6.5	2.0	4.0	13.0	11.0	12.0
18	.5	0	.0	6.0	1.0	3.5	6.5	3.0	4.5	11.5	9.0	10.5
19	.5	0	.0	6.5	2.0	4.5	8.0	3.5	5.5	10.5	7.0	9.0
20	.5	0	.0	6.0	3.0	4.5	9.5	3.5	6.5	11.5	8.5	9.5
21	.5	0	.0	7.0	3.0	4.5	9.0	4.5	6.5	12.0	8.0	10.0
22	.5	0	.5	6.0	2.5	4.5	10.0	4.5	7.0	14.0	10.5	12.0
23	.5	0	.5	5.0	2.0	3.5	10.0	6.5	8.0	14.0	11.5	13.0
24	.5	0	.5	5.0	2.5	3.5	8.5	7.0	7.5	14.5	11.0	13.0
25	1.0	0	.5	5.0	1.0	3.0	8.0	5.5	6.5	13.5	10.0	11.5
26	2.0	0	1.0	3.0	.0	1.5	7.5	4.0	5.5	12.0	9.0	10.5
27	1.5	0	1.0	5.5	.5	3.0	6.5	2.5	5.0	11.0	8.5	10.0
28	2.5	0	1.0	6.0	2.0	4.0	8.0	3.5	5.5	10.5	8.5	9.5
29	---	---	---	6.5	2.0	4.0	9.5	4.0	6.5	12.0	9.5	10.5
30	---	---	---	8.5	2.0	5.0	10.5	4.5	7.5	12.0	9.5	10.5
31	---	---	---	9.5	3.5	6.5	---	---	---	10.5	9.0	10.0
MONTH	2.5	0	.5	9.5	.0	3.0	10.5	.0	5.0	14.5	3.0	9.5
		JUNE			JULY			AUGUST			SEPTEMBER	
1	13.5	9.0	11.0	16.0	12.5	14.0	20.5	16.5	18.5	20.5	15.5	17.5
2	15.0	11.5	13.0	17.5	14.0	16.0	21.0	14.5	17.5	19.5	14.5	17.0
3	15.0	13.0	14.0	19.0	15.5	17.0	21.0	15.0	18.0	19.0	13.5	16.0
4	13.0	10.5	11.5	19.0	16.0	17.5	21.0	16.0	18.5	19.0	13.5	16.5
5	10.5	9.0	9.5	19.5	16.0	17.5	19.5	16.5	18.0	19.0	13.5	16.5
6	11.0	9.0	10.0	19.5	15.5	17.5	18.5	15.0	17.0	19.5	14.0	17.0
7	13.0	10.5	12.0	19.0	14.5	16.5	20.5	14.0	17.0	18.0	15.0	16.5
8	13.0	12.0	12.5	20.0	15.0	17.0	21.5	15.5	18.5	16.5	13.5	15.0
9	14.0	11.5	12.5	20.5	15.5	17.5	20.5	16.0	18.5	14.5	12.5	13.5
10	15.5	12.5	14.0	20.0	16.0	18.0	20.0	16.0	18.5	15.5	12.0	14.0
11	16.0	13.5	14.5	20.0	15.0	17.5	20.5	16.0	18.5	16.5	13.0	14.5
12	14.5	12.5	13.5	21.0	15.5	18.0	21.5	15.5	18.5	17.0	13.0	15.0
13	14.0	12.0	13.0	20.0	16.5	18.0	21.0	16.0	18.5	15.5	12.5	14.5
14	13.0	11.5	12.0	19.5	16.0	17.5	21.0	15.5	18.0	13.5	11.5	12.5
15	12.5	9.5	11.0	20.5	15.0	17.5	19.0	15.0	17.0	14.0	9.0	11.5
16	13.0	11.0	12.0	21.0	16.0	18.5	21.0	14.5	17.5	14.0	10.0	12.0
17	14.0	11.0	12.5	21.0	16.0	18.5	20.0	16.5	18.5	13.0	10.5	12.0
18	14.0	11.0	12.5	20.5	15.5	18.0	21.5	15.0	18.0	13.0	9.0	11.0
19	15.0	12.0	13.0	21.0	15.0	18.0	20.0	15.5	18.0	15.0	10.0	12.5
20	14.5	12.0	13.0	22.0	15.5	18.0	21.5	15.0	18.0	16.0	10.5	13.0
21	14.0	11.0	12.5	22.5	16.0	19.0	21.5	15.0	18.5	14.0	11.0	12.5
22	14.5	13.0	14.0	22.5	16.5	19.0	20.0	15.5	18.0	11.0	8.0	9.5
23	14.5	12.5	13.5	22.0	16.5	19.0	20.5	15.5	18.0	12.5	8.5	10.0
24	13.0	11.5	12.0	23.0	16.5	19.5	19.5	15.5	17.5	14.0	8.5	11.0
25	13.0	10.0	11.5	20.0	17.0	18.5	19.5	15.0	17.5	14.5	9.5	12.0
26	12.0	11.0	11.5	22.0	15.5	18.5	19.0	14.5	17.0	15.0	9.5	12.5
27	14.0	10.5	12.0	22.0	15.5	18.5	19.0	15.5	17.0	14.5	10.0	12.5
28	14.0	12.0	13.0	22.5	15.5	19.0	19.5	14.5	17.0	13.0	10.5	12.0
29	14.0	13.0	13.5	22.0	16.5	19.0	19.5	14.0	16.5	15.5	11.5	13.0
30	15.0	12.5	13.5	22.5	16.5	19.5	20.0	14.0	17.0	14.5	10.5	12.5
31	---	---	---	22.0	16.0	19.0	18.5	14.5	17.0	---	---	---
MONTH	16.0	9.0	12.5	23.0	12.5	18.0	21.5	14.0	18.0	20.5	8.0	13.5

BOULDER RIVER BASIN

06033000 BOULDER RIVER NEAR BOULDER, MT

LOCATION.--Lat 46°12'40", long 112°05'27", in SE1/4NE1/4SW1/4 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 of Muskrat Creek, 2.0 mi southeast of Boulder, and at river mile 44.1.

DRAINAGE AREA.--381 mi^2.

PERIOD OF RECORD.--April 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 above National Geodetic Vertical Datum of 1929, by barometer. Prior to Aug. 29, 1946, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Dec. 18 to Jan. 11, 19-31, Mar. 1. Records good except these for estimated daily discharges, which are poor. Diversions for irrigation of about 3,500 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--48 years (1930-32, 1935-72, 1985-91), 115 ft^3/s, 83,320 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,490 ft^3/s, June 9, 1964, gage height, 10.90 ft; no flow July 15-17, 21, 1931.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 22, 1981, reached a discharge of 7,000 ft^3/s, gage height, 12.3 ft, from floodmarks.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 420 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 19	0430	*1,320	*7.90	June 5	1200	1,090	7.64

Minimum daily discharge, 8.0 ft^3/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	31	27	e10	17	e23	44	67	552	164	30	15
2	24	29	24	e9.5	18	26	50	75	567	143	29	14
3	25	20	26	e9.5	18	29	74	66	653	125	29	14
4	26	31	27	e9.5	19	29	144	60	612	112	28	14
5	26	29	28	e9.0	20	29	195	57	940	101	26	13
6	26	22	27	e9.0	20	25	269	65	845	92	33	13
7	26	18	26	e9.0	20	26	171	89	956	85	31	14
8	26	34	23	e9.5	21	26	108	123	787	80	29	15
9	26	37	23	e10	21	25	72	158	643	68	27	18
10	27	39	25	e10	22	28	61	128	561	66	25	19
11	29	38	27	e10	22	27	50	167	519	60	25	26
12	30	36	26	11	23	25	43	297	467	55	23	32
13	28	37	25	11	23	28	44	266	405	52	21	27
14	27	39	24	12	24	27	41	320	357	54	20	28
15	28	33	21	13	25	27	44	330	324	67	19	38
16	30	22	18	13	26	28	42	342	290	61	18	36
17	30	27	18	15	27	26	41	471	268	56	17	32
18	28	39	e17	15	27	26	40	923	235	52	18	32
19	30	34	e13	e14	27	30	42	1230	212	44	17	30
20	30	31	e10	e14	30	32	43	1050	321	40	16	29
21	28	22	e9.0	e13	30	32	81	968	269	36	16	26
22	31	32	e8.0	e14	29	31	133	967	292	35	16	23
23	33	37	e9.0	e14	30	30	163	929	267	34	15	22
24	31	37	e10	e14	29	31	161	890	234	33	14	22
25	31	37	e9.5	e13	29	27	151	934	230	33	14	21
26	32	31	e9.5	e13	27	31	110	781	217	45	14	21
27	32	19	e10	e14	28	30	86	675	204	41	14	20
28	31	20	e9.5	e13	25	29	75	611	190	34	17	20
29	31	28	e9.0	e12	---	29	70	544	180	32	17	19
30	32	31	e9.5	e14	---	30	66	564	173	31	16	19
31	31	---	e10	e16	---	36	---	589	---	30	15	---
TOTAL	889	920	558.0	373.0	677	878	2714	14736	12770	1961	649	672
MEAN	28.7	30.7	18.0	12.0	24.2	28.3	90.5	475	426	63.3	20.9	22.4
MAX	33	39	28	16	30	36	269	1230	956	164	33	38
MIN	24	18	8.0	9.0	17	23	40	57	173	30	14	13
AC-FT	1760	1820	1110	740	1340	1740	5380	29230	25330	3890	1290	1330

CAL YR 1990 TOTAL 39553.0 MEAN 108 MAX 919 MIN 8.0 AC-FT 78450
WTR YR 1991 TOTAL 37797.0 MEAN 104 MAX 1230 MIN 8.0 AC-FT 74970

e Estimated

WILLOW CREEK BASIN

06035000 WILLOW CREEK NEAR HARRISON, MT

LOCATION.--Lat 46°43'23", long 111°44'25", in SE1/4SW1/4NW1/4 sec.28, T.1 S., R.1 W., Madison County, Hydrologic Unit 10020005, on right bank 2.2 mi upstream from Willow Creek Dam, 2.5 mi northeast of Harrison, and at river mile 13.6.

DRAINAGE AREA.--83.8 mi^2.

PERIOD OF RECORD.--April 1938 to September 1982, October 1982 to current year (seasonal records only). Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1559: Drainage area.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 4,750 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Oct. 8, 1946, water-stage recorder at datum 0.22 ft higher, with different concrete control.

REMARKS.--Estimated daily discharges: Oct. 31. Records good except those for Apr. to May 11, which are fair. Diversions for irrigation of about 12,500 acres of which 3,500 acres is in Norwegian Creek drainage. Several observations of water temperature and specific conductance were obtained during the year.

AVERAGE DISCHARGE.--44 years (1938-82), 40.7 ft^3/s, 29,490 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 813 ft^3/s, Feb. 3, 1963, gage height, 4.24 ft, from floodmarks, from rating curve extended above 300 ft^3/s; minimum, 0.32 ft^3/s, July 21-24, 1988, gage height, 0.26 ft.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 320 ft^3/s, June 5, gage height, 2.54 ft; minimum, 1.8 ft^3/s, Aug. 14-16,22,24, gage height, 0.34 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.5						30	22	49	63	3.7	2.9
2	3.3						32	25	53	58	2.9	2.9
3	3.4						33	28	89	56	2.8	2.9
4	3.2						31	33	164	57	3.5	3.3
5	3.1						35	38	259	60	2.9	3.4
6	3.8						40	35	301	56	3.4	3.0
7	3.9						37	36	282	51	2.8	3.3
8	4.0						32	37	260	44	2.9	4.4
9	3.8						29	48	226	28	2.8	7.0
10	3.4						28	50	210	25	2.8	5.9
11	5.5						28	73	202	21	3.0	6.0
12	8.3						26	57	212	15	2.6	5.0
13	10						28	42	194	12	2.4	5.0
14	11						28	40	172	13	2.2	11
15	11						29	40	133	12	2.1	8.6
16	12						29	40	104	7.5	2.2	7.0
17	12						30	47	101	6.6	2.6	6.3
18	15						40	78	87	7.3	3.1	7.4
19	15						48	91	88	6.5	3.1	7.4
20	15						47	83	98	8.0	3.0	6.7
21	15						41	73	96	5.4	2.4	6.4
22	15						35	69	99	4.0	2.2	6.4
23	15						33	80	117	3.4	2.2	6.5
24	15						31	93	104	3.2	2.1	6.3
25	14						35	97	81	3.6	2.2	6.3
26	12						30	94	74	5.4	2.5	6.1
27	12						26	76	66	3.8	2.6	6.2
28	13						24	72	70	3.7	3.9	7.3
29	13						24	64	63	3.1	3.8	12
30	13						24	62	68	2.8	3.0	14
31	e13						---	58	---	2.6	3.1	---
TOTAL	300.2						963	1781	4122	647.9	86.8	186.9
MEAN	9.68						32.1	57.5	137	20.9	2.80	6.23
MAX	15						48	97	301	63	3.9	14
MIN	3.1						24	22	49	2.6	2.1	2.9
AC-FT	595						1910	3530	8180	1290	172	371

e Estimated

JEFFERSON RIVER BASIN

06036650 JEFFERSON RIVER NEAR THREE FORKS, MT

LOCATION.--Lat 45°53'52", long 111°35'45", in SW1/4SW1/4NW1/4 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^2.

PERIOD OF RECORD.--October 1978 to current year.

GAGE.--Water-stage recorder. Datum of gage is 4,076.76 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Dec. 17 to Feb. 21. Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year. 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.

AVERAGE DISCHARGE.--13 years, 2,061 ft^3/s, 1,493,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,900 ft^3/s, May 24, 1981, gage height recorded, 8.06 ft, 8.21 ft, from floodmark; maximum gage height, 9.39 ft, Dec. 10, 1980, ice jam; minimum discharge, 43 ft^3/s, Aug. 19, 21, Sept. 7, 8, 1988, gage height, 1.31 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 11,900 ft^3/s, June 9, gage height, 7.63 ft; minimum, 149 ft^3/s, Aug. 20,21, gage height, 1.82 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	632	1080	1030	e550	e700	955	1010	1300	3890	3410	376	252
2	646	1080	1030	e600	e800	941	1070	1280	3820	3540	437	262
3	652	1110	1040	e600	e850	1010	1150	1330	3830	3410	448	268
4	685	1070	1040	e650	e850	1050	1290	1340	3980	3010	417	275
5	685	1070	1130	e700	e900	1040	1410	1290	4730	2640	395	272
6	691	1110	1120	e700	e1000	994	1580	1230	6220	2360	351	264
7	706	1110	1090	e750	e1050	920	1820	1220	8290	2150	288	261
8	750	1100	1110	e750	e1050	960	1870	1200	10200	1950	264	270
9	768	1110	1170	e800	e1050	970	1780	1340	11600	1690	246	334
10	802	1120	1170	e850	e1050	976	1590	1580	11100	1450	227	412
11	839	1210	1140	e900	e1050	992	1430	1880	9030	1370	212	492
12	850	1240	1130	e900	e1050	976	1300	2020	8140	1260	200	537
13	845	1220	1070	e950	e1100	969	1230	2040	7760	1200	193	540
14	862	1210	1140	e1000	e1100	982	1170	2040	7080	1150	186	592
15	879	1200	1090	e1000	e1100	972	1160	2170	6310	1090	169	705
16	888	1170	904	e1000	e1100	968	1170	2310	5520	1030	170	757
17	909	1160	e800	e1000	e1100	980	1210	2510	4820	1010	161	756
18	967	1110	e700	e1000	e1150	976	1240	2640	4330	921	161	766
19	1000	1120	e600	e1000	e1200	978	1230	3440	3750	823	164	817
20	1000	1190	e500	e1000	e1100	972	1220	4300	3430	757	156	850
21	1010	1190	e400	e1000	e1050	978	1270	4610	3540	699	152	843
22	1050	1170	e300	e950	1040	1000	1430	4390	3810	636	156	816
23	1080	1110	e350	e950	1030	1020	1560	4260	3740	575	155	818
24	1120	1100	e400	e950	1010	1030	1670	4310	3540	540	157	836
25	1160	1190	e450	e950	1010	1020	1810	4470	3420	479	160	835
26	1160	1250	e500	e950	1010	1040	1930	4810	3420	480	164	825
27	1150	1220	e600	e900	999	1020	1900	5040	3400	473	173	845
28	1140	1140	e550	e900	983	1000	1710	4830	3360	464	175	828
29	1100	1060	e500	e850	---	989	1530	4480	3290	449	182	842
30	1090	1060	e500	e850	---	996	1400	4170	3370	431	215	912
31	1090	---	e550	e800	---	986	---	3920	---	400	235	---
TOTAL	28206	34280	25104	26750	28482	30660	43140	87750	162720	41847	7145	18082
MEAN	910	1143	810	863	1017	989	1438	2831	5424	1350	230	603
MAX	1160	1250	1170	1000	1200	1050	1930	5040	11600	3540	448	912
MIN	632	1060	300	550	700	920	1010	1200	3290	400	152	252
AC-FT	55950	67990	49790	53060	56490	60810	85570	174100	322800	83000	14170	35870

CAL YR 1990 TOTAL 434513 MEAN 1190 MAX 3840 MIN 292 AC-FT 861900
WTR YR 1991 TOTAL 534166 MEAN 1463 MAX 11600 MIN 152 AC-FT 1060000

e Estimated

MADISON RIVER BASIN

06036905 FIREHOLE RIVER NEAR WEST YELLOWSTONE, MT

LOCATION.--Lat 44°37'13", long 110°51'44", 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^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 7,050 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--No estimated daily discharges. Water-discharge records good. No regulation or diversions upstream from station.

AVERAGE DISCHARGE.--8 years, 318 ft^3/s, 230,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,520 ft^3/s, May 31, 1986, gage height, 5.48 ft; minimum, 195 ft^3/s, Jan. 9, 1989, gage height, 2.76 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,150 ft^3/s, May 25, gage height, 4.95 ft; minimum, 215 ft^3/s, Jan. 29, gage height, 2.88 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	244	265	252	249	239	246	265	268	572	364	269	256
2	243	254	256	247	237	243	277	286	641	316	260	255
3	242	240	249	244	237	245	285	292	780	301	257	255
4	251	251	251	243	240	254	286	276	715	294	266	256
5	245	258	250	242	241	260	326	272	705	291	302	258
6	289	249	242	241	241	246	382	298	634	286	266	260
7	259	237	242	244	241	244	325	332	617	282	262	279
8	252	249	243	245	241	245	278	383	577	280	262	302
9	251	251	245	247	241	241	268	503	559	280	260	284
10	257	256	246	247	241	244	277	479	550	301	256	292
11	259	252	254	247	238	250	258	626	539	303	253	306
12	252	251	251	250	240	241	253	513	548	283	251	267
13	253	250	254	252	239	244	251	495	535	279	250	260
14	250	254	258	251	238	245	258	469	489	277	248	318
15	264	255	248	254	242	246	265	467	423	276	252	286
16	285	245	244	246	253	244	282	487	395	273	255	263
17	264	249	246	247	252	246	281	582	384	271	259	257
18	260	255	239	248	239	246	281	810	369	270	254	254
19	278	254	249	251	241	250	275	693	357	267	254	253
20	255	269	234	238	240	249	275	722	353	265	271	253
21	249	247	239	241	242	248	296	776	341	264	255	251
22	261	248	236	247	243	244	313	864	336	263	254	246
23	261	254	237	246	240	246	327	846	327	280	252	250
24	253	253	242	244	236	259	334	891	319	284	249	249
25	257	254	242	235	234	255	341	901	315	283	250	251
26	260	254	244	240	233	254	308	805	325	275	251	251
27	257	240	245	244	234	250	281	616	313	266	257	251
28	255	245	256	243	236	245	271	547	331	261	265	251
29	256	250	244	228	---	245	267	565	320	257	255	263
30	254	256	236	238	---	243	265	572	342	257	254	256
31	253	---	246	244	---	250	---	550	---	258	256	---
TOTAL	7969	7545	7620	7583	6719	7668	8651	17186	14011	8707	8005	7933
MEAN	257	251	246	245	240	247	288	554	467	281	258	264
MAX	289	269	258	254	253	260	382	901	780	364	302	318
MIN	242	237	234	228	233	241	251	268	313	257	248	246
AC-FT	15810	14970	15110	15040	13330	15210	17160	34090	27790	17270	15880	15740

CAL YR 1990 TOTAL 104638 MEAN 287 MAX 518 MIN 234 AC-FT 207500
WTR YR 1991 TOTAL 109597 MEAN 300 MAX 901 MIN 228 AC-FT 217400

MADISON RIVER BASIN

06036905 FIREHOLE RIVER NEAR WEST YELLOWSTONE, MT--Continued

WATER QUALITY RECORDS

PERIOD OF RECORD.--Water years 1983 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: August 1983 to September 1986, October 1987 to September 1988.
WATER TEMPERATURE: August 1983 to current year.

INSTRUMENTATION.--Water-quality monitor Aug. 30, 1983 to Sept. 25, 1988. Water temperature recorder since Sept. 26, 1988.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1983-86, 1988): Maximum, 633 microsiemens, Apr. 1 1988; minimum, 140 microsiemens, Jun. 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, 28.0°C, July 13; minimum, 0.5°C, Dec. 21.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)
OCT 23...	0900	253	544	0.0	12.5
JAN 03...	0930	245	566	-17.0	6.0
FEB 13...	0915	241	572	-2.5	10.0
APR 10...	1415	276	559	-0.5	12.5
MAY 30...	0815	571	308	4.5	12.5
JUL 16...	0845	285	525	24.0	20.5
AUG 21...	1230	250	517	24.0	22.0

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	20.0	15.5	18.0	13.5	11.5	13.0	9.0	7.5	8.0	8.0	6.0	7.0
2	17.5	13.5	16.0	12.5	9.5	11.0	8.0	7.0	7.5	8.5	5.5	7.0
3	14.5	12.5	13.5	12.0	8.0	10.0	9.0	6.5	7.5	9.0	6.5	7.5
4	17.5	13.0	15.0	11.5	10.0	11.0	9.5	7.0	8.5	8.0	5.5	7.0
5	16.5	14.0	15.5	12.5	9.5	11.0	9.0	7.5	8.0	7.5	5.0	6.5
6	15.0	11.5	13.0	10.5	7.5	9.0	8.5	6.0	7.5	9.5	6.0	7.5
7	15.5	10.5	12.5	9.0	6.0	7.5	9.0	6.0	7.5	10.5	8.5	9.5
8	14.0	10.0	12.0	11.0	8.5	9.5	9.5	6.5	8.0	9.5	8.0	9.0
9	16.0	10.0	12.5	10.5	9.5	10.0	11.0	7.5	9.0	10.5	8.0	9.0
10	14.0	12.0	13.0	13.0	10.5	11.5	11.0	7.5	9.5	10.5	9.0	9.5
11	15.5	11.0	13.0	13.5	10.0	11.5	11.0	10.0	10.5	11.0	10.0	10.5
12	12.5	11.5	12.0	13.5	9.5	11.5	10.5	8.5	9.5	10.5	9.5	10.5
13	14.0	11.5	12.5	13.5	10.0	11.5	10.0	8.0	9.0	10.0	9.0	9.5
14	12.0	10.0	11.0	13.0	11.0	12.0	9.5	7.5	9.0	10.5	9.5	9.5
15	15.0	11.5	13.5	12.5	10.0	11.5	8.5	6.5	7.5	11.5	9.5	10.5
16	14.0	11.0	13.0	12.0	8.5	10.5	8.0	5.0	6.5	10.0	8.0	9.5
17	13.5	9.5	11.5	12.0	10.0	11.5	7.5	6.0	7.0	11.0	9.5	10.0
18	14.0	10.0	12.5	13.5	11.5	12.5	8.0	4.0	6.0	12.0	11.0	11.0
19	14.0	12.0	13.5	14.0	11.5	12.5	7.5	2.0	5.0	10.5	6.5	9.0
20	13.0	10.0	11.5	12.5	9.0	11.5	2.0	1.5	1.5	7.5	5.0	6.5
21	12.0	9.5	11.0	8.5	7.0	8.0	3.0	.5	2.0	7.5	5.0	6.5
22	13.5	11.5	12.5	8.5	7.0	8.0	2.5	1.0	2.0	9.5	7.0	8.0
23	14.0	12.0	13.0	10.5	8.0	9.5	3.5	1.5	2.5	9.5	6.5	8.0
24	15.5	11.0	13.0	10.5	8.5	9.5	5.5	3.0	4.0	8.5	6.0	7.5
25	16.5	12.5	14.5	10.5	8.5	9.5	5.5	3.5	5.0	7.5	4.5	6.0
26	16.0	12.5	14.5	11.0	8.5	10.0	7.0	4.5	5.5	7.0	4.0	5.5
27	16.0	12.5	14.5	8.0	6.5	7.5	6.5	5.0	6.0	8.5	6.5	7.5
28	15.0	12.0	13.5	8.0	6.5	7.5	7.0	5.0	6.5	7.5	3.5	6.0
29	15.0	12.5	13.5	10.0	7.5	8.5	4.5	2.5	3.5	5.5	2.0	4.0
30	15.5	12.5	13.5	9.5	7.5	8.5	5.0	2.0	3.0	7.0	3.0	5.0
31	14.5	12.0	13.5	---	---	---	6.5	5.0	6.0	10.0	6.0	7.5
MONTH	20.0	9.5	13.5	14.0	6.0	10.0	11.0	.5	6.5	12.0	2.0	8.0

MADISON RIVER BASIN

06036905 FIREHOLE RIVER NEAR WEST YELLOWSTONE, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	11.5	6.5	9.0	14.5	12.0	13.0	19.0	11.5	15.0	18.5	12.0	15.0
2	11.5	7.0	9.5	14.0	10.5	12.5	19.0	12.0	15.5	15.5	12.0	14.0
3	12.5	10.0	11.0	10.0	8.0	8.5	16.5	12.0	14.0	15.5	11.0	13.5
4	13.0	11.0	12.0	11.0	7.5	9.5	17.5	11.5	14.0	18.5	11.5	14.5
5	12.5	10.0	11.5	10.5	7.0	9.0	16.0	12.0	13.5	19.0	12.5	15.5
6	15.0	12.0	13.0	10.0	6.0	8.0	13.0	10.0	11.5	18.5	14.5	16.5
7	14.0	9.5	11.5	9.5	5.5	8.0	13.0	9.5	11.0	19.0	14.5	16.5
8	13.5	9.5	11.5	12.0	8.0	9.5	14.5	9.5	12.0	18.0	13.0	15.5
9	14.0	9.0	11.5	12.5	7.0	10.0	13.5	10.0	11.5	14.5	10.5	12.0
10	13.5	9.5	11.5	13.0	8.5	10.5	13.5	11.0	12.0	15.0	10.5	12.5
11	13.0	8.0	10.5	13.0	10.5	11.5	12.0	9.0	10.5	15.0	9.5	12.5
12	12.0	10.0	11.5	12.5	9.0	10.5	11.5	8.0	9.5	13.0	10.0	11.0
13	12.5	10.0	11.0	14.0	10.0	12.0	12.5	9.0	10.5	17.5	9.0	13.0
14	13.0	9.5	11.5	14.0	10.0	12.0	16.0	11.5	13.5	17.5	12.5	15.5
15	14.5	12.0	13.0	15.0	11.0	13.0	16.0	12.5	14.0	17.0	13.0	15.0
16	14.5	12.5	14.0	14.0	10.5	12.0	16.5	9.5	13.0	21.0	12.5	16.5
17	12.5	10.5	11.5	11.5	9.5	10.5	18.5	12.5	15.0	19.0	12.0	16.0
18	12.0	8.0	10.0	15.5	9.0	12.0	14.0	12.0	13.0	14.5	9.0	12.5
19	10.5	9.0	10.0	16.5	10.5	13.5	18.5	12.5	15.0	18.0	9.0	13.0
20	11.0	8.5	9.5	14.5	12.5	13.5	20.5	12.5	16.5	18.5	9.5	14.0
21	14.0	9.5	11.5	17.0	10.5	13.5	20.0	13.5	16.5	19.0	8.5	14.0
22	14.5	10.5	12.5	15.5	10.5	13.0	20.5	11.5	16.0	16.5	8.0	13.0
23	14.0	10.0	12.0	15.0	10.5	12.5	19.5	12.5	15.5	17.0	8.5	13.0
24	13.5	8.5	11.0	13.0	10.0	12.0	15.5	12.5	14.0	17.5	9.0	13.5
25	12.0	9.5	10.5	14.5	9.5	11.5	14.5	11.0	13.0	15.0	8.5	12.5
26	12.5	7.5	10.0	16.5	11.0	13.0	15.5	11.5	13.0	13.5	9.0	11.5
27	11.5	9.0	10.0	13.5	11.0	12.0	14.5	11.0	12.5	15.0	11.0	13.0
28	13.0	8.0	10.5	13.5	9.5	11.5	14.5	10.5	12.5	18.0	11.0	14.5
29	---	---	---	14.5	9.5	12.0	16.5	12.0	14.0	16.0	11.5	14.0
30	---	---	---	17.0	9.0	13.0	17.5	11.5	14.0	16.0	12.5	14.5
31	---	---	---	18.5	11.0	14.5	---	---	---	17.0	12.5	15.0
MONTH	15.0	6.5	11.0	18.5	5.5	11.5	20.5	8.0	13.5	21.0	8.0	14.0
		JUNE			JULY			AUGUST			SEPTEMBER	
1	19.0	13.0	16.0	24.0	15.5	19.5	26.0	22.0	23.5	24.5	20.0	22.5
2	18.0	13.5	16.0	25.5	18.0	21.5	26.5	19.0	22.5	24.0	19.0	21.5
3	18.0	13.0	15.5	27.0	19.0	23.0	26.5	20.0	23.0	25.0	18.5	22.0
4	17.5	13.0	15.5	27.0	20.0	23.5	26.0	20.5	22.5	25.0	18.5	22.0
5	16.5	13.0	15.0	26.5	20.5	23.5	26.0	18.0	22.0	24.0	18.5	21.5
6	17.5	12.5	15.5	26.0	20.0	22.5	23.0	20.0	21.5	24.0	18.0	21.0
7	19.0	13.0	16.0	27.0	19.0	23.0	24.0	18.0	21.0	22.5	20.0	21.5
8	18.5	13.5	16.5	26.5	19.5	23.5	27.0	19.0	23.0	20.0	18.5	19.5
9	20.0	14.5	17.5	26.0	20.5	23.5	26.0	20.0	23.5	20.5	18.0	19.0
10	21.0	14.5	18.0	23.5	20.5	21.5	27.5	20.0	23.5	21.5	18.0	19.5
11	20.5	15.0	18.0	26.5	19.0	22.0	25.5	20.5	23.0	20.5	17.0	18.5
12	20.0	15.0	18.0	27.0	19.5	23.5	25.5	19.5	22.5	22.0	17.0	19.0
13	19.5	15.5	18.0	28.0	20.0	24.0	26.0	19.5	22.5	21.5	16.5	19.0
14	18.5	14.0	16.5	25.5	22.0	23.5	24.5	20.5	22.5	19.0	15.0	17.0
15	21.0	13.5	17.0	27.0	20.0	23.5	22.5	20.5	21.5	18.5	14.0	16.0
16	21.0	15.5	18.5	26.5	20.5	23.5	25.0	19.5	22.0	18.5	15.0	17.0
17	21.5	16.5	19.0	27.0	20.5	23.5	24.5	20.5	22.5	20.5	16.5	18.0
18	21.0	16.0	19.0	26.0	20.0	23.0	26.0	18.5	22.0	19.5	14.0	17.0
19	23.5	18.0	21.0	25.0	19.5	22.5	26.0	20.0	22.5	21.5	15.0	18.0
20	24.0	17.5	21.0	26.0	20.0	23.0	25.5	20.0	22.5	21.5	16.0	19.0
21	24.0	18.0	21.0	26.5	20.0	23.0	26.5	20.0	23.0	19.0	16.0	17.5
22	22.0	18.5	20.5	25.5	20.5	23.0	25.5	19.5	22.5	18.0	13.5	15.5
23	23.0	17.5	20.0	23.5	19.5	21.5	25.5	20.5	22.5	18.5	14.5	16.0
24	24.0	18.0	21.0	24.0	19.0	21.5	25.0	20.0	22.5	21.0	14.0	17.5
25	21.0	19.0	20.0	24.0	19.5	22.0	25.5	20.0	22.5	22.0	15.5	18.5
26	20.5	17.0	19.0	25.0	20.0	22.5	25.5	20.0	22.5	21.5	15.5	18.5
27	21.5	16.5	19.0	27.0	19.5	23.0	24.0	20.0	22.0	21.5	16.0	19.0
28	21.0	18.0	19.5	27.5	20.0	24.0	23.5	20.0	21.5	19.0	16.5	17.5
29	22.5	18.0	20.0	27.0	20.0	23.5	24.5	17.5	21.0	20.0	17.5	18.5
30	20.0	17.5	19.0	25.5	20.0	22.5	25.5	17.5	21.5	20.0	15.5	18.0
31	---	---	---	27.0	19.5	23.0	24.5	18.5	22.0	---	---	---
MONTH	24.0	12.5	18.0	28.0	15.5	23.0	27.5	17.5	22.5	25.0	13.5	19.0

MADISON RIVER BASIN

06037000 GIBBON RIVER NEAR WEST YELLOWSTONE, MT

LOCATION.--Lat 44°38'58", long 110°47'02", Yellowstone National Park, Hydrologic Unit 10020007, on right bank, 0.6 mi downstream from Canyon Creek, 4.0 mi east of Madison Junction, 16.7 mi east of West Yellowstone, and at river mile 5.6.

DRAINAGE AREA.--118 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1913 to September 1916 (incomplete record most years), October 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 6,940 ft above National Geodetic Vertical Datum of 1929, from topographic map. Nonrecording gage at site 0.1 mi downstream at different datum, 1913-1916.

REMARKS.--Estimated daily discharges: Nov. 7, Dec. 7, 21-31, Jan. 4, 5, 20, 21, 25, 26, 28-31, Feb. 20. Water-discharge records good except those for estimated daily discharges and those for May to June, which are fair. No regulation or diversions upstream of station.

AVERAGE DISCHARGE.--8 years, 114 ft^3/s, 82,590 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,290 ft^3/s, May 18, 1991, gage height, 4.68 ft; minimum, 47 ft^3/s, Jan. 9, 1989, gage height, 2.20 ft, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,290 ft^3/s, May 18, gage height, 4.68 ft; minimum, 53 ft^3/s, Jan. 29, gage height, 2.27 ft, but may have been lower during other periods of ice effect.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	78	88	74	78	69	76	83	95	338	169	115	90
2	78	84	78	76	69	76	88	100	337	151	113	89
3	75	76	74	75	69	74	92	100	386	147	109	86
4	78	85	76	e72	70	77	90	94	371	143	110	87
5	77	89	77	e72	70	80	100	93	322	141	115	88
6	97	82	70	73	70	70	116	102	296	139	111	86
7	87	e72	e70	76	69	72	118	132	281	137	110	94
8	83	85	72	76	68	75	100	167	244	136	109	101
9	82	85	73	76	70	72	95	256	249	137	106	120
10	86	83	73	76	69	76	98	231	218	143	104	112
11	85	79	78	77	66	80	92	369	205	147	103	123
12	82	77	78	78	71	75	89	330	193	137	102	101
13	82	78	78	77	70	76	86	268	187	134	101	96
14	82	78	80	77	69	76	88	294	175	132	99	126
15	89	80	76	79	72	76	91	311	171	130	98	111
16	97	75	77	77	77	75	93	380	171	130	98	98
17	91	78	75	77	76	76	93	687	160	130	98	96
18	87	80	79	75	70	76	94	1020	162	126	99	92
19	96	80	80	77	72	78	91	930	165	126	97	91
20	87	84	70	e68	e74	78	92	887	160	126	97	90
21	81	79	e67	e70	75	77	104	865	157	126	95	88
22	85	79	e67	71	76	76	115	879	157	123	97	86
23	86	80	e62	73	74	76	126	847	155	129	96	86
24	82	81	e65	72	71	80	131	739	153	129	93	87
25	85	80	e68	e70	70	79	137	765	152	129	92	86
26	87	80	e70	e70	68	81	125	706	182	125	92	85
27	85	70	e72	71	70	77	110	537	161	120	93	84
28	83	76	e75	e70	71	75	106	435	170	117	94	83
29	83	76	e72	e65	---	76	101	398	161	115	91	87
30	83	78	e72	e65	---	75	97	406	176	115	90	84
31	82	---	e75	e68	---	77	---	368	---	114	90	---
TOTAL	2621	2397	2273	2277	1985	2363	3041	13791	6415	4103	3117	2833
MEAN	84.5	79.9	73.3	73.5	70.9	76.2	101	445	214	132	101	94.4
MAX	97	89	80	79	77	81	137	1020	386	169	115	126
MIN	75	70	62	65	66	70	83	93	152	114	90	83
AC-FT	5200	4750	4510	4520	3940	4690	6030	27350	12720	8140	6180	5620

CAL YR 1990 TOTAL 40697 MEAN 111 MAX 407 MIN 62 AC-FT 80720
WTR YR 1991 TOTAL 47216 MEAN 129 MAX 1020 MIN 62 AC-FT 93650

e Estimated

MADISON RIVER BASIN

06037000 GIBBON RIVER NEAR WEST YELLOWSTONE, MT--Continued

WATER QUALITY RECORDS

PERIOD OF RECORD.--Water years 1983 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: September 1983 to September 1986, October 1987 to September 1988.
WATER TEMPERATURE: August 1983 to current year.

INSTRUMENTATION.--Water-quality monitor Aug. 31, 1983 to Sep. 26, 1988. Water temperature recorder since Sep. 26, 1988.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1983-86, 1988): Maximum, 612 microsiemens, Dec. 30, 1987; minimum, 77 microsiemens, May 30, 1986.
WATER TEMPERATURE: Maximum, 25.5°C, June 24, 1988; minimum, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 23.0°C, July 13, 28, Aug. 9; minimum, 0.0°C on many days during winter period.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)
OCT					
23...	1245	87	430	4.0	8.5
JAN					
03...	1330	77	468	-4.0	2.5
FEB					
13...	1300	71	466	1.0	6.5
APR					
10...	1215	97	463	-0.5	7.0
24...	1545	130	375	15.0	10.0
MAY					
30...	1145	418	160	10.0	8.5
JUL					
16...	1130	128	260	26.0	17.5
AUG					
20...	1630	103	327	27.0	22.0

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	16.5	10.5	13.0	9.0	6.5	7.5	3.0	1.0	2.0	4.0	1.5	3.0
2	13.5	9.0	12.0	8.0	4.0	6.0	3.0	1.5	2.0	3.5	.5	2.0
3	10.0	7.5	9.0	6.5	1.5	4.0	3.0	.5	2.0	3.5	.5	2.0
4	15.0	10.0	11.5	6.5	5.5	6.0	4.5	2.0	3.5	2.5	.0	1.0
5	13.0	11.0	11.5	7.0	5.0	6.0	4.0	2.0	3.0	2.5	.0	1.0
6	11.5	6.5	8.5	6.0	2.0	4.0	3.0	.0	1.5	4.5	1.5	3.0
7	10.0	5.5	7.5	3.5	.0	2.0	3.0	.0	1.5	4.5	2.5	3.5
8	9.0	5.0	7.0	6.5	3.5	5.0	3.5	.0	2.0	5.0	4.0	4.5
9	11.0	5.0	8.0	7.0	5.5	6.0	4.5	1.0	2.5	5.0	3.0	4.0
10	9.5	7.0	8.5	8.5	5.5	7.0	5.5	1.5	3.5	5.5	3.5	4.5
11	10.5	6.0	8.0	8.5	4.0	6.0	6.0	4.0	5.0	6.0	4.5	5.0
12	8.5	7.0	7.5	7.5	3.5	5.5	5.0	2.5	3.5	6.0	5.0	5.5
13	9.5	7.0	8.0	8.0	4.0	6.0	5.0	2.5	3.5	6.0	4.0	5.0
14	7.0	6.0	6.5	9.0	5.5	7.0	4.5	2.0	3.5	5.5	4.5	5.0
15	10.0	6.5	8.5	8.0	4.5	6.5	3.0	.5	2.0	7.0	4.5	5.5
16	9.5	6.5	8.0	6.5	2.5	4.5	2.5	.0	1.0	5.0	3.0	4.0
17	8.5	4.0	6.0	7.0	4.0	6.0	2.5	1.0	1.5	6.0	4.0	5.0
18	8.5	5.0	7.0	8.5	6.5	7.5	3.5	1.0	2.0	7.0	5.5	6.0
19	9.0	7.0	8.5	8.5	7.5	7.5	1.0	.0	.0	6.0	1.0	4.0
20	8.0	4.5	6.5	7.5	4.0	6.5	.0	.0	.0	2.5	.0	1.0
21	7.5	4.0	6.0	4.0	3.0	3.5	.0	.0	.0	2.5	.0	1.0
22	9.0	6.5	7.5	4.5	3.5	4.0	.0	.0	.0	4.0	1.0	2.5
23	9.5	7.0	8.0	6.5	4.5	5.5	.0	.0	.0	3.5	1.0	2.5
24	10.5	5.5	7.5	7.0	4.5	5.5	.0	.0	.0	4.0	.5	3.0
25	11.5	6.0	8.5	6.5	5.0	5.5	.0	.0	.0	1.0	.0	.0
26	11.5	7.5	9.5	6.0	3.0	5.0	.0	.0	.0	2.0	.0	.5
27	11.5	7.0	9.0	2.5	1.0	2.0	.0	.0	.0	3.5	1.5	2.0
28	10.5	7.0	8.5	3.5	1.0	2.5	1.5	.0	.5	2.5	.0	1.5
29	11.0	7.5	9.0	4.5	2.0	3.5	.0	.0	.0	.0	.0	.0
30	10.5	7.0	8.5	4.5	1.5	3.5	.0	.0	.0	.0	.0	.0
31	10.5	7.0	9.0	---	---	---	1.0	.0	.0	3.5	.0	1.5
MONTH	16.5	4.0	8.5	9.0	.0	5.0	6.0	.0	1.5	7.0	.0	3.0

MADISON RIVER BASIN

06037000 GIBBON RIVER NEAR WEST YELLOWSTONE, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	5.5	1.0	3.0	8.0	6.5	7.5	14.0	6.0	10.0	13.0	5.5	9.0
2	5.5	1.0	3.5	8.5	5.5	7.0	14.5	6.5	10.0	11.0	6.5	9.0
3	7.0	4.5	6.0	5.5	4.0	5.0	11.5	7.0	9.5	11.5	6.5	9.0
4	7.5	6.0	6.5	6.5	5.0	5.5	12.5	7.0	9.5	13.0	6.0	9.5
5	7.5	4.0	6.0	6.5	3.5	5.0	10.0	8.0	9.0	13.0	7.0	10.5
6	9.5	6.0	7.5	5.0	.0	2.5	10.0	7.5	8.5	14.0	9.5	11.5
7	8.0	3.5	5.5	4.5	.5	2.5	9.0	6.0	7.5	14.0	10.0	11.5
8	7.5	2.5	5.0	8.0	2.5	4.5	9.5	4.5	7.0	10.5	8.0	9.5
9	8.0	3.5	5.5	7.5	1.0	4.0	7.0	4.5	5.5	8.0	6.0	7.0
10	8.0	3.0	5.0	8.0	3.0	5.5	9.5	5.0	6.5	10.5	6.0	8.0
11	7.5	1.5	4.5	8.0	4.5	6.0	8.5	4.0	6.5	10.0	6.0	8.0
12	6.5	5.0	6.0	7.5	4.0	5.5	8.0	4.5	6.0	7.0	5.0	6.0
13	7.0	4.5	6.0	8.0	4.5	6.0	7.0	4.0	5.5	12.0	5.5	8.5
14	7.5	4.0	6.0	8.5	3.5	6.5	11.0	6.0	8.0	10.5	6.0	8.5
15	9.0	7.0	8.0	10.0	5.5	7.5	10.0	7.0	8.5	10.0	6.5	8.5
16	9.0	6.5	8.5	8.5	5.0	6.5	10.0	4.5	7.5	12.5	5.5	9.0
17	8.0	5.0	6.5	7.0	4.0	6.0	13.0	7.5	10.0	12.0	5.0	8.5
18	6.5	2.5	4.5	10.5	2.5	6.5	9.0	7.0	8.0	11.0	5.0	7.5
19	5.5	4.0	5.0	11.0	4.0	7.5	14.0	7.5	10.0	14.0	3.5	8.5
20	6.0	5.0	5.5	9.0	7.0	8.0	16.0	6.5	11.0	14.0	5.0	9.5
21	9.5	5.0	6.5	13.0	5.5	8.5	16.0	8.5	11.5	15.5	5.5	10.5
22	9.5	4.5	7.0	11.5	6.0	8.5	15.5	7.0	11.0	15.0	6.5	11.0
23	9.0	4.5	6.5	10.0	6.0	8.0	13.0	8.0	10.5	13.0	7.0	10.5
24	8.0	3.5	5.5	8.5	5.0	7.0	10.5	8.0	9.5	15.5	7.0	11.5
25	7.5	4.0	5.0	9.5	4.5	6.5	9.0	6.5	8.0	13.0	8.0	11.0
26	8.0	1.5	4.5	9.5	6.0	7.5	11.5	6.0	8.0	11.0	7.0	9.0
27	6.5	3.0	4.5	10.5	5.0	7.0	10.0	5.5	7.5	10.5	6.5	8.5
28	8.0	1.5	5.0	9.0	4.0	6.5	10.5	6.0	8.0	13.0	6.5	10.0
29	---	---	---	11.5	4.0	7.0	13.0	6.0	8.5	11.5	7.5	9.5
30	---	---	---	12.5	3.5	7.5	11.5	6.5	9.0	12.5	8.0	10.0
31	---	---	---	14.0	4.5	9.0	---	---	---	13.5	9.0	11.5
MONTH	9.5	1.0	5.5	14.0	.0	6.5	16.0	4.0	8.5	15.5	3.5	9.5
		JUNE			JULY			AUGUST			SEPTEMBER	
1	15.5	9.5	12.5	19.5	11.5	15.0	21.5	17.0	19.0	20.0	15.0	17.5
2	14.5	11.0	13.0	21.0	13.0	17.0	22.5	15.0	18.5	20.5	14.0	17.0
3	15.0	11.5	13.5	22.0	14.0	18.0	21.5	14.5	18.0	21.0	14.0	17.0
4	15.5	11.0	13.5	22.0	15.0	18.0	22.0	16.0	18.0	21.0	13.5	17.0
5	14.0	11.5	13.0	21.5	15.5	18.5	21.5	14.5	18.0	20.5	13.5	17.0
6	15.0	10.5	13.0	20.5	14.5	17.5	19.0	15.0	17.0	20.0	13.0	16.5
7	16.0	11.0	13.5	22.0	14.0	17.5	20.0	13.5	16.5	18.0	15.0	16.5
8	15.5	11.0	13.5	22.0	14.5	18.0	22.0	14.0	18.0	16.0	14.5	15.5
9	17.5	12.0	14.5	22.0	16.0	18.5	23.0	15.5	18.5	15.5	13.0	14.5
10	18.5	12.5	15.5	19.5	16.0	17.0	22.0	15.0	18.5	17.5	13.0	15.0
11	18.5	13.0	16.0	21.5	14.0	17.5	20.0	15.0	17.5	16.0	13.5	14.5
12	18.5	13.0	15.5	22.5	14.5	18.5	21.0	14.0	17.5	18.0	12.0	14.5
13	16.5	13.5	15.0	23.0	15.0	19.0	21.5	14.5	17.5	17.0	12.0	14.5
14	15.5	11.5	13.5	21.0	16.5	18.5	19.5	16.5	17.5	14.5	11.0	13.0
15	17.0	10.0	13.5	22.5	15.5	18.5	18.5	15.0	16.5	14.5	10.5	12.0
16	18.0	11.5	14.5	22.0	15.5	18.5	21.5	14.5	17.5	14.0	10.5	12.5
17	17.0	13.0	15.0	22.0	15.0	18.5	20.5	16.0	18.0	15.0	11.0	12.5
18	16.0	11.0	14.0	22.0	15.0	18.0	22.0	14.0	17.5	15.0	9.0	12.0
19	19.5	13.5	16.0	21.5	14.5	17.5	21.5	15.0	17.5	17.0	10.0	13.5
20	20.0	13.5	16.5	20.5	15.0	17.5	22.0	14.5	18.0	17.5	11.0	14.0
21	18.5	13.0	16.0	22.0	14.5	18.0	22.0	15.0	18.0	15.0	11.5	13.0
22	16.5	14.0	15.0	20.5	15.5	18.0	21.5	14.5	17.5	13.0	9.0	11.0
23	17.5	12.0	14.5	18.5	14.5	16.5	21.0	16.0	18.0	14.5	9.5	11.5
24	19.0	13.0	16.0	20.0	14.0	17.0	21.5	15.0	18.0	16.5	9.0	12.5
25	17.0	13.5	15.0	20.0	15.0	17.0	21.5	15.0	18.0	17.5	10.5	13.5
26	15.5	12.0	13.5	21.0	15.5	18.0	20.0	15.5	17.5	17.0	10.5	13.5
27	16.5	11.5	14.0	22.5	15.0	18.5	19.0	14.5	17.0	17.0	10.5	14.0
28	15.5	13.0	14.0	23.0	15.5	19.0	19.5	15.5	16.5	14.0	11.5	13.0
29	17.5	12.5	15.0	22.5	15.0	18.5	20.0	12.5	16.0	16.5	13.0	14.0
30	15.0	13.0	14.0	22.0	15.0	18.0	21.0	12.5	16.5	16.0	10.5	13.0
31	---	---	---	22.5	14.5	18.0	20.0	13.5	17.0	---	---	---
MONTH	20.0	9.5	14.5	23.0	11.5	18.0	23.0	12.5	17.5	21.0	9.0	14.0

MADISION RIVER BASIN

06037500 MADISON RIVER NEAR WEST YELLOWSTONE, MT

LOCATION.--Lat 44°39'25", long 111°04'03", in NE1/4NW1/4SW1/4 sec.36, T.13 S., R.5 E., Gallatin County, Hydrologic Unit 10020007, Yellowstone National Park, on left bank 0.7 mi downstream of 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^2.

WATER-DISCHARGE RECORDS

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 above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Oct. 20, 1918, nonrecording gage, and Oct. 20, 1918 to June 29, 1930, nonrecording gage or water-stage recorder at sites 2.5 mi upstream at different datums. Supplementary nonrecording gage at site 0.3 mi downstream at different datum used at time during 1927-30.

REMARKS.--Estimated daily discharges: Dec. 21 to Jan. 2, Jan. 21, Jan. 30 to Feb. 2. Water-discharge records good except those for estimated daily discharges, which are fair. No regulation or diversions upstream from station.

AVERAGE DISCHARGE.--64 years (1913-17, 1918-21, 1922-73, 1984-86, 1989-91), 489 ft^3/s, 15.81 in/yr, 354,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,340 ft^3/s, May 31, 1986, gage height, 3.56 ft, maximum gage height, about 10.0 ft, Jan. 8, 1937, ice jam; minimum discharge, 100 ft^3/s, Feb. 7, 1933, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,070 ft^3/s and maximums (*)

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
a Dec. 30	unknown	ice jam	b,c*7.2	May 22	1000	*1,960	3.27
May 11	1000	1,180	2.69	June 3	1200	1,390	2.86

a--about.
b--from floodmark.
c--backwater from ice

Minimum discharge, 255 ft^3/s, Dec. 20, 21, gage height, 1.68 ft, but may have been lower during period of ice effect or no gage height record.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	365	414	382	e380	e350	369	388	410	1010	610	418	384
2	367	406	391	e380	e370	370	405	433	1060	535	411	382
3	368	380	376	370	377	370	430	444	1270	509	404	377
4	379	392	378	356	377	382	417	427	1220	493	408	376
5	371	409	380	366	377	407	467	408	1170	484	462	379
6	433	396	368	365	377	376	551	436	1070	475	418	378
7	413	369	379	368	379	372	550	494	1020	466	412	393
8	403	394	380	368	378	374	462	566	951	459	405	450
9	392	394	369	363	377	367	431	804	924	459	399	463
10	405	399	371	364	377	371	445	790	894	484	396	448
11	403	393	383	364	374	382	417	1030	864	504	391	490
12	392	388	389	366	375	372	401	950	858	462	390	423
13	392	386	384	371	377	371	393	866	833	447	385	408
14	390	390	399	370	377	375	395	857	788	444	383	483
15	405	397	382	377	374	376	411	857	710	439	387	482
16	434	380	396	369	382	371	432	902	665	433	391	427
17	425	384	388	367	389	371	433	1120	643	429	394	416
18	409	393	379	368	370	372	434	1640	622	425	391	406
19	436	395	381	372	370	374	422	1560	607	423	387	406
20	411	415	282	348	370	377	418	1530	593	421	405	400
21	392	393	e300	e330	369	370	445	1610	577	421	392	399
22	403	388	e320	365	369	370	478	1700	572	418	388	391
23	409	391	e350	363	366	367	508	1700	569	436	385	393
24	397	394	e370	364	360	382	520	1640	556	453	382	391
25	400	391	e380	331	356	382	541	1700	552	449	379	391
26	408	394	e380	345	353	383	507	1590	586	438	377	391
27	406	374	e380	379	357	377	457	1290	559	422	384	390
28	401	368	e370	368	357	368	433	1100	569	411	399	391
29	400	371	e350	296	---	368	420	1050	559	406	387	406
30	396	385	e360	e300	---	362	413	1080	575	405	384	408
31	395	---	e370	e320	---	367	---	1030	---	408	384	---
TOTAL	12400	11723	11467	11113	10384	11595	13424	32014	23446	14068	12278	12322
MEAN	400	391	370	358	371	374	447	1033	782	454	396	411
MAX	436	415	399	380	389	407	551	1700	1270	610	462	490
MIN	365	368	282	296	350	362	388	408	552	405	377	376
AC-FT	24600	23250	22740	22040	20600	23000	26630	63500	46510	27900	24350	24440

CAL YR 1990 TOTAL 161405 MEAN 442 MAX 879 MIN 282 AC-FT 320100
WTR YR 1991 TOTAL 176234 MEAN 483 MAX 1700 MIN 282 AC-FT 349600

e Estimated

MADISON RIVER BASIN

06037500 MADISON RIVER NEAR WEST YELLOWSTONE, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1983-86, 1989 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: July 1883 to July 1986.
WATER TEMPERATURE: July 1983 to July 1986.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1983-86): Maximum, 558 microsiemens, Mar. 24, 25, 1986; minimum, 78 microsiemens, May 30, 1986.
WATER TEMPERATURE (water years 1983-86): Maximum, 25.5°C, Aug. 6, 9, 1983; minimum, 0.0°C, on many days during winter periods.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	ARSENIC TOTAL (UG/L AS AS) (01002)
OCT								
23...	1600	406	40	1	514	6.0	10.5	240
JAN								
02...	1545	377	--	--	525	-3.0	1.5	--
FEB								
12...	1545	377	100	2	559	0.0	7.5	280
APR								
11...	0900	422	100	3	550	-3.5	6.0	340
MAY								
29...	1815	1060	100	2	268	9.0	12.5	120
JUN								
19...	2030	604	--	0	364	23.5	19.5	170
JUL								
16...	1415	429	0	0	448	22.5	27.0	260
AUG								
21...	0945	391	0	0	460	25.5	17.5	270

MADISON RIVER BASIN

06038500 MADISON RIVER BELOW HEBGEN LAKE, NEAR GRAYLING, MT

LOCATION.--Lat 44°52'00", long 111°20'15", NE1/4NE1/4NE1/4 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^2.

WATER-DISCHARGE RECORDS

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. Datum of gage is 6,448.47 ft above National Geodetic Vertical Datum of 1929 (after 1959 earthquake). Prior to July 13, 1943, nonrecording gage in stilling well.
REMARKS.--No estimated daily discharges this year. Records good. Flow completely regulated by Hebgen Lake (station number 06038000). Diversions for irrigation of about 1,100 acres upstream from station. Several observations of water temperature and specific conductance were obtained during the year. U.S. Bureau of Reclamation satellite telemeter at station.
AVERAGE DISCHARGE.--82 years, 1,004 ft^3/s, 15.06 in/yr, 727,400 acre-ft/yr, adjusted for storage.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,200 ft^3/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^3/s on basis of slope-area measurement of peak flow; maximum observed unaffected by wave over dam, 5,980 ft^3/s, June 3, 1943, gage height, 3.69 ft; minimum daily, 5.0 ft^3/s, May 9-12, 1960.
EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,620 ft^3/s, June 8, gage height, 2.81 ft; minimum daily, 515 ft^3/s, Feb. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	892	1440	1850	720	708	521	536	551	946	981	852	929
2	1400	1440	1840	708	708	521	536	552	950	1060	854	929
3	1510	1440	1830	709	707	521	537	552	950	1060	851	929
4	1510	1440	1820	709	707	521	538	553	952	1060	854	929
5	1510	1440	1810	710	707	521	535	553	1640	1060	854	929
6	1510	1430	1810	708	706	521	536	555	2350	1060	856	1020
7	1510	1430	1800	708	705	521	536	557	2490	1040	856	1200
8	1510	1430	1800	708	704	521	537	557	2600	809	854	1200
9	1500	1430	1210	708	704	521	536	559	2600	884	853	1200
10	1500	1420	721	709	703	521	538	560	2590	1100	856	1200
11	1500	1420	722	709	705	521	539	563	2540	1060	813	1200
12	1500	1420	722	708	704	521	539	566	2300	819	738	1200
13	1490	1410	723	709	704	525	541	567	1850	819	809	1200
14	1490	1410	723	709	703	529	541	570	1420	819	851	1200
15	1490	1410	723	709	702	529	542	574	1420	819	940	1200
16	1490	1410	723	709	703	529	543	574	1420	819	939	1200
17	1480	1400	724	709	705	530	543	576	1420	819	939	1190
18	1480	1400	723	708	705	529	543	641	1410	820	940	1190
19	1480	1400	728	709	705	529	544	771	1410	821	940	1190
20	1480	1400	730	709	640	530	543	877	1410	821	939	1190
21	1480	1400	731	708	515	531	544	881	1410	821	939	1190
22	1470	1400	732	708	517	533	544	887	1410	823	939	1190
23	1470	1400	732	708	518	534	546	1110	1410	825	939	1190
24	1460	1390	732	708	518	534	548	2470	1030	822	939	1190
25	1450	1390	734	708	517	535	550	2460	810	819	938	1190
26	1450	1390	734	708	519	536	551	2470	810	819	938	1190
27	1440	1380	734	708	520	536	551	2470	810	819	937	1190
28	1450	1380	731	708	520	536	551	2480	811	819	937	1190
29	1450	1650	731	708	---	536	551	2470	815	819	933	1180
30	1450	1850	732	708	---	536	551	2360	817	755	931	1180
31	1440	---	730	708	---	536	---	1570	---	852	929	---
TOTAL	45242	43050	31785	21973	18179	16365	16270	33456	44801	27543	27687	34305
MEAN	1459	1435	1025	709	649	528	542	1079	1493	888	893	1143
MAX	1510	1850	1850	720	708	536	551	2480	2600	1100	940	1200
MIN	892	1380	721	708	515	521	535	551	810	755	738	929
AC-FT	89740	85390	63050	43580	36060	32460	32270	66360	88860	54630	54920	68040
MEAN †	760	741	689	726	691	715	872	2210	1798	880	753	772
CFSM †	.84	.82	.76	.80	.76	.79	.96	2.44	1.99	.97	.83	.85
IN †	.97	.91	.88	.92	.80	.91	1.07	2.82	2.22	1.12	.96	.95
AC-FT †	46740	44090	42350	44680	38460	43960	51870	135900	107000	54130	46320	45940

OBSERVED

CAL YR 1990	TOTAL	333858	MEAN	915	MAX	1850	MIN	437	AC-FT	662200
WTR YR 1991	TOTAL	360656	MEAN	988	MAX	2600	MIN	515	AC-FT	715400

ADJUSTED

CAL YR 1990	TOTAL	331700	MEAN	909	CFSM	1.00	IN	13.63	AC-FT	657900
WTR YR 1991	TOTAL	353600	MEAN	969	CFSM	1.07	IN	14.53	AC-FT	701400

(†) Adjusted for change in contents in Hebgen Lake.

MADISON RIVER BASIN

06038500 MADISON RIVER BELOW HEBGEN LAKE, NEAR GRAYLING ,MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1986-88, 1990 to current year.

REMARKS.--Water year 1986 open file report 87-124, 1987 open file report 87-697, 1988 open file report 88-722.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	ARSENIC TOTAL (UG/L AS AS) (01002)
OCT								
24...	0915	1450	20	1	297	-3.5	9.0	96
JAN								
04...	0945	--	--	--	352	-20.0	2.0	--
FEB								
12...	1100	708	100	2	375	-1.0	2.5	160
APR								
11...	1300	536	100	3	398	0.5	3.0	190
MAY								
29...	1245	2470	100	2	298	10.0	7.0	110
JUN								
19...	1830	1410	30	1	272	19.5	11.0	94
JUL								
15...	1800	819	25	1	266	28.0	14.0	100
AUG								
20...	1415	939	20	1	258	24.5	17.0	120

MADISON RIVER BASIN

06038800 MADISON RIVER AT KIRBY RANCH, NEAR CAMERON, MT

LOCATION.--Lat 44°53'22", long 111°34'46", in NE1/4NE1/4SE1/4 sec.10, T.11 S., R.1 E., Madison County, Hydrologic Unit 10020007, on upstream side of 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^2.

PERIOD OF RECORD.--September 1959 to September 1963, May 1978 to current season (seasonal records only).

GAGE.--Nonrecording gage. Elevation of gage is 5,860 ft above National Geodetic Vertical Datum of 1929, from topographic map. Aug. 31, 1959, to Oct. 2, 1959, nonrecording gage at present site but at a different datum. Oct. 3, 1959, to September 1963, water-stage recorder at site 75 ft upstream at different datum.

REMARKS.--No estimated daily discharges this year. Seasonal records fair. Flow regulated by Hebgen Lake (station 06038000). Diversions for irrigation of about 1,500 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 5,000 ft^3/s, June 6, 1986, gage height, 3.14 ft; minimum daily, 280 ft^3/s, May 26, 27, 1960.

EXTREMES FOR CURRENT SEASON.--Maximum discharge observed, 3,780 ft^3/s, June 8, 10, 12, gage height, 2.67 ft; minimum observed, 621 ft^3/s, May 6, gage height, 0.92 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1								632	1710	1320		
2								632	1590	1440		
3								632	1710	1480		
4								632	2010	1360		
5								630	2440	1390		
6								627	3350	1400		
7								649	3690	1430		
8								681	3700	1360		
9								718	3540	1190		
10								712	3740	1240		
11								750	3710	1360		
12								708	3670	1210		
13								699	3130	1090		
14								696	2430	1090		
15								743	2120	1110		
16								752	1950	1090		
17								776	1960	1080		
18								898	1930	1080		
19								1010	1980	1080		
20								1150	2030	1080		
21								1340	1930	1060		
22								1420	1940	1010		
23								1710	1960	1010		
24								2580	1810	1010		
25								3180	1400	1010		
26								3170	1280	1030		
27								2960	1300	1020		
28								2920	1270	993		
29								2930	1230	1030		
30								2910	1230	1050		
31								2370	---	1010		
TOTAL								42217	67740	36113		
MEAN								1362	2258	1165		
MAX								3180	3740	1480		
MIN								627	1230	993		
AC-FT								83740	134400	71630		

MADISON RIVER BASIN

06040300 JACK CREEK NEAR ENNIS, MT

LOCATION(REVISED).--Lat 45°21'22", long 111°34'55", in NE1/4NW1/4SE1/4 sec.34, T.5 S., R.1 E., Madison County, Hydrologic Unit 10020007, Beaverhead National Forest, on left bank 800 ft upstream from bridge at forest boundary, 8.8 mi east of Ennis, and at river mile 6.5.

DRAINAGE AREA.--51.5 mi^2.

PERIOD OF RECORD.--September 1973 to September 1986, April to September 1991.

GAGE.--Water-stage recorder. Elevation of gage is 5,470 ft, revised, above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Apr. 1-4. Records good. No known regulation or diversion upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--13 years (1974-86), 47.0 ft^3/s, 34,050 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 555 ft^3/s, June 14, 1974, gage height, 3.97 ft in gage well, about 4.97 ft, from outside gage; maximum gage height, 5.46 ft, Dec. 23, 1983 (backwater from ice); minimum discharge, 5.0 ft^3/s, Mar. 7, 1975, gage height, 1.84 ft; minimum gage height, 1.81 ft, Mar. 10, 1979, and Nov. 14, 1980.

EXTREMES FOR CURRENT SEASON.--Peak discharges greater than base discharge of 200 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 17	2145	468	3.67	June 5	1845	528	*3.79
May 25	2315	*552	3.78	June 11	1945	375	3.43

Minimum discharge, 11 ft^3/s, Apr. 9, gage height, 2.05 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1							e13	20	177	90	42	27
2							e14	21	207	87	42	28
3							e15	20	245	85	40	27
4							e16	19	269	82	40	26
5							21	20	428	82	41	26
6							26	28	347	77	42	25
7							20	48	305	74	39	25
8							17	87	264	71	37	27
9							16	113	232	69	37	27
10							14	86	238	68	36	26
11							13	152	283	67	35	26
12							14	137	285	65	34	25
13							13	128	250	64	34	24
14							13	173	207	64	33	33
15							12	201	161	63	33	30
16							12	190	145	60	32	28
17							12	260	139	59	32	26
18							13	319	142	58	32	25
19							13	255	144	57	31	24
20							17	261	145	56	30	23
21							24	258	153	53	29	23
22							31	245	154	52	29	23
23							35	223	144	51	30	22
24							36	243	131	50	29	22
25							37	278	127	50	28	21
26							29	280	111	50	36	21
27							26	216	103	47	36	21
28							23	197	97	45	42	21
29							21	166	92	44	31	22
30							20	151	95	43	29	21
31							---	190	---	42	28	---
TOTAL							586	4985	5820	1925	1069	745
MEAN							19.5	161	194	62.1	34.5	24.8
MAX							37	319	428	90	42	33
MIN							12	19	92	42	28	21
AC-FT							1160	9890	11540	3820	2120	1480

e Estimated

MADISON RIVER BASIN

06041000 MADISON RIVER BELOW ENNIS LAKE, NEAR MCALLISTER, MT

LOCATION.--Lat 45°29'25", long 111°38'00", in SW1/4SE1/4NW1/4 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^2.

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. Datum of gage is 4,689.03 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to May 7, 1941, nonrecording gage in wooden stilling well at present site at different datum. May 7, 1941, to Jan. 13, 1945, nonrecording gages in concrete stilling well at present site and datum.

REMARKS.--Estimated daily discharges: Dec. 20-23. Water-discharge 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. U. S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--53 years, 1,755 ft^3/s, 1,271,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,550 ft^3/s, June 12, 1970, gage height, 8.01 ft; minimum daily 210 ft^3/s, Aug. 25, 26, 1959.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,770 ft^3/s, June 6, gage height, 6.93 ft; minimum daily, 608 ft^3/s, Dec. 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1250	1890	2230	726	971	1090	1030	1080	2730	1710	1100	1300
2	1430	1900	2220	830	1010	1080	1090	1060	2520	1690	1100	1290
3	1840	1900	2330	983	1140	1080	1100	1070	2580	1770	1110	1260
4	1990	1900	2390	1040	1260	1090	1110	1070	3330	1860	1200	1230
5	1880	1900	2320	1060	1320	1100	1110	1070	4540	1900	1240	1240
6	1870	1910	2300	1060	1370	1090	1110	1060	6220	1870	1230	1250
7	1880	1920	2250	1070	1350	1080	1120	1070	6490	1840	1230	1260
8	1890	1910	2220	1090	1340	1080	1050	1090	6050	1790	1280	1400
9	1890	1920	2230	1110	1340	1080	1020	1090	5610	1860	1260	1760
10	1880	1910	1640	1210	1330	1070	1020	1110	5280	1780	1140	1870
11	1880	1920	1370	1300	1310	1090	1040	1160	5410	1540	1090	1770
12	1910	1910	1440	1280	1300	1090	1060	1210	5600	1240	1090	1640
13	1890	1930	1390	1280	1300	1090	1070	1220	5500	1280	1090	1650
14	1890	1910	1370	1310	1300	1090	1070	1220	4470	1400	1090	1670
15	1900	1910	1230	1320	1300	1100	1070	1230	3560	1490	1090	1860
16	1900	2020	998	1320	1330	1200	1080	1390	3000	1340	1100	2020
17	1920	2110	948	1310	1460	1320	1090	1490	2700	1230	1110	1900
18	1930	2070	955	1290	1520	1220	1090	1510	2570	1230	1120	1700
19	1900	2040	956	1270	1470	1170	1100	1790	2750	1230	1130	1630
20	1920	2010	e950	1260	1360	1160	1100	2110	2800	1230	1160	1650
21	1950	2000	e900	1230	1180	1150	1100	2180	2630	1220	1190	1650
22	1910	1980	e800	1190	1080	1040	1100	1780	2430	1220	1230	1660
23	1910	1980	e750	1170	1100	1060	1110	1630	2540	1210	1250	1670
24	1910	1940	718	1180	1110	1130	1110	2860	2590	1210	1250	1680
25	1920	1920	676	1170	1110	1120	1110	4330	2260	1210	1250	1710
26	1910	1640	630	1070	1110	1120	1120	4420	1840	1220	1230	1750
27	1910	1920	608	957	1100	1110	1120	4400	1600	1220	1220	1740
28	1920	1900	652	982	1100	1110	1110	3940	1610	1220	1380	1730
29	1910	2060	686	994	---	1000	1100	3650	1770	1210	1450	1730
30	1930	2240	703	983	---	936	1090	3630	1810	1200	1300	1730
31	1920	---	718	958	---	954	---	3250	---	1130	1300	---
TOTAL	57940	58470	41578	35003	34971	34100	32600	61170	104790	44550	37010	48400
MEAN	1869	1949	1341	1129	1249	1100	1087	1973	3493	1437	1194	1613
MAX	1990	2240	2390	1320	1520	1320	1120	4420	6490	1900	1450	2020
MIN	1250	1640	608	726	971	936	1020	1060	1600	1130	1090	1230
AC-FT	114900	116000	82470	69430	69360	67640	64660	121300	207900	88360	73410	96000

CAL YR 1990 TOTAL 547958 MEAN 1501 MAX 4490 MIN 400 AC-FT 1087000
WTR YR 1991 TOTAL 590582 MEAN 1618 MAX 6490 MIN 608 AC-FT 1171000

e Estimated

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.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum, 23.0°C, July 29, 1980, July 31, Aug. 1, 1988, July 29, 30, 1991; minimum, 0.0°C several to many days during winter months most years.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 23.0°C, July 29, 30; minimum, 0.0°C several days November to January.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	ARSENIC TOTAL (UG/L AS AS) (01002)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT											
24...	1545	1920	100	2	305	17.0	4.5	54	--	--	--
DEC											
18...	1130	937	--	--	318	-8.0	1.0	--	--	--	--
FEB											
11...	1530	1320	50	1	348	11.5	2.5	57	--	--	--
APR											
12...	1100	1060	100	76	321	-1.0	2.0	63	--	--	--
MAY											
10...	1100	1110	100	73	--	--	--	--	12	36	92
28...	1145	3640	--	1	306	13.0	11.5	81	--	--	--
JUN											
19...	1300	2870	--	0	236	21.5	14.5	35	--	--	--
JUL											
15...	1430	1490	0	0	259	30.0	20.5	70	--	--	--
AUG											
19...	1750	1140	30	1	278	30.0	21.5	88	--	--	--

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	15.5	15.0	15.0	7.5	6.5	7.0	.5	.0	.5	1.5	1.5	1.5
2	15.0	14.0	14.5	6.5	6.0	6.5	.5	.5	.5	1.5	1.0	1.5
3	14.0	12.0	13.0	6.0	5.5	5.5	1.0	.5	.5	1.5	1.5	1.5
4	12.0	12.0	12.0	5.5	4.5	5.0	1.0	1.0	1.0	1.5	1.5	1.5
5	12.0	11.0	11.5	4.5	4.0	4.5	1.0	1.0	1.0	1.5	1.0	1.5
6	11.0	10.5	10.5	4.0	3.5	3.5	1.0	1.0	1.0	1.5	1.0	1.5
7	10.5	10.0	10.0	3.5	1.5	2.5	1.0	1.0	1.0	1.5	1.5	1.5
8	10.0	9.0	9.5	1.5	1.0	1.5	1.5	1.0	1.0	1.5	1.5	1.5
9	9.0	8.5	9.0	2.0	1.0	1.5	1.5	1.0	1.5	1.5	1.0	1.5
10	8.5	7.5	8.0	2.0	1.5	2.0	1.5	1.5	1.5	1.5	1.5	1.5
11	7.5	7.0	7.5	2.5	2.0	2.0	1.5	1.5	1.5	1.5	1.5	1.5
12	7.0	6.5	6.5	3.5	2.5	3.0	1.5	1.0	1.0	1.5	1.5	1.5
13	6.5	6.5	6.5	3.5	2.5	3.0	1.5	1.0	1.0	1.5	1.5	1.5
14	6.5	6.0	6.0	4.5	3.5	4.0	1.5	1.0	1.0	1.5	1.5	1.5
15	5.5	5.5	5.5	4.0	3.5	4.0	1.0	.5	1.0	1.5	1.5	1.5
16	5.5	5.5	5.5	3.5	3.0	3.0	1.5	1.0	1.0	1.5	1.5	1.5
17	5.5	5.0	5.0	3.0	2.5	3.0	1.5	1.0	1.0	1.5	1.0	1.5
18	5.0	4.5	5.0	3.0	3.0	3.0	1.5	.0	1.0	1.5	1.0	1.0
19	5.0	5.0	5.0	3.0	3.0	3.0	.0	.0	.0	1.5	1.0	1.0
20	5.5	5.0	5.0	3.0	2.5	3.0	.0	.0	.0	1.5	1.0	1.0
21	5.0	4.5	4.5	2.5	2.0	2.5	1.0	.0	.5	1.5	1.0	1.0
22	4.5	4.5	4.5	2.0	2.0	2.0	1.0	1.0	1.0	1.5	1.0	1.5
23	4.5	4.5	4.5	2.0	1.5	2.0	1.0	1.0	1.0	1.5	1.5	1.5
24	5.0	4.5	4.5	2.0	1.5	2.0	1.5	1.0	1.0	1.5	1.0	1.5
25	5.5	4.5	5.0	2.5	2.0	2.0	1.5	1.0	1.5	1.5	1.0	1.0
26	6.0	5.5	5.5	2.5	2.0	2.0	1.5	1.0	1.5	1.5	1.0	1.0
27	6.5	6.0	6.5	1.5	.5	1.0	1.5	1.0	1.0	1.0	1.0	1.0
28	7.5	6.0	6.5	.5	.0	.5	1.0	.5	.5	1.0	.0	.5
29	7.5	6.5	7.0	.5	.5	.5	1.0	.5	1.0	1.0	.5	.5
30	7.5	7.5	7.5	.5	.5	.5	1.0	1.0	1.0	1.0	.5	1.0
31	7.5	7.0	7.5	---	---	---	1.5	1.0	1.0	1.5	1.0	1.0
MONTH	15.5	4.5	7.5	7.5	.0	3.0	1.5	.0	1.0	1.5	.0	1.5

MADISON RIVER BASIN

06041000 MADISON RIVER BELOW ENNIS LAKE, NEAR MCALLISTER, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	1.5	1.0	1.5	2.0	2.0	2.0	6.0	5.0	5.5	9.0	8.0	8.5
2	2.0	1.0	1.5	3.0	2.0	2.5	6.0	5.0	5.5	8.0	6.5	7.5
3	2.0	1.5	1.5	3.0	2.5	2.5	5.5	5.0	5.5	7.0	6.0	6.5
4	2.0	1.5	2.0	3.0	2.5	3.0	5.0	3.5	4.5	6.5	6.0	6.0
5	2.0	2.0	2.0	2.5	2.0	2.5	4.0	3.0	3.5	7.0	5.5	6.5
6	2.0	2.0	2.0	2.5	2.0	2.0	4.0	2.5	3.0	8.0	7.0	8.0
7	2.5	2.0	2.0	2.0	1.5	2.0	4.0	3.0	3.5	9.0	8.0	8.5
8	2.5	2.0	2.0	3.0	2.0	2.5	3.5	2.5	3.0	9.5	8.5	9.0
9	2.5	2.0	2.5	3.0	2.0	2.5	4.0	3.0	3.5	9.0	8.5	8.5
10	2.5	2.0	2.5	3.5	2.5	3.0	4.0	3.0	3.5	8.5	7.5	8.0
11	2.5	2.0	2.5	3.5	2.5	3.0	3.5	2.5	3.0	8.0	7.5	8.0
12	2.5	2.5	2.5	3.5	2.5	3.0	2.5	2.0	2.0	8.0	7.0	7.5
13	2.5	2.5	2.5	3.5	2.5	3.0	2.5	2.0	2.5	8.5	8.0	8.0
14	2.5	2.5	2.5	3.0	2.5	2.5	3.5	2.5	3.0	9.0	8.5	8.5
15	2.5	2.0	2.5	3.0	2.5	2.5	4.0	3.5	3.5	9.5	9.0	9.0
16	2.5	2.0	2.5	3.0	2.0	2.5	5.0	3.5	4.5	11.0	9.0	10.0
17	2.5	2.0	2.0	2.5	2.0	2.5	5.0	4.5	5.0	13.0	10.0	11.0
18	2.0	2.0	2.0	3.0	2.0	2.5	5.0	4.5	5.0	12.5	12.0	12.0
19	2.5	2.0	2.0	3.0	2.5	2.5	6.0	5.0	5.5	13.5	12.0	13.0
20	2.5	2.5	2.5	3.0	2.5	3.0	6.5	5.5	6.0	14.5	13.0	13.5
21	3.0	2.5	2.5	3.5	2.5	3.0	6.5	5.0	6.0	14.5	13.0	13.5
22	3.0	2.5	2.5	3.5	3.0	3.5	8.0	6.5	7.5	14.5	12.5	13.5
23	2.5	2.0	2.5	3.5	3.0	3.5	10.5	6.5	8.5	16.0	14.0	15.0
24	3.0	2.0	2.5	4.0	3.5	3.5	11.0	9.0	10.0	16.5	15.0	15.5
25	3.0	2.5	3.0	4.0	3.5	3.5	9.0	8.5	9.0	15.5	14.5	15.0
26	3.0	2.5	2.5	4.0	3.0	3.5	9.5	8.5	9.0	14.5	12.5	13.5
27	3.0	2.5	2.5	4.5	3.5	4.0	8.5	7.5	8.0	12.5	11.5	12.0
28	3.0	2.5	2.5	5.0	4.0	4.5	8.0	7.5	7.5	12.0	11.0	11.5
29	---	---	---	5.5	4.0	4.5	8.0	7.5	8.0	12.0	11.5	11.5
30	---	---	---	5.5	4.0	5.0	8.5	7.5	8.0	11.5	11.0	11.0
31	---	---	---	6.0	5.0	5.5	---	---	---	11.0	11.0	11.0
MONTH	3.0	1.0	2.5	6.0	1.5	3.0	11.0	2.0	5.5	16.5	5.5	10.5
		JUNE			JULY			AUGUST			SEPTEMBER	
1	12.0	10.5	11.5	16.0	14.5	15.5	22.5	21.5	22.0	20.0	19.5	19.5
2	13.5	12.0	13.0	17.0	15.0	16.0	21.5	21.0	21.0	19.5	19.0	19.0
3	15.5	13.0	14.5	19.0	15.5	17.0	21.0	20.0	20.5	19.5	18.5	19.0
4	15.5	14.5	15.0	20.0	18.5	19.0	21.0	20.0	20.5	19.0	18.0	18.5
5	15.0	14.0	14.5	20.5	19.5	20.0	21.5	21.0	21.0	19.0	18.0	18.5
6	14.0	13.5	13.5	21.0	19.5	20.5	20.5	20.0	20.5	19.0	18.0	18.5
7	14.5	13.0	14.0	20.0	19.0	19.5	20.0	19.0	19.5	19.0	18.5	19.0
8	15.5	14.0	14.5	20.0	19.0	19.5	20.5	19.5	20.0	18.5	18.0	18.5
9	15.5	13.5	14.5	20.5	18.5	19.5	21.0	20.0	20.5	18.0	16.5	17.5
10	16.0	12.5	14.0	20.5	20.0	20.0	21.0	20.0	20.5	16.5	16.0	16.5
11	16.0	14.5	15.0	20.5	19.5	20.0	21.5	20.5	20.5	16.5	16.0	16.0
12	15.0	13.5	14.5	21.0	19.5	20.5	21.5	21.0	21.0	16.5	16.0	16.5
13	14.5	13.0	13.5	21.0	20.0	20.5	21.5	20.5	21.0	16.5	16.5	16.5
14	13.0	12.5	13.0	21.5	20.5	21.0	22.0	21.0	21.0	16.5	15.0	15.5
15	13.5	12.5	13.0	21.0	20.0	20.5	21.0	20.5	20.5	15.0	15.0	15.0
16	13.0	12.5	13.0	21.5	20.5	21.0	21.0	20.0	20.5	15.0	14.0	14.5
17	13.5	12.5	13.0	21.5	20.5	21.0	20.5	20.0	20.0	14.0	13.5	13.5
18	14.0	13.0	13.5	21.0	20.5	20.5	21.5	20.0	20.5	13.5	12.5	12.5
19	15.5	13.5	14.5	21.0	20.0	20.5	21.5	20.5	21.0	13.0	12.0	12.5
20	15.5	14.0	15.0	21.5	20.5	21.0	22.0	21.0	21.5	14.0	13.0	13.5
21	16.5	15.0	16.0	22.0	21.0	21.5	22.0	21.0	21.5	14.0	12.5	13.5
22	17.0	15.0	16.0	21.5	21.0	21.0	22.0	21.5	21.5	12.5	12.0	12.5
23	16.5	16.0	16.0	21.0	20.5	20.5	21.5	21.0	21.5	12.5	12.0	12.5
24	16.5	15.5	16.0	21.0	20.5	20.5	21.0	20.5	21.0	12.5	12.0	12.5
25	16.0	15.5	15.5	21.0	20.0	20.5	21.0	20.5	21.0	13.0	12.5	13.0
26	15.5	15.0	15.0	21.5	20.5	21.0	20.5	20.0	20.0	13.0	12.0	12.5
27	15.5	15.0	15.0	21.5	20.5	21.0	20.0	19.5	20.0	13.5	12.5	13.0
28	15.0	14.5	14.5	22.0	21.0	21.5	19.5	19.0	19.5	13.5	13.0	13.5
29	15.5	14.5	15.0	23.0	22.0	22.0	19.5	18.5	19.0	14.0	13.5	13.5
30	15.5	15.0	15.0	23.0	22.5	22.5	19.5	19.0	19.5	14.0	14.0	14.0
31	---	---	---	22.5	22.0	22.5	19.5	19.0	19.5	---	---	---
MONTH	17.0	10.5	14.5	23.0	14.5	20.0	22.5	18.5	20.5	20.0	12.0	15.5

GALLATIN RIVER BASIN

06043500 GALLATIN RIVER NEAR GALLATIN GATEWAY, MT

LOCATION.--Lat 45°29'51", long 111°25'12", in SE1/4SE1/4SE1/4 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^2.

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).

GAGE.--Water-stage recorder. Datum of gage is 5,167.67 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 20, 1932, nonrecording gages at several different sites and datums within 0.8 mi of present site.

REMARKS.--Estimated daily discharges: Dec. 19 to Jan. 9, Jan. 25-30, Mar. 1-3. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 1,400 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--61 years (1890-94, 1931-69, 1972-81, 1985-91), 806 ft^3/s, 583,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,100 ft^3/s, June 17, 1974, gage height, 7.38 ft; minimum, 117 ft^3/s, Jan. 19, 1935, gage height, 0.68 ft, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,900 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 26	0300	5,090	4.95	June 12	0115	6,600	5.89
June 6	0015	*7,640	*6.50				

Minimum daily discharge, 180 ft^3/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	375	384	265	e230	283	e250	296	337	2760	2090	718	490
2	379	359	265	e250	284	e230	308	357	3650	1980	722	492
3	376	297	244	e240	286	e260	331	346	4950	1920	690	480
4	383	371	241	e230	285	269	321	337	5380	1900	677	474
5	383	381	267	e230	286	287	378	335	7240	1960	691	470
6	421	341	249	e250	287	254	435	372	6840	1830	697	465
7	395	281	231	e260	277	242	415	460	6270	1700	682	463
8	389	350	239	e270	274	256	347	601	5800	1590	647	504
9	379	365	270	e280	277	254	318	890	5180	1520	625	564
10	410	367	282	293	283	260	324	732	5180	1520	610	540
11	403	348	308	294	275	280	310	770	5560	1420	596	539
12	387	341	275	293	275	258	300	949	5980	1330	584	501
13	389	343	264	295	291	264	295	926	5420	1270	575	482
14	380	357	290	298	286	268	297	1190	4630	1230	566	648
15	388	356	257	290	287	270	298	1420	3660	1180	570	636
16	407	304	261	288	303	270	303	1460	3420	1120	560	583
17	376	336	274	287	296	269	297	1890	3450	1080	551	567
18	379	358	285	282	282	263	293	2830	3270	1030	594	542
19	419	342	e220	289	267	272	293	2800	3260	985	553	520
20	389	353	e200	270	271	282	299	2940	3400	944	546	512
21	351	315	e190	249	286	277	335	3300	3270	924	527	507
22	401	333	e180	261	286	271	384	3540	3090	888	522	495
23	379	334	e190	267	283	268	431	3880	2870	875	538	485
24	380	335	e200	277	280	268	461	4060	2700	870	526	477
25	381	336	e210	e250	268	265	484	4530	2630	855	503	469
26	395	341	e200	e230	257	270	430	4520	2430	906	517	462
27	382	268	e210	e250	257	261	386	3460	2300	824	602	457
28	378	287	e230	e230	261	257	371	2890	2250	781	617	458
29	384	304	e220	e210	---	263	357	2670	2100	754	555	472
30	377	314	e210	e250	---	256	350	2570	2130	735	515	462
31	374	---	e200	281	---	272	---	2750	---	721	501	---
TOTAL	11989	10101	7427	8174	7833	8186	10447	60112	121070	38732	18377	15216
MEAN	387	337	240	264	280	264	348	1939	4036	1249	593	507
MAX	421	384	308	298	303	287	484	4530	7240	2090	722	648
MIN	351	268	180	210	257	230	293	335	2100	721	501	457
AC-FT	23780	20040	14730	16210	15540	16240	20720	119200	240100	76820	36450	30180

CAL YR 1990 TOTAL 283882 MEAN 778 MAX 4800 MIN 180 AC-FT 563100
WTR YR 1991 TOTAL 317664 MEAN 870 MAX 7240 MIN 180 AC-FT 630100

e Estimated

06050000 HYALITE CREEK AT HYALITE RANGER STATION, NEAR BOZEMAN, MT

LOCATION.--Lat 45°33'42", long 111°04'12", in NW1/4NW1/4SE1/4 sec.23, T.3 S., R.5 E., Gallatin County, Hydrologic Unit 10020008, Gallatin National Forest, on right bank 0.8 mi south of former Hyalite Ranger Station, 7.3 mi south of Bozeman, and at river mile 20.8.
DRAINAGE AREA.--48.2 mi^2.
PERIOD OF RECORD.--August 1895 to October 1896, calendar year 1897 (discharge measurements only), April 1898 to October 1899, June to October 1900, May to September 1902, calendar year 1903 (discharge measurements only), September to December 1904, September 1934 to current year. Monthly discharge only for some periods, published in WSP 1309. Prior to 1934, published as Middle Creek near Bozeman.
REVISED RECORDS.--WSP 84: 1898-99. WSP 1509: 1902, 1939(M). WSP 1559: Drainage area. WSP 1709: 1953, 1956-57.
GAGE.--Water-stage recorder. Datum of gage is 5,539.6 ft above National Geodetic Vertical Datum of 1929. Prior to September 1934, nonrecording gages at two sites 0.5 mi upstream at different datums. Sept. 13, 1934, to May 13, 1948, water-stage recorder at site 0.3 mi downstream at different datum.
REMARKS.--Estimated daily discharges: Nov. 3, 4, 7, 8, 16, 17, 21, 22, Nov. 26 to Dec. 9, 12-26, Jan. 26, 27, 29, 30, Feb. 26 to Mar. 3, Mar. 6-9, 11, 12. Records good except those for estimated daily discharges, which are poor. Flow regulated by Middle Creek Reservoir (station 06049500) since March 1951. Several observations of water temperature and specific conductance were made during the year.
AVERAGE DISCHARGE.--59 years (1895-96, 1898-99, 1935-91), 66.3 ft^3/s, 18.54 in/yr, 47,650 acre-ft/yr, adjusted for storage in Middle Creek Reservoir.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 956 ft^3/s, June 14, 1898, gage height, 2.10 ft, site and datum then in use; maximum gage height, 4.56 ft, Dec. 22, 1983, backwater from ice; minimum daily discharge, 5.0 ft^3/s, Jan. 27, 1961.
EXTREMES FOR CURRENT YEAR.--Maximum discharge, 624 ft^3/s, June 4, gage height, 3.20 ft; maximum gage height, 3.55 ft, Mar. 18, backwater from ice; minimum daily discharge, 10 ft^3/s, Dec. 20,21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30	25	e18	15	16	e15	18	38	196	285	97	40
2	31	24	e16	15	16	e14	19	38	183	340	95	40
3	30	e23	e17	15	16	e15	20	37	195	261	88	39
4	30	e24	e18	15	16	16	21	37	465	225	81	39
5	31	25	e17	15	16	17	24	37	498	243	81	39
6	32	24	e16	15	16	e16	26	42	469	278	80	39
7	31	e23	e16	15	16	e15	23	54	442	303	78	39
8	30	e24	e17	15	16	e16	20	72	369	229	75	40
9	31	25	e19	15	16	e16	19	91	296	178	66	39
10	32	25	21	15	16	16	20	71	278	168	55	38
11	31	25	21	15	16	e16	22	88	233	161	55	39
12	30	24	e20	15	16	e16	26	107	318	153	56	38
13	31	24	e19	15	16	16	23	127	314	144	64	37
14	30	25	e19	15	16	16	19	150	257	142	60	44
15	30	24	e18	15	16	16	18	157	196	135	58	41
16	31	e22	e18	15	17	16	18	165	180	127	58	40
17	29	e21	e19	16	16	16	18	207	138	123	52	41
18	29	20	e15	15	16	16	18	232	127	143	45	38
19	31	20	e12	15	16	16	18	206	164	161	45	33
20	29	20	e10	15	16	16	20	198	245	175	44	32
21	29	e20	e10	15	16	16	23	196	292	178	44	32
22	30	e20	e11	15	16	16	27	285	227	165	46	31
23	30	20	e11	15	16	16	30	321	180	131	47	31
24	29	20	e12	15	16	16	31	331	169	125	46	31
25	29	20	e12	15	16	16	32	366	169	126	45	26
26	29	e20	e13	e14	e16	16	27	370	170	130	47	21
27	29	e19	14	e14	e16	16	25	254	173	125	46	21
28	28	e19	13	15	e15	16	23	209	157	123	44	21
29	28	e20	13	e13	---	16	23	200	138	108	41	21
30	27	e19	14	e14	---	16	28	178	151	104	40	21
31	24	---	14	16	---	17	---	197	---	99	40	---
TOTAL	921	664	483	462	448	493	679	5061	7389	5388	1819	1031
MEAN	29.7	22.1	15.6	14.9	16.0	15.9	22.6	163	246	174	58.7	34.4
MAX	32	25	21	16	17	17	32	370	498	340	97	44
MIN	24	19	10	13	15	14	18	37	127	99	40	21
AC-FT	1830	1320	958	916	889	978	1350	10040	14660	10690	3610	2040
MEAN †	28.0	22.9	22.4	17.5	17.6	18.4	31.9	198	251	101	43.3	36.0
CFSM †	.58	.48	.46	.36	.37	.38	.66	4.11	5.21	2.10	.90	.75
IN †	.67	.53	.54	.42	.38	.44	.74	4.74	5.81	2.43	1.03	.83
AC-FT†	1720	1360	1380	1070	979	1130	1900	12180	14940	6240	2660	2140

OBSERVED

CAL YR 1990 TOTAL	20882	MEAN	57.2	MAX	268	MIN	10	AC-FT	41420
WTR YR 1991 TOTAL	24838	MEAN	68.0	MAX	498	MIN	10	AC-FT	49270

ADJUSTED

CAL YR 1990 TOTAL	20837	MEAN	57.1	CFSM	1.18	IN	16.08	AC-FT	41330
WTR YR 1991 TOTAL	24023	MEAN	65.9	CFSM	1.37	IN	18.55	AC-FT	47690

(†) Adjusted for change in contents in Middle Creek Reservoir.

e Estimated.

GALLATIN RIVER BASIN

06052500 GALLATIN RIVER AT LOGAN, MT

LOCATION.--Lat 45°53'07", long 111°26'15", in SE1/4NW1/4NE1/4 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^2.

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. Datum of gage is 4,086.42 ft above National Geodetic Vertical Datum of 1929. Prior to Aug. 10, 1928, nonrecording gages at several sites within 0.5 mi of present site at various datums. Aug. 10, 1928, to Oct. 7, 1941, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Nov. 28, Dec. 1, 8, 13, Dec. 15 to Jan. 15, Jan. 20-22, Jan. 25 to Feb. 2, Mar. 2, 3. 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. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--75 years (1894-1905, 1929-91), 1,065 ft^3/s, 771,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 9,840 ft^3/s, June 21, 1899, gage height, 6.25 ft, site and datum then in use; maximum gage height, 11.88 ft, Feb. 5, 1963, from floodmark, backwater from ice; minimum discharge observed, 130 ft^3/s, July 19, 1939, gage height, 2.04 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 8,120 ft^3/s, June 6, gage height, 9.06 ft; minimum, 253 ft^3/s, Aug. 21, gage height, 3.52 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	507	648	e680	e550	e600	573	583	626	3070	1670	328	313
2	514	697	654	e520	e620	e550	598	632	3480	1480	328	306
3	534	689	647	e500	635	e600	629	675	4370	1340	327	306
4	547	717	639	e480	655	616	640	671	5070	1240	326	314
5	534	791	660	e450	643	635	642	654	6130	1210	329	315
6	580	773	661	e450	635	601	715	642	7900	1090	324	316
7	610	702	633	e500	622	574	805	677	6910	1020	342	311
8	606	735	e620	e550	612	572	743	785	6240	979	332	338
9	606	812	642	e600	615	566	687	1120	5560	843	304	387
10	633	801	660	e600	616	565	672	1470	5250	698	293	408
11	626	784	687	e620	611	608	684	1510	5130	599	292	413
12	624	768	680	e620	611	579	666	1850	5480	544	296	422
13	617	764	e650	e650	627	574	656	1810	5470	508	290	415
14	608	765	652	e650	626	589	650	1880	4810	495	287	467
15	625	787	e600	e660	615	577	661	2260	3990	497	282	571
16	663	750	e620	665	653	591	667	2420	3390	463	280	588
17	676	721	e650	663	710	592	665	2510	3280	400	278	604
18	641	771	e600	652	645	586	670	3360	3000	374	280	607
19	646	777	e350	650	620	589	699	3970	2730	362	288	598
20	678	776	e300	e650	626	599	684	4070	2830	349	274	588
21	659	762	e300	e630	648	615	676	4210	2790	345	262	572
22	637	743	e300	e620	643	620	705	4490	2680	356	259	571
23	657	770	e350	613	635	598	750	4720	2530	361	269	566
24	639	759	e400	608	621	592	822	4750	2400	367	281	569
25	641	751	e400	e580	606	587	875	5100	2220	352	275	557
26	637	774	e450	e550	593	587	880	5490	2070	400	277	563
27	639	722	e500	e580	589	580	802	4800	1940	436	306	541
28	634	e650	e450	e520	586	570	736	3880	1810	420	345	529
29	626	700	e400	e500	---	562	691	3320	1720	403	351	570
30	628	733	e400	e550	---	563	648	3060	1610	375	335	565
31	622	---	e450	e580	---	562	---	3120	---	355	324	---
TOTAL	19094	22392	16685	18011	17518	18172	21001	80532	115860	20331	9364	14190
MEAN	616	746	538	581	626	586	700	2598	3862	656	302	473
MAX	678	812	687	665	710	635	880	5490	7900	1670	351	607
MIN	507	648	300	450	586	550	583	626	1610	345	259	306
AC-FT	37870	44410	33090	35720	34750	36040	41660	159700	229800	40330	18570	28150

CAL YR 1990 TOTAL 344117 MEAN 943 MAX 3840 MIN 300 AC-FT 682600
WTR YR 1991 TOTAL 373150 MEAN 1022 MAX 7900 MIN 259 AC-FT 740100

e Estimated

MISSOURI RIVER MAIN STEM

06054500 MISSOURI RIVER AT TOSTON, MT

LOCATION.--Lat 46°08'46", long 111°25'11", 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^2.

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. Datum of gage is 3,905.68 ft above National Geodetic Vertical Datum of 1929. Prior to Dec. 20, 1916, nonrecording gages at site 2.5 mi downstream at different datums.

REMARKS.--Estimated daily discharges: Dec. 19 to Jan. 9. Water-discharge records good except those for estimated daily discharges, which are fair. 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.

AVERAGE DISCHARGE.--56 years (1911-16, 1942-91), 5,274 ft^3/s, 3,821,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,000 ft^3/s, June 6, 1948, gage height, 11.77 ft; minimum, 450 ft^3/s, July 31, 1989, gage height, 1.68 ft, result of regulation.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 23,800 ft^3/s, June 9, gage height, 10.41 ft, result of regulation; minimum, 727 ft^3/s, Aug. 1, gage height, 2.09 ft, result of regulation.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2130	3800	4030	e2000	2620	2600	2650	3020	10300	6550	1310	1530
2	2160	3910	4010	e2100	2630	2420	2850	2950	10100	6430	1310	1510
3	2410	3910	4100	e2200	2710	3110	3020	3070	10700	6290	1430	1530
4	3000	3940	4370	e2300	3060	3130	3180	3080	11900	5880	1410	1490
5	2890	4060	4470	e2400	3160	3030	3300	3000	14200	5600	1470	1480
6	2940	4110	4180	e2500	3190	2930	3580	2900	18700	5160	1540	1500
7	3030	4040	4120	e2400	3240	2790	3920	2890	21700	4830	1520	1490
8	3140	4040	4100	e2600	3210	2770	4040	2990	22700	4580	1470	1570
9	3180	4140	4370	e2700	3250	2790	3820	3340	22800	4110	1470	1900
10	3260	4140	4420	2830	3240	2790	3600	4100	22600	3710	1410	2390
11	3260	4180	3460	2900	3230	2860	3400	4570	20100	3330	1250	2560
12	3280	4210	3340	3130	3310	2830	3290	5400	19100	2820	1220	2440
13	3330	4180	3000	3210	3340	2800	3180	5360	19100	2570	1210	2360
14	3320	4160	3170	3170	3390	2820	3110	5360	17400	2530	1180	2520
15	3370	4240	2790	3140	3360	2830	3070	5860	14700	2650	1160	2710
16	3460	4160	2450	3200	3540	2860	3100	6300	12200	2590	1140	3070
17	3500	4280	2370	3100	3610	3010	3170	6680	10900	2330	1130	3150
18	3510	4310	2520	3110	3560	3060	3210	7740	9770	2150	1170	3040
19	3620	4260	e1400	3140	3430	2940	3260	9350	8800	2000	1160	2850
20	3650	4310	e800	2990	3460	2910	3190	10900	8690	1900	1160	2900
21	3660	4310	e900	2960	3400	2950	3190	11600	8600	1820	1180	2880
22	3700	4190	e1000	2910	3140	2960	3360	11600	8570	1750	1200	2860
23	3720	4180	e1200	2900	3030	2800	3590	10900	8400	1690	1230	2850
24	3740	4140	e1400	2840	3030	2900	3660	11100	8220	1660	1240	2890
25	3770	4130	e1600	2840	2940	2930	3970	13500	7930	1610	1250	2930
26	3810	4210	e1800	2790	2940	2970	4110	14800	7280	1630	1270	2950
27	3780	3940	e2000	2640	2930	2860	3980	15200	6760	1670	1260	2970
28	3780	3940	e1800	2640	2890	2880	3690	13800	6520	1620	1400	2950
29	3750	3880	e1700	2350	---	2820	3500	12100	6370	1600	1580	3060
30	3780	4340	e1700	2140	---	2700	3180	11200	6470	1510	1580	3060
31	3780	---	e1800	2300	---	2710	---	11000	---	1460	1500	---
TOTAL	103710	123640	84370	84430	88840	88760	102170	235660	381580	96030	40810	73390
MEAN	3345	4121	2722	2724	3173	2863	3406	7602	12720	3098	1316	2446
MAX	3810	4340	4470	3210	3610	3130	4110	15200	22800	6550	1580	3150
MIN	2130	3800	800	2000	2620	2420	2650	2890	6370	1460	1130	1480
AC-FT	205700	245200	167300	167500	176200	176100	202700	467400	756900	190500	80950	145600

CAL YR 1990 TOTAL 1329680 MEAN 3643 MAX 11800 MIN 800 AC-FT 2637000
WTR YR 1991 TOTAL 1503390 MEAN 4119 MAX 22800 MIN 800 AC-FT 2982000

e Estimated

MISSOURI RIVER MAIN STEM

06054500 MISSOURI RIVER AT TOSTON, MT--Continued
(National stream quality accounting network station)

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.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1973-81): Maximum daily, 524 microsiemens, Mar. 4, 1978; minimum daily, 159 microsiemens, 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 (water years 1949-53): Maximum daily mean, 670 mg/L, Mar. 22, 25, 1951; minimum daily mean, 5 mg/L, Jul. 12, 1951.
SEDIMENT LOAD (water years 1949-53): Maximum daily, 16,100 tons, May 5, 1952; minimum daily, 51 tons Feb. 1, 1951.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 24.5°C July 30, 31, Aug. 10, 11; minimum, 0.0°C on many days during winter period.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT												
22...	1000	3700	20	1	392	10.5	5.5	--	--	--	--	--
29...	1100	3720	--	--	390	11.0	8.5	--	--	--	--	--
NOV												
28...	0945	3590	30	1	378	-2.0	0.0	672	12.8	99	K4	K9
DEC												
18...	1515	--	--	--	433	-14.0	0.0	--	--	--	--	--
JAN												
04...	1445	2200	--	--	479	-10.0	0.0	--	--	--	--	--
FEB												
11...	1030	3240	5	1	411	6.0	0.0	--	--	--	--	--
MAR												
07...	1030	2780	100	3	400	0.0	1.0	661	13.5	110	K2	K3
APR												
12...	1645	3270	100	2	358	3.5	4.0	--	--	--	--	--
MAY												
31...	1545	11000	95	2	247	18.5	13.0	--	--	--	--	--
JUN												
07...	1630	21700	--	--	220	20.0	14.0	--	--	--	--	--
12...	0830	18800	20	1	213	18.0	14.5	662	9.4	106	92	180
19...	1015	9850	95	3	233	19.0	15.5	--	--	--	--	--
JUL												
15...	1000	2700	0	0	334	26.5	20.0	--	--	--	--	--
AUG												
16...	1130	1040	--	--	363	20.5	17.0	--	--	--	--	--
19...	0830	1170	0	0	340	23.5	17.5	--	--	--	--	--
20...	1100	1120	8	1	342	27.0	22.0	666	9.2	121	K6	42
SEP												
02...	0930	1490	5	1	345	17.5	19.5	665	8.1	102	--	--

DATE	TIME	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)
NOV												
28...	0945	171	0	139	8.4	4.9	140	37	11	25	0.9	4.0
MAR												
07...	1030	179	0	146	8.2	2.3	160	42	13	24	0.8	3.8
JUN												
12...	0830	98	0	79	8.2	45	85	24	6.0	11	0.5	2.6
AUG												
20...	1100	134	8	120	8.7	3.0	120	31	9.7	24	1	4.0
SEP												
02...	0930	137	8	125	8.8	--	120	32	10	25	1	3.9

MISSOURI RIVER MAIN STEM

06054500 MISSOURI RIVER AT TOSTON, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRATE TOTAL (MG/L AS N) (00620)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)
NOV												
28...	140	34	13	1.1	27	230	237	0.31	2230	--	<0.01	<0.01
MAR												
07...	149	47	13	1.1	24	249	257	0.34	1870	--	<0.01	<0.01
JUN												
12...	85	17	6.4	0.6	19	156	136	0.21	7920	0.06	0.02	0.03
AUG												
20...	127	27	14	1.5	25	205	211	0.28	620	--	0.01	<0.01
SEP												
02...	127	31	13	1.6	25	--	217	0.30	874	--	--	<0.01

DATE	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ANTIMONY, DISSOLVED (UG/L AS SB) (01095)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)
NOV												
28...	0.10	0.10	0.04	0.04	0.04	0.01	0.02	<0.01	<10	--	42	43
MAR												
07...	0.21	0.22	0.02	0.02	0.02	0.02	<0.01	<0.01	<10	--	32	27
JUN												
12...	0.08	0.07	0.04	0.02	0.10	0.03	0.05	0.02	60	--	17	19
AUG												
20...	<0.05	<0.05	<0.01	<0.01	0.04	0.01	0.02	0.01	<10	--	54	50
SEP												
02...	--	<0.05	--	<0.01	--	--	--	<0.01	--	7	69	67

DATE	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	BORON, DISSOLVED (UG/L AS B) (01020)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)
NOV											
28...	40	<0.5	--	<1	<1	<3	2	17	<1	100	5
MAR											
07...	46	0.6	--	1	<1	<3	4	19	1	83	14
JUN											
12...	34	<0.5	--	<1	<1	<3	3	97	1	39	9
AUG											
20...	38	0.5	--	<1	<1	<3	9	9	<1	110	3
SEP											
02...	--	--	160	--	--	--	--	8	--	110	3

DATE	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV											
28...	0.1	<10	<1	<1	<1	210	<6	5	15	145	88
MAR											
07...	<0.1	<10	<1	<1	<1	260	<6	6	4	30	92
JUN											
12...	<0.1	<10	1	<1	<1	130	<6	6	169	8580	74
AUG											
20...	<0.1	<10	<1	<1	<1	170	<6	5	9	27	92
SEP											
02...	--	--	--	--	--	--	--	--	9	36	96

MISSOURI RIVER MAIN STEM

06054500 MISSOURI RIVER AT TOSTON, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)
SEP							
01...	1100	1510	335	9.0	27.5	21.5	663
01...	1200	1520	334	9.0	29.0	22.0	664
01...	1300	1540	333	9.0	30.0	23.0	664
01...	1400	1520	332	9.1	32.5	23.0	663
01...	1500	1550	333	9.0	34.0	23.0	663
01...	1600	1550	332	9.0	33.5	23.0	662
01...	1700	1530	333	9.0	32.5	23.0	662
01...	1800	1510	335	8.9	28.5	21.5	661
01...	1900	1510	338	8.9	29.0	21.5	661
01...	2000	1500	341	8.8	27.0	21.0	662
01...	2100	1500	340	8.7	24.0	20.0	662
01...	2200	1500	345	8.7	22.0	20.0	662
01...	2300	1510	345	8.7	21.0	20.0	662
01...	2400	1510	344	8.6	20.0	19.5	663
02...	0100	1510	345	8.6	19.5	19.5	663
02...	0200	1510	343	8.6	18.0	19.0	663
02...	0445	1490	346	8.6	17.0	19.0	664
02...	0600	1500	347	8.6	16.0	19.0	664
02...	0700	1500	346	8.6	15.0	19.0	665
02...	0800	1500	346	8.7	14.0	19.0	665
02...	0900	1500	344	8.8	17.0	19.5	665
02...	1000	1480	342	8.9	18.0	20.5	665
02...	1100	1480	343	9.0	18.5	20.5	665
02...	1200	1480	341	9.0	21.0	22.0	666
02...	1300	1480	341	9.0	21.5	22.0	666
02...	1400	1490	341	9.0	23.0	22.5	666
02...	1500	1490	341	9.0	22.5	24.0	665
02...	1600	1500	343	9.0	24.0	22.5	665
02...	1700	1500	343	9.0	23.5	22.0	665
02...	1800	1510	344	8.9	24.5	21.5	666
02...	1900	1500	347	8.8	23.5	20.5	666
02...	2000	1520	350	8.8	22.5	19.5	666

DATE	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)
SEP							
01...	9.2	121	125	13	122	--	68
01...	9.6	127	119	14	122	--	--
01...	9.7	131	118	16	122	--	70
01...	9.7	131	127	12	123	--	67
01...	9.6	130	124	14	123	--	74
01...	9.5	128	120	15	123	--	73
01...	9.0	121	126	13	125	--	67
01...	8.2	108	131	10	123	--	67
01...	7.6	100	139	7	125	--	70
01...	7.0	91	138	7	125	--	70
01...	6.6	84	139	8	126	--	65
01...	6.2	79	141	6	126	60	60
01...	6.2	79	140	6	126	--	69
01...	6.2	78	150	2	126	--	64
02...	6.3	79	147	4	126	--	71
02...	6.3	78	148	3	125	--	65
02...	6.2	77	145	4	126	61	61
02...	6.3	78	140	7	125	--	67
02...	6.5	81	143	5	126	--	71
02...	6.9	86	142	6	125	--	68
02...	7.8	97	144	4	123	--	64
02...	8.6	110	--	--	--	--	70
02...	9.0	114	128	12	124	--	66
02...	9.7	128	128	12	124	--	69
02...	9.7	128	--	--	124	--	66
02...	9.7	130	127	13	124	--	66
02...	9.5	130	127	13	125	67	63
02...	9.3	124	129	12	125	--	61
02...	8.9	117	133	11	126	--	65
02...	8.6	112	137	9	126	--	67
02...	7.9	100	145	6	127	--	65
02...	7.1	89	145	6	128	--	--

MISSOURI RIVER MAIN STEM

06054500 MISSOURI RIVER AT TOSTON, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	15.5	13.5	14.0	8.5	7.0	8.0	.5	.0	.0	.0	0	0
2	14.0	12.5	13.5	7.0	5.5	6.5	.5	.0	.0	.0	0	0
3	12.5	10.0	11.5	5.5	4.0	5.0	.5	.0	.0	.0	0	0
4	11.0	10.0	10.5	5.0	4.0	4.5	.5	.0	.0	.0	0	0
5	12.5	11.0	12.0	5.0	4.0	4.5	.5	.0	.0	.0	0	0
6	11.5	9.5	10.5	4.0	2.5	3.0	.5	.0	.0	.0	0	0
7	9.5	8.5	9.0	2.5	1.5	2.0	.5	.0	.0	.0	0	0
8	9.0	8.0	8.5	2.0	1.0	1.5	.5	.0	.0	.0	0	0
9	9.0	7.5	8.0	4.0	2.5	3.0	.5	.0	.0	.0	0	0
10	9.0	8.5	8.5	5.5	4.0	4.5	.5	.0	.0	.0	0	0
11	8.5	7.0	7.5	6.0	5.0	5.5	1.0	.5	.5	.0	0	0
12	8.0	7.0	7.5	5.5	4.5	5.5	1.0	.0	.5	.0	0	0
13	7.5	6.5	7.0	5.0	4.5	4.5	.5	.0	.0	.0	0	0
14	7.0	6.0	6.5	5.5	5.0	5.0	.5	.0	.0	.0	0	0
15	6.0	5.5	6.0	5.0	4.0	4.5	.0	.0	.0	.0	0	0
16	7.0	6.0	6.5	4.0	2.5	3.0	.5	.0	.0	.5	0	0
17	7.0	5.5	6.0	2.5	2.0	2.5	.5	.0	.0	.5	0	0
18	6.5	5.5	6.0	3.5	2.5	3.0	.0	.0	.0	.5	0	0
19	6.5	5.5	6.0	4.0	3.0	3.5	.0	.0	.0	1.0	0	0
20	6.5	5.0	6.0	4.0	3.0	3.5	.0	.0	.0	.5	0	0
21	5.0	4.5	5.0	3.0	1.5	2.0	.0	.0	.0	.5	0	0
22	6.0	4.5	5.5	2.0	1.5	1.5	.0	.0	.0	.5	0	0
23	6.5	6.0	6.0	3.0	2.0	2.5	.0	.0	.0	.5	0	0
24	6.0	5.5	6.0	4.0	2.5	3.5	.0	.0	.0	.5	0	0
25	6.5	5.5	6.0	4.5	3.5	4.0	.0	.0	.0	.0	0	0
26	8.5	7.0	7.5	4.0	2.5	3.5	.0	.0	.0	.0	0	0
27	8.0	6.5	7.5	2.5	.5	1.5	.0	.0	.0	.0	0	0
28	7.5	6.5	7.0	.5	.0	.0	.0	.0	.0	.0	0	0
29	8.5	7.5	8.0	.5	.0	.0	.0	.0	.0	.0	0	0
30	8.5	7.5	8.0	.5	.0	.0	.0	.0	.0	.0	0	0
31	8.5	7.5	8.0	---	---	---	.0	.0	.0	.5	0	0
MONTH	14.0	4.5	8.0	8.5	.0	3.5	1.0	.0	.0	1.0	0	0
		FEBRUARY			MARCH			APRIL			MAY	
1	.5	.0	.0	1.5	.0	.5	11.0	8.5	9.5	10.5	9.0	9.5
2	1.0	.0	.5	1.0	.0	.5	12.0	10.0	10.5	9.5	8.5	9.0
3	1.0	.0	.5	1.0	.0	.5	11.0	9.5	10.5	8.5	6.0	7.0
4	1.0	.0	.0	1.5	.0	1.0	11.0	9.5	10.0	7.5	6.5	7.0
5	1.0	.0	.5	4.0	1.5	3.0	11.0	9.5	10.5	10.0	7.5	9.0
6	1.0	.0	.0	4.0	2.0	3.0	10.5	9.0	10.0	12.0	10.0	11.0
7	1.0	.0	.0	1.5	.5	1.0	9.0	7.5	8.0	13.0	11.5	12.0
8	1.0	.0	.5	2.5	.5	1.5	7.5	6.5	7.0	13.5	12.5	13.0
9	1.0	.0	.0	4.0	1.5	3.0	7.0	6.0	6.5	12.5	10.5	11.5
10	1.0	.0	.0	4.5	3.0	3.5	7.0	6.0	6.5	10.5	8.0	9.0
11	1.0	.0	.5	5.5	3.5	4.5	6.5	4.5	6.0	9.5	8.0	8.5
12	1.0	.0	.5	4.5	3.5	4.0	4.5	4.0	4.5	10.5	9.5	9.5
13	.5	.0	.5	4.5	3.5	4.0	5.0	4.0	4.5	12.0	10.5	11.0
14	.5	.0	.0	5.5	4.0	5.0	6.0	4.5	5.5	12.5	12.0	12.5
15	1.0	.0	.5	5.5	4.5	5.0	7.5	6.0	6.5	12.0	11.5	12.0
16	.5	.0	.5	5.5	4.5	5.0	8.0	6.5	7.5	14.0	12.0	12.5
17	1.0	.0	.5	6.5	5.0	5.5	6.5	6.0	6.0	15.0	14.0	14.5
18	1.0	.0	.5	6.5	5.0	5.5	6.5	6.0	6.0	15.5	14.0	15.0
19	1.0	.0	.5	7.0	5.5	6.0	8.0	6.5	7.0	13.5	12.0	12.5
20	1.5	.5	1.0	7.5	6.5	7.0	11.0	8.0	9.5	14.5	13.0	13.5
21	3.0	2.0	2.5	7.5	7.0	7.0	12.0	10.5	11.5	14.5	13.5	14.0
22	3.0	2.5	2.5	8.0	6.5	7.0	13.0	11.5	12.0	15.5	14.0	14.5
23	4.0	2.5	3.0	8.0	6.5	7.0	13.5	12.5	13.0	16.0	15.0	15.5
24	4.0	2.5	3.0	7.5	6.5	7.0	13.0	11.5	12.5	16.5	14.5	15.5
25	3.5	3.0	3.0	7.0	5.0	6.0	12.0	9.5	10.5	16.5	14.0	15.0
26	4.0	3.0	3.5	4.5	2.5	4.0	9.5	8.0	8.5	14.0	12.0	13.0
27	3.5	2.5	3.0	5.5	3.0	4.5	8.5	7.0	7.5	14.0	11.5	12.5
28	3.5	1.5	2.5	6.0	5.0	5.5	7.0	6.5	6.5	13.5	11.5	12.0
29	---	---	---	6.0	4.5	5.5	8.5	6.5	7.5	13.5	12.5	13.0
30	---	---	---	7.5	5.5	6.5	9.5	8.0	9.0	14.0	12.5	13.0
31	---	---	---	9.0	6.5	8.0	---	---	---	14.0	12.5	13.0
MONTH	4.0	.0	1.0	9.0	.0	4.5	13.5	4.0	8.5	16.5	6.0	12.0

MISSOURI RIVER MAIN STEM

06054500 MISSOURI RIVER AT TOSTON, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	15.0	12.5	13.0	16.5	15.0	15.5	22.5	18.0	20.0	22.5	18.5	20.0
2	16.5	15.0	15.5	18.5	16.5	17.5	23.0	18.0	20.0	22.0	17.5	19.5
3	17.0	16.0	16.5	20.0	18.5	19.0	22.5	17.0	19.5	21.0	17.0	18.5
4	17.0	14.5	15.0	20.0	20.0	20.0	23.5	18.0	20.5	21.0	16.5	18.0
5	14.5	13.0	13.5	20.5	20.0	20.5	24.0	19.0	20.5	21.0	16.5	18.0
6	14.0	12.0	13.0	20.5	19.5	20.0	22.5	18.5	19.5	21.0	16.5	18.0
7	15.5	13.0	14.0	19.5	18.5	18.5	22.5	17.5	19.0	19.5	17.0	18.0
8	15.5	13.5	14.5	20.0	19.0	19.5	22.5	17.5	20.0	18.0	16.0	17.0
9	16.5	14.0	15.0	20.5	19.5	20.0	23.5	18.5	20.5	16.0	14.0	15.5
10	17.0	15.0	16.0	21.5	20.5	21.0	24.5	19.0	20.5	15.0	13.5	14.0
11	17.0	15.0	16.0	21.0	20.0	20.5	24.5	18.5	20.5	17.5	14.5	16.0
12	16.5	14.5	15.5	22.5	20.0	21.0	23.5	18.0	20.0	18.0	16.0	17.0
13	16.0	14.0	15.0	23.0	21.0	21.5	24.0	18.0	20.5	18.0	16.5	17.0
14	15.5	12.5	13.5	21.5	20.0	21.0	24.0	18.5	20.5	17.0	14.5	16.0
15	14.5	11.5	12.5	21.5	20.0	20.5	23.5	18.0	20.0	14.5	13.0	13.5
16	15.0	13.5	14.0	23.0	20.0	21.5	23.0	17.0	19.5	14.5	13.0	13.5
17	15.0	13.5	14.5	22.5	19.5	21.0	23.0	17.0	19.5	14.0	13.0	13.5
18	15.5	13.5	14.5	21.5	19.0	20.0	23.5	17.5	20.0	13.5	12.0	13.0
19	16.0	15.0	15.5	22.0	19.0	20.0	24.0	17.5	20.0	13.5	12.0	13.0
20	17.0	15.5	16.0	22.5	19.0	20.5	23.5	18.0	20.0	14.5	13.0	14.0
21	17.0	16.0	16.5	23.5	19.5	21.5	23.5	17.5	20.0	15.0	14.0	14.5
22	17.5	16.0	17.0	23.5	19.5	21.5	24.0	18.0	20.0	14.0	12.0	13.0
23	16.5	15.0	15.5	23.5	19.0	21.0	23.5	18.5	20.0	13.5	12.0	12.5
24	15.5	15.0	15.5	24.0	20.0	21.5	23.5	18.0	20.0	14.0	12.5	13.0
25	16.0	14.5	15.5	23.5	20.0	21.0	23.0	18.0	19.5	14.5	13.0	13.5
26	15.5	14.5	15.0	23.0	19.0	20.5	23.0	17.0	19.0	15.0	13.5	14.0
27	15.5	15.0	15.5	23.0	18.5	20.5	21.5	17.5	19.0	15.0	13.5	14.5
28	16.5	16.0	16.0	24.0	19.0	21.0	22.0	18.0	19.5	15.0	14.0	14.5
29	16.0	15.5	16.0	24.0	19.5	21.5	21.5	17.5	19.0	15.0	14.0	14.5
30	16.0	15.0	15.5	24.5	19.5	21.5	21.5	17.5	19.0	16.0	14.5	15.0
31	---	---	---	24.5	19.5	21.5	22.0	17.5	19.5	---	---	---
MONTH	17.5	11.5	15.0	24.5	15.0	20.5	24.5	17.0	20.0	22.5	12.0	15.5

MISSOURI RIVER MAIN STEM

06058500 CANYON FERRY LAKE NEAR HELENA, MT

LOCATION.--Lat 46°38'57", long 111°43'39", in SE1/4SE1/4 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 mi².

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. Datum of gage is referenced to National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

REMARKS.--Reservoir is formed by concrete dam; construction began in 1949, completed in 1953. Storage began in March 1953. Usable capacity, 2,043,000 acre-ft between elevation 3,650.00 ft, invert of outlet works, and 3,800.00 ft, controlled spillway elevation. Dead storage, 7,470 acre-ft, below elevation 3,650.00 ft. Minimum operating level, 426,500 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 U.S. 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, 1,978,000 acre-ft, July 2, 3, elevation, 3,798.02 ft; minimum, 1,428,000 acre-ft, Apr. 2, 3, elevation, 3,780.51 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	3,786.54	1,611,000	---
Oct. 31	3,787.15	1,630,000	+19,000
Nov. 30	3,789.27	1,696,000	+66,000
Dec. 31	3,785.95	1,592,000	-104,000
CAL YR 1990			+59,000
Jan. 31	3,781.81	1,466,000	-126,000
Feb. 28	3,780.83	1,437,000	-29,000
Mar. 31	3,780.56	1,429,000	-8,000
Apr. 30	3,780.88	1,439,000	+10,000
May 31	3,788.42	1,669,000	+230,000
June 30	3,797.97	1,977,000	+308,000
July 31	3,793.72	1,838,000	-139,000
Aug. 31	3,787.78	1,649,000	-189,000
Sept. 30	3,784.58	1,550,000	-99,000
WTR YR 1991			-61,000

PRICKLY PEAR CREEK BASIN

06061500 PRICKLY PEAR CREEK NEAR CLANCY, MT

LOCATION.--Lat 46°31'09", long 111°56'45", in NE1/4SE1/4SW1/4 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^2.

PERIOD OF RECORD.--July 1908 to September 1916, July 1921 to September 1933, October 1945 to October 1953, October 1954 to September 1969, October 1978 to current year. October 1969 to September 1980 record collected by Montana Department of Natural Resources and Conservation. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1086: 1946(m). WSP 1309: 1925, 1927, 1931(M), 1933, 1948(M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 4,067.1 ft above National Geodetic Vertical Datum of 1929. Prior to July 12, 1910, nonrecording gage at site 1.2 mi upstream at different datum. July 12, 1910, to Sept. 30, 1916, and July 28, 1921, to Aug. 12, 1933, nonrecording gage at site 2.2 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Nov. 3, 6, 7, 16, 17, 21, 26-28, Dec. 1, 2, 6-8, Dec. 12 to Feb. 4, 7, 8, 10, 11, 23, 24, Feb. 28 to Mar. 4, 6, 7, 9, 18, 26, 27. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 700 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--56 years (water years, 1909-16, 1922-33, 1946-53, 1955-69, 1979-91), 48.6 ft^3/s, 35,210 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,300 ft^3/s, May 22, 1981, gage height, 8.82 ft, from rating curve extended above 900 ft^3/s, on basis of culvert computation at gage height 8.82 ft; minimum, 0.5 ft^3/s, Jan. 26, 1958, gage height, 0.40 ft, ice jam upstream; minimum gage height, 0.16 ft, Sept. 3-5, 7,8, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 19, 1975, reached a discharge of 1,200 ft^3/s, gage height, 6.56 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 19	0245	*248	*2.72	June 7	1400	238	2.63
June 5	2045	235	2.61				

Minimum daily discharge, 8.0 ft^3/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	18	e15	e12	e13	e16	25	28	117	74	21	17
2	15	18	e16	e12	e15	e15	27	27	118	66	21	16
3	16	e15	16	e11	e14	e17	30	27	137	61	20	16
4	16	18	17	e11	e16	e18	32	26	132	57	20	16
5	16	19	18	e11	17	20	42	26	185	53	19	16
6	16	e17	e17	e10	17	e18	44	28	189	50	20	16
7	17	e16	e16	e10	e17	e17	36	35	217	47	20	16
8	17	19	e16	e10	e16	17	30	43	182	45	19	18
9	17	19	17	e11	16	e15	28	54	156	41	18	25
10	18	20	17	e11	e16	16	26	45	144	46	17	25
11	18	19	17	e12	e16	16	25	67	139	43	18	50
12	18	20	e16	e13	16	16	23	100	128	40	18	41
13	18	20	e15	e14	16	16	24	89	114	37	17	30
14	18	19	e15	e14	16	16	23	97	105	41	17	29
15	20	18	e14	e13	17	16	23	88	96	45	16	34
16	21	e16	e14	e13	18	17	24	84	90	40	16	30
17	21	e17	e14	e13	18	17	25	99	87	38	17	28
18	21	19	e12	e13	18	e16	25	189	74	35	16	28
19	20	19	e10	e12	18	18	25	205	68	33	16	26
20	21	19	e9.0	e11	20	20	28	165	120	31	15	25
21	20	e17	e9.0	e11	21	22	33	155	101	29	15	23
22	21	20	e8.0	e12	20	22	37	158	129	28	14	23
23	20	19	e9.0	e12	e19	20	42	154	116	28	14	22
24	19	19	e11	e11	e18	20	43	149	100	28	14	22
25	20	20	e10	e11	18	20	46	155	95	28	14	21
26	20	e18	e10	e11	18	e17	38	140	89	30	14	21
27	20	e16	e11	e12	18	e18	34	126	85	28	14	20
28	20	e17	e10	e11	e17	19	32	118	79	26	27	19
29	19	18	e9.0	e10	---	19	32	108	76	24	25	19
30	18	18	e10	e11	---	19	30	119	80	22	20	19
31	18	---	e11	e12	---	21	---	130	---	21	18	---
TOTAL	575	547	409.0	361	479	554	932	3034	3548	1215	550	711
MEAN	18.5	18.2	13.2	11.6	17.1	17.9	31.1	97.9	118	39.2	17.7	23.7
MAX	21	20	18	14	21	22	46	205	217	74	27	50
MIN	15	15	8.0	10	13	15	23	26	68	21	14	16
AC-FT	1140	1080	811	716	950	1100	1850	6020	7040	2410	1090	1410

CAL YR 1990 TOTAL 12828.0 MEAN 35.1 MAX 138 MIN 8.0 AC-FT 25440
WTR YR 1991 TOTAL 12915.0 MEAN 35.4 MAX 217 MIN 8.0 AC-FT 25620

e Estimated

PRICKLY PEAR CREEK BASIN

06062500 TENMILE CREEK NEAR RIMINI, MT

LOCATION.--Lat 46°31'27", long 112°15'22", in NW1/4SW1/4NE1/4 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 picnic grounds, 500 ft upstream from Moose Creek, 2.5 mi north of Rimini, and at river mile 20.4.

DRAINAGE AREA.--32.7 mi^2.

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

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

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 4,850 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Dec. 17, 1934, water-stage recorder at site 40 ft downstream at different datum and different control.

REMARKS.--Estimated daily discharges: Dec. 17 to Feb. 20, Aug. 3-8. Records good except those Aug. 30 to Sept. 30, which are fair, 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-ft. Small diversions upstream from station for water supply for city of Helena. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--77 years, 17.5 ft^3/s, 12,680 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,290 ft^3/s, May 22, 1981, gage height, 6.20 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 105 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 21	2045	*171	*3.04	June 7	0900	148	2.93

Minimum daily discharge, 0.14 ft^3/s, Aug. 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.41	.40	1.6	e1.0	e1.2	1.0	2.3	5.2	73	19	.51	.18
2	.32	.34	1.7	e.90	e1.0	.82	2.3	4.5	74	16	.46	.17
3	.29	.27	1.1	e.90	e1.2	.80	2.7	4.4	78	13	e.43	.19
4	.23	.43	1.1	e.80	e1.5	1.1	3.6	4.1	74	11	e.43	.19
5	.54	.78	1.0	e.60	e1.2	1.1	7.0	4.6	115	10	e.46	.19
6	1.1	.64	.93	e.40	e1.0	.92	7.2	7.2	103	9.3	e.45	.20
7	1.5	.83	.85	e.50	e.90	.88	4.6	10	130	8.0	e.44	.22
8	1.4	.96	.80	e.60	e.90	.79	3.4	17	106	4.4	e.41	.44
9	1.3	1.3	.85	e.70	e.90	.84	2.8	21	90	2.5	.36	.55
10	1.1	1.7	.85	e.80	e.80	.88	2.5	16	75	5.6	.32	.74
11	1.7	2.1	1.1	e1.0	e.70	.89	2.4	36	65	5.9	.32	3.9
12	1.2	2.2	1.2	e1.2	e.70	.84	2.2	50	59	3.6	.30	1.1
13	1.3	2.1	.76	e1.0	e.90	.85	2.1	54	53	1.5	.28	.28
14	1.4	2.1	.53	e.90	e1.0	.85	2.0	60	47	1.7	.26	.58
15	1.3	1.7	.27	e.90	e1.1	.91	1.9	62	42	4.5	.27	1.1
16	1.6	.86	.35	e.90	e1.2	.91	.99	73	36	2.4	.26	.70
17	1.2	1.2	e.40	e1.1	e1.1	.88	1.0	104	33	1.4	.25	.44
18	.99	1.2	e.35	e1.0	e1.0	.90	.91	158	28	1.1	.24	.35
19	1.5	1.0	e.30	e.90	e1.1	1.0	.98	151	25	1.0	.22	.23
20	1.2	.94	e.25	e.70	e1.2	1.2	1.5	142	51	.87	.20	.21
21	.96	.84	e.20	e.70	1.1	1.2	3.5	146	40	.79	.17	.18
22	1.7	1.0	e.25	e.90	1.0	1.1	7.5	145	40	.79	.17	.18
23	1.3	.95	e.40	e.70	.99	1.1	11	138	36	.72	.15	.18
24	.54	1.0	e.60	e.60	.93	1.0	14	136	31	.67	.17	.17
25	.51	1.7	e.60	e.60	.89	1.0	13	132	28	.69	.16	.19
26	.81	1.3	e.50	e.60	.86	1.3	9.7	111	25	3.0	.14	.19
27	.96	.88	e.60	e.80	.89	.95	7.4	97	23	1.4	.15	.19
28	.79	1.1	e.50	e.50	.81	.95	7.4	84	22	.93	1.0	.19
29	.73	1.2	e.40	e.40	---	.92	6.3	75	21	.76	.71	.20
30	.47	2.2	e.60	e.50	---	1.0	5.8	84	21	.68	.25	.21
31	.40	---	e1.1	e.70	---	1.4	---	79	---	.61	.20	---
TOTAL	30.75	35.22	22.04	23.80	28.07	30.28	139.98	2211.0	1644	133.81	10.14	13.84
MEAN	.99	1.17	.71	.77	1.00	.98	4.67	71.3	54.8	4.32	.33	.46
MAX	1.7	2.2	1.7	1.2	1.5	1.4	14	158	130	19	1.0	3.9
MIN	.23	.27	.20	.40	.70	.79	.91	4.1	21	.61	.14	.17
AC-FT	61	70	44	47	56	60	278	4390	3260	265	20	27

CAL YR 1990 TOTAL 5824.33 MEAN 16.0 MAX 123 MIN .20 AC-FT 11550
WTR YR 1991 TOTAL 4322.93 MEAN 11.8 MAX 158 MIN .14 AC-FT 8570

e Estimated

MISSOURI RIVER MAIN STEM

06066500 MISSOURI RIVER BELOW HOLTER DAM, NEAR WOLF CREEK, MT

LOCATION.--Lat 46°59'41", long 112°00'37", in NE1/4SW1/4SE1/4 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^2.

PERIOD OF RECORD.--October 1945 to current year.

GAGE.--Water-stage recorder. Datum of gage is 3,464.11 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges this year. 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. Several observations of water temperature and specific conductance were obtained during the year.

AVERAGE DISCHARGE.--46 years, 5,520 ft^3/s, 3,999,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 34,800 ft^3/s, June 8, 1948, gage height, 11.70 ft; minimum, probably less than 250 ft^3/s during powerplant shutdown July 26, 1968; minimum daily, 747 ft^3/s, May 27, 1962.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 15,600 ft^3/s, June 11, gage height, 6.97 ft; minimum daily, 2,920 ft^3/s, Oct. 13, 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3790	3030	3050	5140	4700	3650	3320	3270	4390	6710	4160	4480
2	3750	3040	3440	5110	4330	3620	3280	3270	4150	6690	4180	4500
3	3750	3060	4100	5110	4050	3670	3290	3270	4080	6680	4130	4550
4	3360	3010	4110	5090	4140	3830	3310	3290	4550	6700	4080	4530
5	3290	3040	3930	5110	4180	3800	3300	3340	5010	6750	4050	4520
6	3480	3050	3960	5070	4250	3810	3300	3290	5890	6690	4030	4490
7	3460	3040	4010	5050	4250	3810	3400	3320	7460	6080	4030	4460
8	3330	3100	3970	5080	4200	3730	3460	3380	8650	5930	4040	4540
9	3260	2950	3940	5070	4130	3560	3460	3390	8860	6970	4030	4570
10	3190	2950	3950	5070	4130	3400	3460	3390	10900	7060	4080	4520
11	3080	2980	4030	5060	4140	3140	3640	3430	13500	6780	4120	4600
12	2930	2990	4230	5050	4100	2990	3720	3480	15400	6360	4150	4650
13	2920	3000	4360	5050	4090	3000	3530	3560	14500	5960	4160	4600
14	2920	2970	4400	5070	4110	3010	3400	3970	13800	5970	4290	4590
15	2950	2970	4290	4930	4060	3010	3340	4520	12000	5900	4320	4570
16	2970	3010	4110	4850	4060	3030	3330	4530	8610	5810	4340	4460
17	3040	3000	4080	4850	4180	3040	3290	4800	6390	5710	4360	4320
18	3040	2990	4580	4770	4200	3070	3210	5020	5750	5560	4330	4350
19	2980	3010	5120	4740	4210	3120	3170	5050	5590	5100	4370	4340
20	2990	3000	5210	4660	4170	3190	3240	5140	5980	5020	4340	4280
21	3020	3000	5290	4640	3920	3270	3300	5140	6830	4940	4350	4230
22	2980	3010	5420	4640	3700	3350	3370	4900	7170	4930	4360	4280
23	2990	2990	5260	4640	3960	3340	3400	4770	6810	4970	4410	4260
24	3010	3000	5090	4630	3660	3280	3380	4750	6490	5030	4440	4430
25	2980	3030	5000	4620	3670	3170	3400	4710	6460	5180	4400	4410
26	3020	3030	4940	4680	3670	3120	3420	4540	6580	5390	4440	4370
27	3060	3030	4930	4690	3650	3110	3420	4510	6560	5270	4440	4230
28	3040	3030	5050	4740	3650	3100	3370	4480	6520	5140	4510	4100
29	3060	3040	5080	4810	---	3140	3370	4460	6550	5040	4520	4110
30	3030	3030	5110	4810	---	3210	3330	4450	6690	4660	4530	4150
31	3040	---	5090	4780	---	3290	---	4430	---	4250	4510	---
TOTAL	97710	90380	139130	151610	113560	102860	101210	127850	232120	179230	132500	132490
MEAN	3152	3013	4488	4891	4056	3318	3374	4124	7737	5782	4274	4416
MAX	3790	3100	5420	5140	4700	3830	3720	5140	15400	7060	4530	4650
MIN	2920	2950	3050	4620	3650	2990	3170	3270	4080	4250	4030	4100
AC-FT	193800	179300	276000	300700	225200	204000	200800	253600	460400	355500	262800	262800

CAL YR 1990 TOTAL 1377220 MEAN 3773 MAX 6350 MIN 2820 AC-FT 2732000
WTR YR 1991 TOTAL 1600650 MEAN 4385 MAX 15400 MIN 2920 AC-FT 3175000

DEARBORN RIVER BASIN

06073500 DEARBORN RIVER NEAR CRAIG, MT

LOCATION.--Lat 47°11'56", long 112°05'27", in NW1/4NE1/4SE1/4 sec.27, T.17 N., R.4 W., Lewis and Clark County, Hydrologic Unit 10030102, at bridge on U.S. Highway 287, 7.6 mi downstream from South Fork, 10.6 mi northwest of Craig, and 19.4 mi upstream from mouth.

DRAINAGE AREA.--325 mi^2.

PERIOD OF RECORD.--August to September 1991 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRESSURE (MM OF HG) (00025)
AUG								
08...	1300	88	0	0	343	33.0	22.0	695
SEP								
05...	1515	41	0	0	349	24.0	20.0	695

DATE	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	PH (STANDARD UNITS) (00400)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	LITHIUM DISSOLVED (UG/L AS LI) (01130)
AUG							
08...	7.9	99	8.4	0.80	<1	<1	<10
SEP							
05...	8.3	100	8.5	0.40	<1	<1	<10

SMITH RIVER BASIN

06076690 SMITH RIVER NEAR FORT LOGAN, MT

LOCATION.--Lat 46°47'45", long 111°10'41", in NE1/4SW1/4SW1/4 sec.13, T.12 N., R.4 E., Meagher County, Hydrologic Unit 10030103, on left bank, 15 ft downstream from ranch bridge, 1.0 mi upstream from Sheep Creek, 9.0 mi north of Fort Logan, and at river mile 83.7.

DRAINAGE AREA.--846 mi^2.

PERIOD OF RECORD.--October 1977 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 4,400 ft above National Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 6-8, Nov. 28 to Mar. 13. 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 of station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--14 years, 149 ft^3/s, 108,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,600 ft^3/s, May 22, 1981, gage height, 7.80 ft; minimum, 16 ft^3/s, Aug. 22, Sept. 2, 1988; minimum gage height, 2.12 ft, Nov. 11, 1978.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft^3 /s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 6	1500	*717	*4.38	No other peak greater than base discharge.			

Minimum discharge, 37 ft^3/s, Aug. 31, gage height, 2.51 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	71	85	e80	e80	e85	e80	106	131	221	104	59	44
2	70	84	e75	e75	e95	e70	111	117	214	98	65	44
3	66	77	e80	e75	e100	e85	125	109	218	89	60	43
4	77	81	e90	e75	e100	e100	127	108	262	80	60	41
5	76	84	e85	e70	e100	e100	122	103	377	76	60	44
6	72	e78	e85	e70	e100	e95	118	98	647	79	61	46
7	72	e76	e85	e70	e105	e90	107	97	638	75	61	44
8	75	e86	e90	e75	e105	e90	102	97	556	72	56	48
9	78	94	e92	e75	e100	e100	100	111	470	70	50	52
10	79	88	e95	e80	e100	e105	104	117	401	81	50	60
11	79	88	e90	e85	e95	e88	104	210	370	84	50	65
12	80	87	e80	e85	e90	e88	101	358	341	83	53	70
13	82	84	e80	e90	e95	e88	94	271	306	92	55	66
14	84	82	e80	e90	e95	88	94	227	269	93	50	69
15	84	81	e85	e90	e95	88	92	204	237	95	49	81
16	86	74	e85	e90	e95	84	92	193	196	87	53	82
17	86	80	e85	e90	e100	84	94	201	178	78	48	78
18	86	86	e80	e90	e100	84	97	215	158	78	51	80
19	86	77	e65	e85	e95	85	98	294	130	68	54	79
20	86	81	e60	e80	e95	89	98	317	142	67	54	80
21	86	73	e55	e75	e95	112	94	337	160	60	48	81
22	86	84	e50	e75	e95	132	93	320	135	58	45	81
23	83	89	e55	e70	e90	122	89	322	144	59	45	83
24	79	86	e65	e65	e90	113	88	282	157	56	45	87
25	81	84	e75	e60	e90	104	89	283	161	58	45	87
26	83	85	e80	e55	e88	92	89	285	157	62	45	84
27	79	76	e85	e65	e88	102	83	270	141	64	44	80
28	78	e78	e70	e60	e88	93	96	233	121	64	44	79
29	82	e80	e60	e60	---	93	109	200	103	59	44	80
30	83	e85	e55	e55	---	97	136	182	100	57	45	80
31	83	---	e70	e70	---	104	---	179	---	58	43	---
TOTAL	2478	2473	2367	2330	2669	2945	3052	6471	7710	2304	1592	2038
MEAN	79.9	82.4	76.4	75.2	95.3	95.0	102	209	257	74.3	51.4	67.9
MAX	86	94	95	90	105	132	136	358	647	104	65	87
MIN	66	73	50	55	85	70	83	97	100	56	43	41
AC-FT	4920	4910	4690	4620	5290	5840	6050	12840	15290	4570	3160	4040

CAL YR 1990 TOTAL 36493 MEAN 100 MAX 356 MIN 50 AC-FT 72380
WTR YR 1991 TOTAL 38429 MEAN 105 MAX 647 MIN 41 AC-FT 76220

e Estimated

06078000 SMITH RIVER AT TRULY, MT

LOCATION.--Lat 47°21'00", long 111°26'00", near center of sec.35, T.19 N., R.2 E., Cascade County, Hydrologic Unit 10030103, at site of former gaging station, at county bridge at former post office at Truly, 6 mi southeast of Ulm, amd 6 mi upstream from mouth.

DRAINAGE AREA.--2006 mi^2.

PERIOD OF RECORD.--August to September 1991 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRESSURE (MM OF HG) (00025)
AUG								
08...	1015	102	0	0	359	32.0	21.0	681
SEP								
04...	1145	44	0	0	375	20.0	15.0	684

DATE	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	PH (STANDARD UNITS) (00400)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	LITHIUM DISSOLVED (UG/L AS LI) (01130)
AUG							
08...	7.9	100	8.4	3.7	1	2	<10
SEP							
04...	9.1	101	8.4	4.7	2	2	10

MISSOURI RIVER MAIN STEM

06078200 MISSOURI RIVER NEAR ULM, MT

LOCATION.--Lat 47°26'06", long 111°23'07", in NE1/4NW1/4NW1/4 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^2.

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

GAGE.--Water-stage recorder. Datum of gage is 3,313.27 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Dec. 15 to Feb. 13, Mar. 2-4. 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.

AVERAGE DISCHARGE.--34 years, 6,542 ft^3/s, 4,740,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,500 ft^3/s, May 24, 1981, gage height, 14.99 ft; minimum daily, 1,700 ft^3/s, June 17, 1961.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1953 reached a stage of about 17 ft; discharge, 35,000 ft^3/s. Flood in June 1948 reached a stage of about 16 ft; discharge, 32,000 ft^3/s, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 16,800 ft^3/s, June 13, gage height, 10.87 ft; minimum daily, 2,980 ft^3/s, Mar. 15, 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3970	3390	3310	e5400	e5200	3600	3250	4170	6730	8150	4610	4600
2	3940	3370	3330	e5400	e5200	e3800	3320	4000	6660	8120	4530	4530
3	3910	3410	3560	e5400	e5000	e3900	3350	3980	6570	8000	4500	4540
4	3980	3440	4270	e5400	e5000	e4000	3370	3980	6560	7880	4440	4580
5	3730	3430	4440	e5400	e4800	4000	3420	3890	7090	7740	4380	4570
6	3420	3470	4340	e5400	e4800	3970	3410	3840	7960	7630	4350	4590
7	3670	3510	4350	e5300	e4800	4000	3470	3910	9180	7440	4320	4550
8	3720	3440	4460	e5200	e4800	3930	3620	4180	10400	6970	4320	4510
9	3680	3530	4330	e5200	e4800	3890	3710	4600	11400	6470	4320	4620
10	3530	3450	4330	e5200	e4700	3690	3650	5010	11400	7160	4320	4700
11	3480	3380	4370	e5200	e4500	3530	3620	5120	12500	7300	4360	4690
12	3440	3320	4390	e5400	e4400	3300	3910	5840	14500	7060	4420	4710
13	3250	3400	4560	e5400	e4400	3030	3990	6930	16500	6660	4470	4770
14	3200	3340	4680	e5400	4350	2990	3680	6870	16400	6180	4480	4740
15	3240	3350	e4700	e5400	4380	2980	3530	7250	15500	6050	4590	4770
16	3240	3350	e4600	e5400	4330	2980	3430	7620	14000	6000	4630	4800
17	3260	3370	e4550	e5200	4290	3040	3560	7630	10900	5960	4640	4740
18	3350	3360	e4400	e5200	4360	3050	3580	8220	8110	5850	4660	4590
19	3340	3350	e4900	e5200	4480	3010	3540	9260	7130	5740	4620	4590
20	3300	3380	e5400	e5200	4430	3050	3440	10200	7020	5400	4630	4580
21	3380	3410	e5500	e5200	4350	3130	3560	10300	8020	5210	4600	4500
22	3330	3500	e5800	e5200	4230	3250	3780	9830	9300	5090	4570	4450
23	3300	3470	e5800	e5200	3940	3340	4080	9380	9680	5050	4570	4490
24	3330	3320	e5600	e5200	4130	3380	4390	9010	9250	5080	4570	4490
25	3320	3310	e5400	e5200	3860	3330	4760	8790	8710	5140	4580	4540
26	3310	3360	e5400	e5200	3810	3260	4990	8680	8490	5290	4560	4590
27	3300	3410	e5400	e5200	3790	3190	4760	8200	8450	5490	4540	4530
28	3410	3360	e5400	e5200	3750	3120	4590	7740	8370	5460	4670	4460
29	3360	3430	e5400	e5200	---	3130	4440	7300	8170	5370	4640	4290
30	3380	3340	e5400	e5200	---	3150	4280	6950	8160	5250	4660	4300
31	3390	---	e5400	e5200	---	3170	---	6800	---	5010	4650	---
TOTAL	107460	101950	147770	163500	124880	105190	114480	209480	293110	195200	140200	137410
MEAN	3466	3398	4767	5274	4460	3393	3816	6757	9770	6297	4523	4580
MAX	3980	3530	5800	5400	5200	4000	4990	10300	16500	8150	4670	4800
MIN	3200	3310	3310	5200	3750	2980	3250	3840	6560	5010	4320	4290
AC-FT	213100	202200	293100	324300	247700	208600	227100	415500	581400	387200	278100	272600

CAL YR 1990 TOTAL 1619490 MEAN 4437 MAX 7150 MIN 2990 AC-FT 3212000
WTR YR 1991 TOTAL 1840630 MEAN 5043 MAX 16500 MIN 2980 AC-FT 3651000

e Estimated

SUN RIVER BASIN

06078500 NORTH FORK SUN RIVER NEAR AUGUSTA, MT

LOCATION.--Lat 47°38'27", long 112°51'34", in SW1/4SW1/4SW1/4 sec.23, T.22 N., R.10 W., Teton County, Hydrologic Unit 10030104, on left bank 400 ft upstream from Arsenic Creek, 1 mi upstream from South Fork and Gibson Reservoir, and 25 mi northwest of Augusta.

DRAINAGE AREA.--258 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1911 to September 1912, October 1945 to September 1967, May 1989 to current year (seasonal records only). Monthly discharge only for some periods, published in WSP 1309. Prior to October 1959, published as North Fork of North Fork Sun River near Augusta.

GAGE.--Water-stage recorder. Datum of gage is 4,785.72 ft above National Geodetic Vertical Datum of 1929, levels by U.S. Bureau of Reclamation. May 27, 1911, to Sept. 30, 1912, staff gage near present site at different datum. Oct. 1, 1945, to July 22, 1946, wire-weight gage at site three-quarters of a mile downstream at different datum. July 23, 1946, to June 8, 1964, water-stage recorder at present site and datum. Sept. 12, 1964 to Sept. 30, 1968, water-stage recorder at present site and datum.

REMARKS.--Estimated daily discharges: Apr. 1, Aug. 28 to Sept. 4. Water-discharge records fair. No known regulation or diversion upstream of station. U.S. Bureau of Reclamation satellite telemeter at station.

AVERAGE DISCHARGE.--24 years (1912, 1946-68), 361 ft^3/s, 19.00 in/yr, 261,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 51,100 ft^3/s, June 8, 1964, gage height, 15.82 ft, from floodmark, from slope-area measurement of peak flow; minimum, 27 ft^3/s, Nov. 21, 1949.

EXTREMES FOR CURRENT SEASON.--Peak discharges greater than base discharge of 1,250 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 19	0145	a*6,620	*8.71	June 21	0745	2,950	5.38
June 4	0145	2,870	5.34	June 30	1300	2,720	5.01

a-- from rating curve extended above 3,150 ft^3/s.

Minimum discharge, 103 ft^3/s, Oct. 1, gage height, 0.38 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	104						e140	478	1950	2280	382	e160
2	114						160	428	2300	2050	358	e155
3	113						191	400	2650	1990	321	e155
4	157						236	383	2640	2030	304	e155
5	244						298	371	2410	2000	294	150
6	222						367	476	2420	1780	290	143
7	177						344	710	2470	1460	282	143
8	158						327	886	2350	1270	273	148
9	149						299	1080	2180	1200	266	162
10	160						287	917	2240	1160	270	148
11	166						268	1190	2390	1100	294	140
12	157						254	1830	2370	1030	263	136
13	165						244	1750	1980	982	251	134
14	156						252	2000	1670	961	243	141
15	155						244	1990	1310	898	233	139
16	174						232	2100	1210	852	224	133
17	164						221	2290	1130	812	215	137
18	155						211	3170	1060	756	215	132
19	169						215	5130	1130	684	203	128
20	161						293	3320	1900	626	195	125
21	155						388	2850	2690	584	189	125
22	197						527	2690	2330	549	185	128
23	178						849	2720	2120	529	182	124
24	166						1080	2640	2030	510	180	121
25	178						988	2670	1840	497	177	118
26	280						784	2220	1750	472	176	118
27	286						668	1910	1730	445	175	117
28	263						543	1770	1750	415	e180	116
29	261						503	1590	1820	390	e180	115
30	243						492	1640	2560	367	e170	114
31	248						---	1680	---	347	e165	---
TOTAL	5675						11905	55279	60380	31026	7335	4060
MEAN	183						397	1783	2013	1001	237	135
MAX	286						1080	5130	2690	2280	382	162
MIN	104						140	371	1060	347	165	114
AC-FT	11260						23610	109600	119800	61540	14550	8050
CFSM	.71						1.54	6.91	7.80	3.88	.92	.52
IN.	.82						1.72	7.97	8.71	4.47	1.06	.59

e Estimated

SUN RIVER BASIN

06078500 NORTH FORK SUN RIVER NEAR AUGUSTA, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1989 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
25...	1145	179	--	--	275	19.5	2.0	--	--	--
APR										
02...	1150	159	--	--	287	7.0	3.0	--	--	--
30...	1310	478	--	--	266	8.0	3.5	11	14	89
MAY										
15...	1310	1760	--	--	220	15.0	5.0	76	361	78
21...	1540	2780	--	--	219	19.0	6.5	363	2720	80
JUN										
13...	1410	1910	--	--	207	14.0	7.0	57	294	74
JUL										
10...	1400	1130	--	--	--	--	--	14	43	69
29...	1310	214	--	--	267	23.0	12.0	--	--	--
AUG										
19...	1240	207	20	1	291	18.0	10.5	8	4.5	93

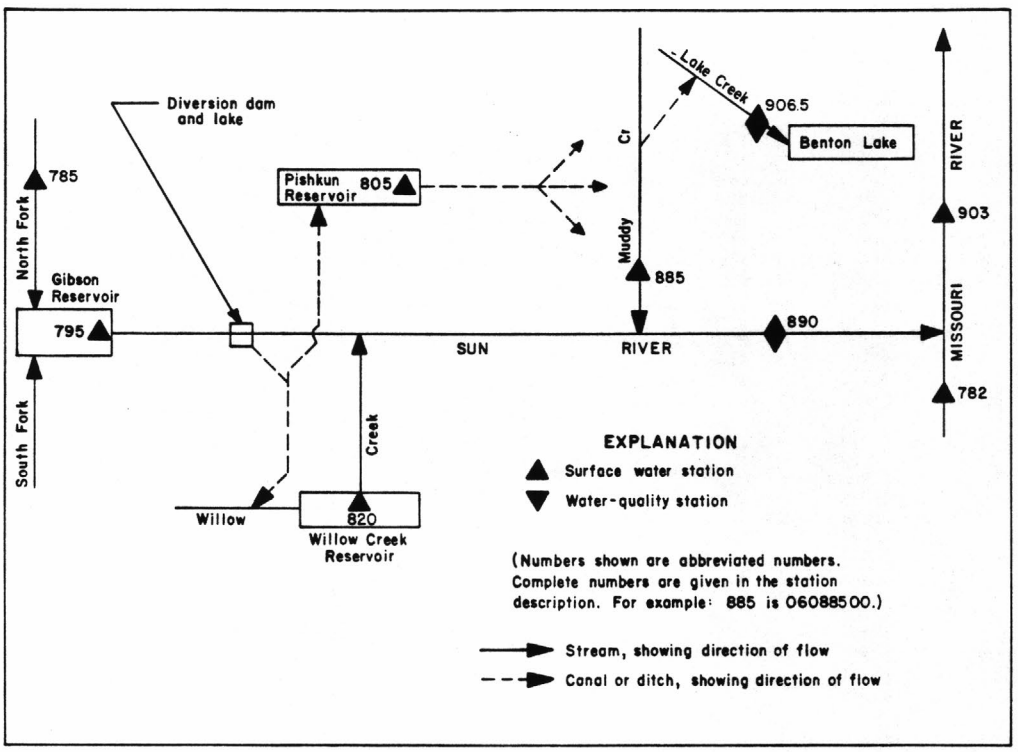

Figure 11.--Schematic diagram showing diversions and storage in Sun River Basin

SUN RIVER BASIN

06088500 MUDDY CREEK AT VAUGHN, MT

LOCATION.--Lat 47°33'42", long 111°32'33", in SE1/4SW1/4NE1/4 sec.24, T.21 N., R.1 E., Cascade County, Hydrologic Unit 10030104, on right bank at Vaughn, and at river mile 1.3.

DRAINAGE AREA.--314 mi^2.

PERIOD OF RECORD.--May 1925 to February 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. Datum of gage is 3,337.64 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). May 21, 1925 to Feb. 8, 1926, nonrecording gage at site 500 ft downstream at different datum. Apr. 19, 1925 to Sept. 30, 1955, at present site at datum 1.00 ft higher. 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 30 ft downstream at present datum.

REMARKS.--Estimated daily discharges: Nov. 5-8, Nov. 20 to Mar. 11, Mar. 25-29. Records fair 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. Several observations of water discharge and specific conductance were made during the year.

AVERAGE DISCHARGE.--54 years (1934-68, 1971-91), 127 ft^3/s, 92,010 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,600 ft^3/s, June 4, 1953, gage height, 17.7 ft, present datum, from floodmarks, from rating curve extended above 3,000 ft^3/s on basis of slope-area measurement of peak flow; minimum, 2.0 ft^3/s, Mar. 16, 17, 1972, gage height, 1.20 ft, result of ice jams upstream.

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

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,060 ft^3/s, June 21, gage height, 7.20 ft; minimum daily, 15 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	120	59	e40	e30	e35	e35	31	33	178	336	341	156
2	114	60	e40	e28	e40	e40	29	33	134	325	356	159
3	106	60	e42	e27	e50	e40	29	27	161	309	306	141
4	106	61	e45	e26	e60	e35	27	30	284	260	287	166
5	99	e60	e43	e26	e55	e32	26	26	353	320	265	154
6	81	e55	e42	e25	e55	e32	25	24	537	331	270	134
7	79	e60	e50	e25	e60	e32	24	22	320	289	295	186
8	77	e62	e55	e25	e60	e33	25	31	256	288	275	225
9	75	62	e55	e26	e55	e34	24	145	396	209	268	233
10	71	59	e52	e27	e55	e35	24	130	311	267	267	247
11	68	57	e50	e28	e55	e33	37	159	188	235	230	232
12	68	55	e50	e29	e60	32	42	222	181	219	226	219
13	66	53	e49	e30	e55	33	58	118	162	245	263	211
14	66	49	e48	e31	e55	33	48	52	128	275	266	224
15	65	48	e47	e32	e55	31	43	36	152	302	244	225
16	67	47	e46	e32	e55	31	44	62	122	254	250	218
17	67	51	e45	e31	e50	31	58	99	125	261	280	195
18	66	49	e40	e30	e45	30	82	97	110	324	296	187
19	65	47	e30	e29	e50	34	69	148	114	404	282	190
20	64	e47	e20	e28	e50	35	58	236	363	356	250	190
21	63	e45	e15	e27	e50	34	51	208	861	288	215	183
22	64	e48	e18	e26	e48	39	47	150	637	324	185	171
23	61	e45	e20	e26	e45	37	44	94	581	332	194	164
24	61	e40	e25	e25	e45	33	41	138	571	343	189	177
25	61	e37	e30	e25	e48	e32	40	191	390	292	154	189
26	61	e35	e35	e26	e48	e30	38	176	390	271	152	186
27	59	e40	e40	e26	e45	e30	38	126	397	308	194	164
28	57	e45	e30	e24	e30	e32	40	115	338	274	215	162
29	54	e42	e20	e22	---	e34	38	227	315	255	210	151
30	57	e40	e30	e25	---	35	37	195	300	224	192	160
31	59	---	e40	e30	---	33	---	194	---	261	161	---
TOTAL	2247	1518	1192	847	1414	1040	1217	3544	9355	8981	7578	5599
MEAN	72.5	50.6	38.5	27.3	50.5	33.5	40.6	114	312	290	244	187
MAX	120	62	55	32	60	40	82	236	861	404	356	247
MIN	54	35	15	22	30	30	24	22	110	209	152	134
AC-FT	4460	3010	2360	1680	2800	2060	2410	7030	18560	17810	15030	11110

CAL YR 1990 TOTAL 40298 MEAN 110 MAX 448 MIN 15 AC-FT 79930
WTR YR 1991 TOTAL 44532 MEAN 122 MAX 861 MIN 15 AC-FT 88330

e Estimated

SUN RIVER BASIN

06089000 SUN RIVER NEAR VAUGHN, MT

LOCATION.--Lat 47°31'37", long 111°29'05", in NW1/4SE1/4SW1/4 sec.33, T.21 N., R.2 E., Cascade County, Hydrologic Unit 10030104, on right bank 3.7 mi downstream from Muddy Creek, 3.6 mi southeast of Vaughn, and at river mile 13.6.

DRAINAGE AREA.--1,854 mi^2.

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. Datum of gage is 3,317.12 ft above National Geodetic Vertical Datum of 1929. July 11 to Oct. 30, 1897, nonrecording gage at site 0.8 mi upstream at different datum. Apr. 19 to Aug. 3, 1934, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Nov. 6-7, Nov. 25 to Feb. 19, Feb. 28 to Mar. 8. Water-discharge records good except those for June 12 to July 11, which are fair, and those for estimated daily discharges, which are poor. Flow regulated by Gibson, Pishkun, Willow Creek, and Nilan Reservoir Diversion for irrigation of about 110,000 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--57 years, 707 ft^3/s, 512,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 53,500 ft^3/s, June 9, 1964, 42,200 ft^3/s in main channel, plus 11,300 ft^3/s in bypass channel, gage height, 23.4 ft, from floodmark; minimum, 20 ft^3/s, Apr. 24, 1944.

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.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,240 ft^3/s, May 22, gage height, 10.55 ft; minimum daily, 200 ft^3/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	345	277	e550	e400	e600	e250	424	840	3350	3920	752	570
2	317	279	e520	e350	e800	e280	418	749	3600	4120	949	596
3	308	276	e500	e330	e700	e350	411	917	4160	3920	815	615
4	313	275	e550	e320	e650	e450	409	973	4790	3200	817	651
5	300	288	e600	e310	e600	e420	404	1200	5290	2920	808	573
6	309	e270	e580	e300	e550	e400	407	1340	5720	2920	800	555
7	321	e250	e550	e300	e500	e390	426	1550	5880	2760	868	605
8	318	278	e600	e300	e450	e380	433	1710	5740	2010	850	589
9	316	300	e650	e320	e420	365	428	1810	5670	1580	813	638
10	306	346	e580	e360	e400	355	426	1840	5220	1490	845	694
11	309	433	e520	e450	e380	350	462	1900	4930	1150	809	658
12	308	457	e500	e550	e370	336	507	2180	4850	919	845	589
13	307	462	e480	e500	e360	336	497	2300	4600	732	951	558
14	305	460	e470	e450	e360	338	492	2410	3870	704	977	578
15	305	459	e470	e400	e350	336	489	2560	3210	780	982	613
16	309	457	e460	e390	e350	347	497	2490	2760	677	989	589
17	307	477	e450	e400	e350	358	535	2500	2510	637	1010	522
18	301	532	e350	e430	e340	344	583	2560	2200	662	996	481
19	296	536	e300	e400	e350	340	564	3100	1730	791	991	479
20	291	547	e250	e380	352	386	539	4430	1760	792	917	487
21	284	530	e220	e360	353	418	529	6200	3140	668	809	470
22	283	547	e200	e350	354	439	522	6990	3300	709	634	471
23	282	542	e250	e350	348	436	543	6230	4850	728	610	481
24	282	537	e350	e340	342	426	654	6140	4960	742	700	454
25	282	e510	e400	e330	347	431	711	5960	4720	673	695	453
26	279	e450	e430	e320	342	379	782	5990	4470	708	677	515
27	275	e400	e450	e320	348	421	790	5370	4030	776	706	459
28	270	e450	e400	e300	e300	489	938	4440	4170	710	755	437
29	267	e500	e300	e310	---	454	941	3830	4020	648	765	420
30	270	e600	e250	e350	---	433	930	3370	3750	584	681	444
31	272	---	e300	e400	---	427	---	3260	---	624	619	---
TOTAL	9237	12725	13480	11370	11966	11864	16691	97139	123250	44254	25435	16244
MEAN	298	424	435	367	427	383	556	3134	4108	1428	820	541
MAX	345	600	650	550	800	489	941	6990	5880	4120	1010	694
MIN	267	250	200	300	300	250	404	749	1730	584	610	420
AC-FT	18320	25240	26740	22550	23730	23530	33110	192700	244500	87780	50450	32220

CAL YR 1990 TOTAL 263975 MEAN 723 MAX 4730 MIN 200 AC-FT 523600
WTR YR 1991 TOTAL 393655 MEAN 1079 MAX 6990 MIN 200 AC-FT 780800

e Estimated

06089000 SUN RIVER NEAR VAUGHN, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

LOCATION.--Samples collected at county bridge 1.8 mi downstream from gaging station.

PERIOD OF RECORD.--Water years 1969 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1968 to current year.
WATER TEMPERATURE: October 1968 to September 1979.

REMARKS.--Unpublished records of once-daily water temperature are available in files of District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 2,610 microsiemens, Apr. 8, 1977; minimum daily, 214 microsiemens, June 8, 1970.
WATER TEMPERATURE (water years 1969-79): Maximum daily, 28.0°C, Aug. 11, 27, 1969, Aug. 16, 1977; minimum daily, 0.0°C on many days during winter.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum daily, 1,170 microsiemens, Apr. 19; minimum daily, 277 microsiemens, May 26.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT												
04...	1245	315	--	--	723	22.0	12.0	--	--	--	--	--
15...	1045	306	30	1	752	8.0	9.0	675	11.8	116	K7	20
DEC												
11...	0945	510	75	3	550	1.0	0.0	670	11.8	92	K8	64
MAR												
05...	0930	418	90	1	643	-8.0	0.0	665	12.6	99	K5	K12
13...	1615	330	--	--	640	8.0	3.0	--	--	--	--	--
APR												
05...	1110	404	90	1	555	19.0	10.5	--	--	--	--	--
25...	1500	735	--	--	554	7.0	10.0	--	--	--	--	--
MAY												
07...	1300	1620	80	1	370	10.0	11.0	675	9.6	99	98	110
20...	1310	4410	--	--	342	23.0	12.0	--	--	--	--	--
21...	1120	6170	--	--	305	18.0	8.5	--	--	--	--	--
22...	1045	6990	--	--	296	19.0	10.0	--	--	--	--	--
24...	1140	6320	--	--	291	19.5	10.0	--	--	--	--	--
29...	1510	3770	--	--	311	20.0	10.5	--	--	--	--	--
JUN												
11...	1300	4910	80	1	284	21.0	13.0	669	8.9	96	73	120
JUL												
12...	0920	936	0	0	490	21.0	19.5	--	--	--	--	--
24...	1200	745	0	0	563	25.0	20.5	--	--	--	--	--
AUG												
23...	1010	605	--	--	533	24.0	21.0	--	--	--	--	--
SEP												
10...	1030	700	30	1	592	17.0	13.0	677	9.9	106	130	230

SUN RIVER BASIN

06089000 SUN RIVER NEAR VAUGHN, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	BICARBONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CARBONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STANDARD UNITS) (00400)	TURBIDITY (NTU) (00076)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)
OCT												
15...	1045	107	0	88	8.2	1.3	350	66	44	41	1	2.0
DEC												
11...	0945	239	0	195	8.2	5.5	250	56	27	23	0.6	1.3
MAR												
05...	0930	233	0	188	8.3	19	270	58	31	32	0.8	1.3
APR												
05...	1110	--	--	--	--	--	260	58	27	24	0.7	1.3
MAY												
07...	1300	173	5	150	8.4	56	180	47	15	8.6	0.3	1.1
JUN												
11...	1300	134	4	115	8.4	56	140	36	11	6.1	0.2	0.90
JUL												
12...	0920	--	--	--	--	--	220	52	22	20	0.6	1.7
24...	1200	--	--	--	--	--	260	53	30	23	0.6	1.8
SEP												
10...	1030	257	5	217	8.6	8.5	280	59	31	26	0.7	1.9

DATE	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRATE TOTAL (MG/L AS N) (00620)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)
OCT												
15...	250	160	7.6	0.4	6.3	481	385	0.65	397	0.99	0.01	<0.01
DEC												
11...	198	110	4.3	0.2	5.7	344	348	0.47	474	0.69	0.01	<0.01
MAR												
05...	187	160	4.5	0.3	5.1	396	411	0.54	447	--	<0.01	<0.01
APR												
05...	151	130	3.5	0.3	3.9	--	339	0.46	369	--	--	--
MAY												
07...	154	48	2.6	0.2	5.1	197	218	0.27	862	0.11	0.03	<0.01
JUN												
11...	124	25	0.3	0.2	4.9	161	155	0.22	2130	0.08	0.03	0.02
JUL												
12...	185	79	4.5	0.2	4.8	--	295	0.40	746	--	--	--
24...	210	98	5.3	0.4	4.8	--	342	0.47	688	--	--	--
SEP												
10...	222	110	5.3	0.4	6.4	355	374	0.48	671	0.50	0.01	<0.01

DATE	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT											
15...	1.00	1.00	0.02	0.01	<0.01	<0.01	<0.01	0.01	46	38	73
DEC											
11...	0.70	0.70	0.03	0.03	0.02	<0.01	<0.01	<0.01	18	25	96
MAR											
05...	0.78	0.76	0.01	0.02	0.02	<0.01	<0.01	<0.01	30	34	95
APR											
05...	--	--	--	--	--	<0.01	--	--	--	--	--
MAY											
07...	0.14	0.13	0.04	0.01	0.15	<0.01	0.01	<0.01	324	1420	74
JUN											
11...	0.11	0.09	0.03	0.01	0.09	<0.01	0.03	<0.01	229	3040	61
JUL											
12...	--	--	--	--	--	<0.01	--	--	--	--	--
24...	--	--	--	--	--	0.03	--	--	--	--	--
SEP											
10...	0.51	0.52	0.01	0.01	0.04	<0.01	<0.01	<0.01	66	125	89

SUN RIVER BASIN

06089000 SUN RIVER NEAR VAUGHN, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)
OCT											
15...	1045	20	<1	95	<0.5	<1	4	<3	3	18	1
MAR											
05...	0930	<10	<1	80	<0.5	<1	<1	<3	2	4	<1
JUN											
11...	1300	<10	<1	72	<0.5	<1	<1	<3	2	15	1
SEP											
10...	1030	<10	<1	90	<0.5	<1	<1	<3	2	<3	<1

DATE	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
OCT										
15...	39	7	<0.1	<10	1	<1	<1.0	690	<6	7
MAR										
05...	25	7	<0.1	<10	1	2	<1.0	480	<6	<3
JUN										
11...	7	6	<0.1	<10	1	<1	<1.0	170	<6	9
SEP										
10...	28	3	<0.1	<10	<1	<1	<1.0	490	<6	<3

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	745	780	567	606	528	644	595	464	303	342	566	545
2	760	761	574	570	649	659	592	530	303	318	580	534
3	749	783	566	569	636	649	578	444	295	349	585	542
4	745	779	575	573	677	633	574	445	291	325	565	549
5	731	777	544	570	637	647	568	418	458	327	561	544
6	756	737	551	575	691	618	564	410	459	411	540	566
7	751	809	555	574	681	707	540	378	444	321	538	581
8	752	845	550	570	646	711	542	373	344	411	538	609
9	748	837	542	578	645	672	752	380	315	433	535	604
10	752	764	554	581	675	612	539	382	303	451	530	607
11	745	692	552	568	703	629	739	581	293	492	542	608
12	755	627	553	568	585	650	599	579	288	520	540	606
13	778	611	593	572	692	655	750	427	284	586	540	610
14	768	598	629	576	619	652	719	385	297	585	536	599
15	763	595	639	565	731	637	728	356	320	574	537	610
16	761	589	665	580	692	643	787	374	319	592	519	602
17	762	604	652	566	689	652	782	359	334	601	515	612
18	744	570	605	691	727	647	941	334	351	612	501	648
19	762	560	606	692	722	650	1170	335	400	581	496	642
20	765	565	607	576	634	598	1110	337	567	559	508	639
21	768	543	---	690	689	595	938	318	846	593	505	642
22	768	582	599	688	651	567	808	304	659	607	514	641
23	767	546	562	674	649	604	733	291	361	582	496	643
24	760	532	564	704	686	594	609	291	357	577	531	648
25	768	529	---	689	672	587	559	284	349	593	498	635
26	763	543	568	674	624	533	523	277	413	602	515	630
27	772	600	571	704	647	528	487	298	365	605	528	621
28	783	594	574	740	656	581	483	299	340	581	526	664
29	772	577	608	674	---	619	477	309	351	594	531	646
30	776	577	565	741	---	610	469	338	347	597	524	665
31	769	---	606	740	---	601	---	338	---	597	537	---
MEAN	760	650	583	627	662	625	675	375	379	513	532	610

WTR YR 1991 MEAN 582 MAX 1170 MIN 277

MISSOURI RIVER MAIN STEM

06090300 MISSOURI RIVER NEAR GREAT FALLS, MT

LOCATION.--Lat 47°35'04", long 111°03'35", in SW1/4SE1/4SW1/4 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^2.

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

GAGE.--Water-stage recorder. Datum of gage is 2,807.21 ft National Geodetic Vertical Datum of 1929. Prior to July 27, 1977, nonrecording gage at same site at 2.00 ft lower datum. July 27, 1977 to May 26, 1987, at site 600 ft upstream at datum 2.00 ft lower. 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 datum of gage at National Geodetic Vertical Datum of 1929 (level by Montana Power Company).

REMARKS.--Estimated daily discharges: June 4-5. Records fair. 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. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--35 years, 7,711 ft^3/s, 5,587,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 72,000 ft^3/s, June 10, 1964, from hydrographic comparison with nearby stations; minimum, about 1.0 ft^3/s, Apr. 16, 1962, powerplant shutdown; minimum daily, 1,760 ft^3/s, Apr. 16, 1961. Flood of June 10, 1964, is the highest since 1908.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 21,300 ft^3/s, June 13, gage height, 6.43 ft; minimum daily, 2,980 ft^3/s, Dec. 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5030	5150	4660	5750	6020	4510	4610	6260	11000	11600	6490	5430
2	4550	4830	4420	6520	6080	3500	4660	5910	10900	11600	6570	5420
3	4650	4330	4380	6660	6310	4520	4750	6000	11300	11600	6390	5580
4	4770	4360	5230	6600	6050	6530	4830	5860	e12000	10700	6200	5450
5	4610	4540	5680	6430	5790	5470	4670	6210	e13000	9940	6210	5510
6	4240	4420	5730	6530	5770	5290	4800	6460	13900	9950	6160	5380
7	4230	4370	5740	6320	5910	5280	4910	6240	15400	9730	6250	5540
8	4520	4110	5840	6300	5960	5180	4860	6820	15900	8910	6070	5470
9	4460	4440	5550	6420	6040	5150	5120	7450	17200	7450	6060	5570
10	4350	4320	5560	6220	6180	5030	5020	8010	16500	7760	5980	5690
11	4340	4430	5700	6380	6060	4720	5170	8230	16600	8380	5950	5800
12	4210	4410	5350	6660	6230	4790	5260	8930	18100	7980	6020	5660
13	4010	4530	5590	6820	6300	4390	5320	10700	19700	7830	5760	5670
14	4010	4650	5400	6870	5520	4330	5330	10400	19300	7220	5460	5730
15	3990	4130	5060	6570	5590	4310	5070	11300	17800	6850	5610	5810
16	3980	4120	5050	6740	5460	4190	4960	11700	16500	6800	5240	5900
17	4090	3750	5000	6420	5600	4510	5030	11700	14100	6870	5910	5910
18	4000	3710	4480	6340	5400	4440	5270	12000	10900	6850	5880	5600
19	4150	3890	2980	6250	5240	4330	5160	13100	9490	6830	5700	5370
20	4040	4640	3060	6240	5720	4280	5040	15300	8880	6860	5740	5520
21	4200	4750	3550	5910	5610	4450	5000	16700	10300	6480	5640	5560
22	4050	4590	4360	5970	5780	4710	5140	17700	12400	6410	5680	5410
23	4120	4660	5140	5920	5230	4660	5400	16400	14100	6470	5480	5400
24	4140	4580	6090	5990	5330	4780	5930	15600	14200	6320	5320	5820
25	4130	4630	6210	5860	5090	4970	6190	15500	13300	6570	5590	5340
26	4140	4390	6600	5830	4980	4650	6910	15300	12900	6650	5510	5930
27	4060	4490	6380	5740	5010	4470	6800	14700	12300	7070	5930	5740
28	4240	4310	6580	5670	5210	4760	6640	13300	12300	7090	5550	5810
29	4140	4590	6270	5670	---	4560	6550	12200	12300	6910	5370	5670
30	4480	4820	5810	5390	---	4550	6370	11500	11700	6850	5740	5170
31	5340	---	5730	5460	---	4620	---	11000	---	6850	5400	---
TOTAL	133270	132940	163180	192450	159470	145930	160770	338480	414270	245380	180860	167860
MEAN	4299	4431	5264	6208	5695	4707	5359	10920	13810	7915	5834	5595
MAX	5340	5150	6600	6870	6310	6530	6910	17700	19700	11600	6570	5930
MIN	3980	3710	2980	5390	4980	3500	4610	5860	8880	6320	5240	5170
AC-FT	264300	263700	323700	381700	316300	289500	318900	671400	821700	486700	358700	333000

CAL YR 1990 TOTAL 2164200 MEAN 5929 MAX 13000 MIN 2980 AC-FT 4293000
WTR YR 1991 TOTAL 2434860 MEAN 6671 MAX 19700 MIN 2980 AC-FT 4830000

e Estimated

MISSOURI RIVER BASIN

06090650 LAKE CREEK NEAR POWER, MT

LOCATION.--Lat 47°42'29", long 111°24'30", in NE1/4SE1/4NE1/4 sec.36, T.23 N., R.2 E., Teton County, Hydrologic Unit 10030102, on left bank 10 ft upstream from county bridge, 1.9 mi upstream from Benton Lake, and 13 mi east of Power.

DRAINAGE AREA.--Indeterminate.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1990 to current year (seasonal records only).

GAGE.--Water-stage recorder and artificial control. Elevation of gage is 3,630 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Mar. 1-18. Water-discharge records fair except those less than 5.0 ft^3/s, which are poor. Flows from Muddy Creek diverted into Lake Creek, seasonally, most years.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 113 ft^3/s, June 6, 1991, gage height, 5.07 ft; no flow many days.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 113 ft^3/s, June 6, gage height, 5.07 ft; no flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.35					e.30	.39	.20	39	.92	.00	35
2	.29					e.40	.30	.18	37	.80	.00	35
3	.22					e.50	.18	9.0	37	.70	.00	35
4	.25					e.80	.12	10	37	.61	.00	34
5	.42					e.70	.10	10	48	.45	.00	37
6	.38					e.50	.09	9.9	100	.36	.00	37
7	.50					e.40	.07	9.7	65	.25	.00	37
8	.41					e.30	.09	9.6	42	.20	.00	37
9	.39					e.40	.10	9.2	35	.16	.00	37
10	.39					e.50	.11	12	34	.17	.00	37
11	.37					e.50	.24	24	37	.15	.00	36
12	.48					e.40	.70	26	35	.12	.00	36
13	.67					e.30	15	28	34	.10	.00	36
14	.63					e.30	8.3	38	33	.08	.00	36
15	.61					e.30	3.0	32	33	.07	.00	36
16	.55					e.30	1.2	37	29	.06	.00	36
17	.48					e.40	11	36	33	.06	.00	36
18	.50					e.40	31	35	28	.04	.00	36
19	.49					.42	11	36	18	.03	.00	35
20	.46					.42	6.1	35	8.3	.02	.32	35
21	.52					.42	2.6	34	77	.00	36	35
22	.57					.44	1.2	34	29	.00	39	35
23	.49					.48	.69	28	13	.00	38	35
24	.48					.42	.46	27	4.1	.00	37	35
25	.51					.38	.25	37	2.7	.00	37	35
26	.51					.31	.20	37	2.1	.00	37	35
27	.42					.31	.19	36	1.6	.00	37	35
28	.47					.34	.27	37	1.3	.00	37	35
29	.48					.50	.30	37	1.1	.00	36	35
30	.53					.62	.27	37	1.0	.00	36	35
31	.57					.53	---	39	---	.00	36	---
TOTAL	14.39					13.29	95.52	789.78	895.2	5.35	406.32	1069
MEAN	.46					.43	3.18	25.5	29.8	.17	13.1	35.6
MAX	.67					.80	31	39	100	.92	39	37
MIN	.22					.30	.07	.18	1.0	.00	.00	34
AC-FT	29					26	189	1570	1780	11	806	2120

e Estimated

MISSOURI RIVER BASIN

06090650 LAKE CREEK NEAR POWER, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1990 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	PH (STAND-ARD UNITS) (00400)
NOV											
05...	1115	--	--	--	7200	-2.0	0.0	--	--	--	--
16...	1010	0.07	5	1	9600	4.5	1.0	--	--	--	6.5
MAR											
05...	1800	0.69	--	--	7080	-3.0	0.0	--	--	--	--
APR											
03...	0900	0.18	100	2	6950	7.0	5.0	670	9.7	89	5.9
04...	1820	0.10	--	--	1980	14.0	10.0	--	--	--	--
18...	1410	35	100	3	1360	4.0	4.5	671	11.0	97	6.3
19...	1250	7.6	60	1	2280	7.0	7.0	--	--	--	6.4
25...	0920	0.41	--	--	9450	7.0	6.5	--	--	--	--
30...	1140	0.30	60	1	9600	11.5	6.5	672	9.8	94	5.2
MAY											
08...	0850	9.8	--	--	2010	10.0	11.0	--	--	--	--
23...	1015	24	--	--	1020	16.5	15.5	--	--	--	--
JUN											
14...	1015	34	10	1	905	16.5	15.0	667	8.8	100	8.5
21...	1015	90	--	--	1070	--	--	--	--	--	7.1
22...	1000	30	--	--	2000	--	--	--	--	--	6.8
JUL											
11...	2015	0.06	--	--	9650	26.0	23.0	--	--	--	--
AUG											
22...	1540	39	--	--	790	32.0	22.0	--	--	--	--
SEP											
10...	1100	37	10	1	665	24.5	12.0	668	9.2	98	8.6

DATE	TIME	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)
NOV												
16...	1010	--	--	--	--	--	--	--	--	--	--	--
APR												
03...	0900	3100	230	610	850	7	8.8	7.0	4300	280	2.5	5.1
18...	1410	500	40	96	100	2	6.6	18	710	24	0.7	6.5
30...	1140	4700	290	960	1300	8	15	3.0	7000	310	4.3	6.1
JUN												
14...	1015	360	48	58	62	1	2.1	221	250	8.3	0.7	5.3
SEP												
10...	1100	310	43	48	31	0.8	2.2	253	120	8.4	0.6	6.6

MISSOURI RIVER BASIN

06090650 LAKE CREEK NEAR POWER, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, TOTAL RECOV-ERABLE (UG/L AS B) (01022)	BORON, DIS-SOLVED (UG/L AS B) (01020)
NOV												
16...	--	--	--	--	--	--	--	--	--	--	--	--
APR												
03...	6630	9.01	3.22	74.8	0.16	75.0	0.68	<0.01	<1	<1	550	530
18...	1020	1.39	96.8	6.68	0.02	6.7	0.08	0.01	4	<1	160	130
30...	9920	13.5	8.03	5.73	0.17	5.9	0.44	<0.01	<1	<1	540	480
JUN												
14...	577	0.79	53.0	2.29	0.01	2.3	0.03	0.02	2	<1	70	130
SEP												
10...	420	0.57	42.0	1.89	0.01	1.9	0.01	<0.01	2	1	160	120

DATE	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, TOTAL (UG/L AS SE) (01147)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
NOV												
16...	--	--	--	--	--	--	--	--	--	250	--	--
APR												
03...	3	4	<1	<1	5	3	400	300	120	140	690	670
18...	1	<1	12	<1	14	2	120	59	12	11	190	100
30...	6	6	7	<1	7	5	550	550	62	61	1100	1100
JUN												
14...	<1	<1	5	<1	11	2	20	6	3	2	30	3
SEP												
10...	<1	<1	5	<1	7	2	11	3	2	2	30	4

MISSOURI RIVER MAIN STEM

06090800 MISSOURI RIVER AT FORT BENTON, MT

LOCATION.--Lat 47°49'03", long 110°39'59", in NW1/4SE1/4SE1/4 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^2.

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. Datum of gage is 2,614.05 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 11, 1920, nonrecording gages, and Oct. 11, 1920, to Apr. 25, 1924, water-stage recorder, all at present site at datum 1.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 16 to Feb. 4. 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. National Weather Service gage-height telemeter at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--101 years, 7,722 ft^3/s, 5,595,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, about 140,000 ft^3/s, June 6, 1908, gage height, 18.5 ft present datum, from rating curve extended above 63,000 ft^3/s; minimum, 320 ft^3/s, July 5, 1936, gage height, -0.50 ft; minimum daily, 627 ft^3/s, July 5, 1936.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 24,100 ft^3/s, June 13, gage height, 6.66 ft; maximum gage height, 7.23 ft, Feb. 3, ice jam; minimum discharge, 2,750 ft^3/s, Nov. 15, 16, gage height, 1.42 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4640	4900	4840	e5500	e5800	4650	4460	6070	11700	13000	5930	5640
2	4650	4610	4080	e6200	e5800	3930	4430	5900	11700	13100	5960	5710
3	4430	4260	4570	e6400	e6000	3780	4570	5810	12100	13200	5890	5570
4	4510	4190	4700	e6300	e5800	5820	4620	5780	12800	12200	5610	5660
5	4560	4320	5260	e6200	5630	5680	4480	6010	13900	11300	5680	5660
6	4150	4240	5240	e6300	5470	5180	4620	6140	15400	11000	5540	5630
7	4140	4250	5410	e6100	5750	4980	4800	6110	16700	11000	5570	5510
8	4210	4000	5490	e6000	5690	4830	4670	6480	17900	10300	5610	5710
9	4320	4320	5450	e6200	5840	5070	4940	7210	19400	8610	5520	5640
10	4210	4070	5280	e6000	5800	4880	4870	7910	19000	8270	5580	5740
11	4070	4260	5400	e6200	5900	4450	4940	8220	18700	8950	5570	5900
12	4070	4230	5200	e6400	5830	4780	5240	8920	20400	8840	5790	5810
13	4020	4470	5360	e6500	6050	4260	5260	11000	22600	8560	5710	5720
14	3940	4360	5210	e6600	5490	4250	5320	11100	22900	7960	5230	5860
15	3720	4230	4750	e6400	5280	4300	4990	11900	20900	7230	5740	5900
16	3900	4020	e4800	e6400	5280	4100	4990	12400	19400	7320	5280	5830
17	3890	3800	e4700	e6200	5380	4290	5020	12400	16400	7110	5730	6030
18	3940	3600	e4200	e6100	5200	4320	5140	13100	12600	7020	5990	5680
19	3930	3750	e2900	e6000	5060	4250	5080	14700	10500	6960	5900	5470
20	3920	4270	e3000	e6000	5460	4230	5070	17300	9750	7010	5850	5450
21	3980	4560	e3500	e5700	5390	4230	4880	19100	11000	6520	5800	5510
22	3970	4470	e4000	e5700	5300	4630	5070	21500	13300	6310	5850	5420
23	3990	4580	e5000	e5700	5400	4500	5250	19400	15400	6220	5780	5330
24	3940	4410	e5800	e5700	4900	4610	5710	18100	16400	6080	5510	5460
25	3920	4450	e6000	e5600	5000	4670	5980	18000	15500	6220	5690	5340
26	3990	4410	e6400	e5600	4790	4640	6640	17800	14600	6180	5760	5540
27	3920	4280	e6200	e5500	4780	4390	6720	17100	13900	6530	5800	5590
28	4020	4280	e6300	e5500	4880	4570	6590	15100	13400	6610	6510	5440
29	3970	4410	e6000	e5400	---	4280	6450	13500	13600	6460	5150	5460
30	4060	4500	e5600	e5200	---	4460	6400	12300	13200	6360	5930	5110
31	4940	---	e5500	e5200	---	4400	---	11900	---	6280	5760	---
TOTAL	127920	128500	156140	184800	152950	141410	157200	368260	465050	258710	177220	168320
MEAN	4126	4283	5037	5961	5462	4562	5240	11880	15500	8345	5717	5611
MAX	4940	4900	6400	6600	6050	5820	6720	21500	22900	13200	6510	6030
MIN	3720	3600	2900	5200	4780	3780	4430	5780	9750	6080	5150	5110
AC-FT	253700	254900	309700	366600	303400	280500	311800	730400	922400	513200	351500	333900

CAL YR 1990 TOTAL 2036420 MEAN 5579 MAX 13200 MIN 2900 AC-FT 4039000
WTR YR 1991 TOTAL 2486480 MEAN 6812 MAX 22900 MIN 2900 AC-FT 4932000

e Estimated

MARIAS RIVER BASIN

06091700 TWO MEDICINE RIVER BELOW SOUTH FORK, NEAR BROWNING, MT

LOCATION.--Lat 48°25'36", long 112°59'20", in SE1/4SE1/4SE1/4 sec. 23, T.31 N., R.11 W., Glacier County, Hydrologic Unit 10030201, Blackfeet Indian Reservation, on right bank 93 ft downstream from bridge on Blackfeet Secondary Highway No. 1, 9.7 mi south of Browning, and 12.3 mi northwest of Heart Butte.

DRAINAGE AREA.--250 mi^2.

PERIOD OF RECORD.--May 1977 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 4,180 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 24 to Dec. 4, Dec. 12 to Feb. 13, Mar. 1-4, 27, 28. Records fair except those for estimated daily discharges, which are poor. Flow regulated by Lower Two Medicine Lake (station number 06090900). Diversions for irrigation of about 64.0 acres upstream from station. Several observations of water discharge and specific conductance were made during the year.

AVERAGE DISCHARGE.--14 years, 338 ft^3/s, 244,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 11,700 ft^3/s, May 19, 1991, gage height, 7.78 ft, from rating curve extended above 5,550 ft^3/s; minimum daily, 10 ft^3/s, Jan. 29, 1980, and Jan. 6, 1982.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 100,000 ft^3/s, June 8, 1964, as determined at Two Medicine River near Browning (station number 06092000) located about 10 mi downstream.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, about 11,700 ft^3/s, May 19, gage height, 7.78 ft from rating curve extended above 5,550 ft^3/s; minimum daily, 35 ft^3/s, Oct. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	431	e200	e60	e90	e110	241	628	1900	1260	237	110
2	41	440	e190	e60	e140	e100	351	563	2110	1200	250	109
3	42	404	e190	e60	e200	e110	364	510	2260	1130	238	109
4	141	399	e190	e55	e220	e120	410	482	2160	1070	207	108
5	617	342	180	e55	e250	141	1130	458	2250	1060	195	108
6	326	267	173	e55	e230	131	1540	548	2340	966	189	108
7	188	254	163	e55	e220	120	1020	775	2090	850	183	108
8	138	246	154	e60	e210	116	725	1030	2110	758	172	109
9	135	305	205	e60	e200	116	602	1160	2010	672	165	120
10	277	1100	287	e65	e200	113	529	1030	1940	626	164	114
11	346	904	324	e75	e200	118	466	1270	2120	587	178	109
12	333	703	e250	e100	e200	117	424	1820	2280	552	177	106
13	305	633	e210	e120	e210	113	414	2560	1900	531	187	103
14	265	562	e200	e100	219	105	401	2270	1540	523	175	111
15	231	488	e200	e90	249	106	371	2090	1240	509	165	113
16	235	418	e210	e90	321	103	331	2020	1070	499	153	106
17	222	368	e210	e85	314	101	305	2100	978	490	144	104
18	217	333	e150	e80	253	100	276	2920	834	453	135	102
19	187	297	e80	e75	246	108	298	7720	852	416	130	98
20	165	271	e60	e70	335	126	404	5000	2130	380	127	95
21	177	234	e50	e70	276	154	524	4030	3690	346	122	106
22	184	241	e45	e65	228	172	704	3310	2580	323	120	108
23	159	333	e50	e60	170	161	1050	2930	2050	306	119	102
24	149	e370	e55	e55	152	145	1440	2660	1680	295	118	100
25	172	e300	e60	e50	172	128	1390	2590	1500	290	124	98
26	341	e270	e65	e50	170	110	1100	2160	1320	281	124	94
27	293	e260	e70	e55	159	e100	938	1820	1210	269	118	50
28	282	e250	e60	e45	141	e110	797	1630	1210	257	116	43
29	303	e230	e50	e40	---	113	792	1620	1160	246	115	42
30	284	e210	e55	e50	---	110	681	1770	1360	234	114	41
31	328	---	e60	e60	---	145	---	1780	---	226	112	---
TOTAL	7118	11863	4446	2070	5975	3722	20018	63254	53874	17605	4873	2934
MEAN	230	395	143	66.8	213	120	667	2040	1796	568	157	97.8
MAX	617	1100	324	120	335	172	1540	7720	3690	1260	250	120
MIN	35	210	45	40	90	100	241	458	834	226	112	41
AC-FT	14120	23530	8820	4110	11850	7380	39710	125500	106900	34920	9670	5820
(†)	0	0	0	0	0	0	0	1280	5700	6170	6440	2730

CAL YR 1990 TOTAL 157004 MEAN 430 MAX 2150 MIN 35 AC-FT 311400
WTR YR 1991 TOTAL 197752 MEAN 542 MAX 7720 MIN 35 AC-FT 392200

e Estimated

(†) Flows, in acre-ft, in Two Medicine Canal.

06093200 BADGER CREEK BELOW FOUR HORNS CANAL, NEAR BROWNING, MT

LOCATION.--Lat 48°22'12", long 112°48'07", in NW1/4SW1/4SE1/4 sec.8, T.30 N., R.9 W., Glacier County, Hydrologic Unit 10030201, Blackfeet Indian Reservation (revised), 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 mi^2.

PERIOD OF RECORD.--October 1951 to current year. Records since October 1973 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 above National Geodetic Vertical Datum of 1929, from topographic map. May 1951 to September 1973, water-stage recorder at site 3.4 mi upstream at datum 4,179.26 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Nov. 26 to Feb. 3, Mar. 1-9. Records good except those for estimated daily discharges, which are poor. Four Horns Canal diverts water from right bank in NE1/4 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.

AVERAGE DISCHARGE.--40 years, 221 ft^3/s, 19.74 in/yr, 160,100 acre-ft/yr, adjusted for diversion.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 49,700 ft^3/s, June 8, 1964, gage height, 10.37 ft, from rating curve extended above 2,000 ft^3/s on basis of slope-area measurement of peak flow (site and datum then in use); minimum daily, 6.5 ft^3/s, Sept. 17, 1984.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,530 ft^3/s, May 19, gage height, 9.25 ft, from straightline extension of rating above 1,900 ft^3/s; minimum daily, 45 ft^3/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	55	129	e110	e52	e110	e80	101	207	991	650	156	75
2	56	145	e100	e50	e130	e70	111	181	1130	611	148	75
3	56	139	e110	e50	e120	e75	117	176	1220	585	131	74
4	69	137	e130	e50	109	e90	123	169	1210	577	125	73
5	145	136	e140	e50	113	e90	169	159	1130	550	126	72
6	105	125	e130	e50	106	e85	269	157	1280	491	153	70
7	79	126	e140	e52	99	e80	243	187	1200	442	130	69
8	69	130	e150	e52	100	e85	210	244	1150	385	124	72
9	63	136	e150	e52	103	e90	190	361	1050	329	117	85
10	71	159	e150	e55	104	99	179	349	1050	312	114	77
11	71	169	e140	e60	100	94	179	388	1150	294	118	74
12	67	167	e130	e70	100	92	163	668	1080	279	118	71
13	68	161	e110	e100	96	93	171	731	860	268	114	69
14	64	161	e100	e120	90	89	172	812	712	258	105	78
15	62	158	e95	e110	96	90	162	849	619	246	102	77
16	65	150	e100	e110	98	89	138	911	606	235	98	73
17	62	146	e100	e120	95	88	123	992	590	223	96	73
18	59	144	e80	e130	94	87	118	1280	536	213	93	71
19	58	139	e60	e120	95	90	115	2830	559	203	91	69
20	57	138	e55	e110	100	91	122	1940	884	195	91	67
21	56	139	e50	e100	95	95	137	1500	1370	187	89	72
22	58	136	e45	e90	95	99	163	1380	1120	180	88	74
23	55	136	e60	e85	93	95	226	1350	938	174	88	69
24	53	149	e65	e80	94	93	344	1230	848	171	87	67
25	54	118	e60	e75	91	94	386	1290	786	163	88	66
26	82	e80	e60	e75	88	88	337	1090	720	159	87	66
27	95	e90	e60	e80	90	95	299	912	694	151	82	66
28	83	e100	e55	e70	91	96	268	865	691	147	82	66
29	79	e130	e50	e65	---	91	261	820	665	139	80	65
30	73	e120	e50	e75	---	91	239	885	707	134	78	66
31	85	---	e55	e90	---	95	---	901	---	131	77	---
TOTAL	2174	4093	2890	2448	2795	2779	5835	25814	27546	9082	3276	2141
MEAN	70.1	136	93.2	79.0	99.8	89.6	194	833	918	293	106	71.4
MAX	145	169	150	130	130	99	386	2830	1370	650	156	85
MIN	53	80	45	50	88	70	101	157	536	131	77	65
AC-FT	4310	8120	5730	4860	5540	5510	11570	51200	54640	18010	6500	4250
(†)	4020	0	0	0	0	0	1130	3850	2830	4650	4770	4250

CAL YR 1990 TOTAL 75462 MEAN 207 MAX 1280 MIN 45 AC-FT 149700
WTR YR 1991 TOTAL 90873 MEAN 249 MAX 2830 MIN 45 AC-FT 180200

e Estimated

(†) Diversions, in acre-feet, by Four Horns Canal.

MARIAS RIVER BASIN

06098500 CUT BANK CREEK NEAR BROWNING, MT

LOCATION--Lat 48°37'00", long 113°02'06", in NE1/4NW1/4SW1/4 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^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1918 to October 1925 (seasonal records only), April to September 1991.

GAGE.--Water-stage recorder. Elevation of gage is 4,380 ft above National Geodetic Vertical Datum of 1929, from topographic map. April 1918 to October 1925, water-stage recorder at site about 120 ft upstream at different datum.

REMARKS.--Estimated daily discharges: Apr. 1-17. Water-discharge records fair except those for estimated daily discharges, which are poor. Diversions for irrigation of about 1,200 acres upstream from station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,870 ft^3/s, May 19, 1991, gage height, 4.79 ft, from rating curve extended above 2,500 ft^3/s; minimum, 30 ft^3/s, Sept. 8, 1991, gage height, 0.97 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft^3/s and maximums(*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 25	0715	425	2.49	June 12	1230	1,210	2.98
May 19	1615	a*3,870	*4.79	June 21	0800	2,630	4.08

a--from rating curve extended above 2,500 ft^3/s.

Minimum discharge, 30 ft^3/s, Sept. 8, gage height, 0.97 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1							e110	212	592	638	129	45
2							e105	196	675	598	132	44
3							e100	182	723	553	119	45
4							e110	176	722	533	107	44
5							e200	169	684	526	100	44
6							e350	166	777	500	114	41
7							e250	166	758	458	130	33
8							e200	187	719	413	113	30
9							e180	225	723	366	105	36
10							e170	244	714	348	106	38
11							e160	260	774	335	113	38
12							e150	398	1080	313	140	33
13							e150	584	746	312	161	32
14							e140	906	541	312	133	33
15							e135	1000	468	312	121	37
16							e130	995	420	302	106	37
17							e125	997	400	287	99	37
18							118	1260	386	273	90	38
19							117	2820	378	244	83	38
20							130	2370	788	217	77	34
21							153	1420	2270	196	71	33
22							176	1230	1290	188	67	41
23							243	1110	884	181	67	42
24							344	973	749	171	64	37
25							399	894	699	170	62	33
26							329	806	656	169	60	33
27							296	676	622	167	54	33
28							258	594	684	159	54	33
29							254	562	621	150	55	31
30							235	577	649	139	53	34
31							---	589	---	130	49	---
TOTAL							5817	22944	22192	9660	2934	1107
MEAN							194	740	740	312	94.6	36.9
MAX							399	2820	2270	638	161	45
MIN							100	166	378	130	49	30
AC-FT							11540	45510	44020	19160	5820	2200

e Estimated

PERIOD OF RECORD.--October 1990 to August 1991.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)
OCT										
30...	1600	110	--	--	204	--	6.0	--	--	--
APR										
03...	0920	97	80	1	285	3.0	0.5	8.2	150	36
17...	1445	124	--	--	292	2.5	2.5	--	--	--
24...	1300	385	--	--	260	9.0	7.0	--	--	--
MAY										
20...	1630	2010	--	--	158	25.0	9.0	--	--	--
21...	1030	1470	--	--	166	15.5	7.0	--	--	--
22...	1620	1240	5	1	163	22.0	11.0	8.0	82	20
28...	1800	584	--	--	183	12.0	9.0	--	--	--
JUN										
26...	0900	663	--	--	172	15.0	8.5	--	--	--
JUL										
10...	1115	350	--	1	170	19.5	13.0	8.2	86	21
AUG										
20...	1710	74	5	1	225	27.0	19.0	8.3	110	28

DATE	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)
OCT										
30...	--	--	--	--	--	--	--	--	--	--
APR										
03...	14	4.7	0.2	0.7	146	8.9	2.2	0.1	4.5	159
17...	--	--	--	--	--	--	--	--	--	--
24...	--	--	--	--	--	--	--	--	--	--
MAY										
20...	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--
22...	7.8	1.8	0.1	0.9	81	5.4	0.1	<0.1	4.4	89
28...	--	--	--	--	--	--	--	--	--	--
JUN										
26...	--	--	--	--	--	--	--	--	--	--
JUL										
10...	8.1	1.9	0.1	0.5	88	3.2	0.1	0.1	3.9	92
AUG										
20...	10	3.0	0.1	0.6	119	3.7	1.2	<0.1	4.8	123

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
OCT										
30...	--	--	--	--	--	--	--	--	--	--
APR										
03...	0.22	41.5	--	--	--	--	--	--	--	--
17...	--	--	--	--	--	--	--	--	--	--
24...	--	--	--	--	--	--	--	--	--	--
MAY										
20...	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--
22...	0.12	298	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--
JUN										
26...	--	--	--	--	--	--	--	--	--	--
JUL										
10...	0.12	86.5	<1	<10	<1	2	5	<1	<1	<3
AUG										
20...	0.17	24.5	--	--	--	--	--	--	--	--

MARIAS RIVER BASIN

06098900 BIG ROCK COULEE NEAR SANTA RITA ,MT

LOCATION.--Lat 48°42'35", long 112°22'34", in NE1/4NE1/4NW1/4 sec. 15, T.34 N., R.6 W., Glacier County, Hydrologic Unit 10030202, 1.5 mi upstream from mouth, 2.5 mi west of Santa Rita, and 4.9 mi northwest of Cut Bank.

PERIOD OF RECORD.--Water years 1982-84, October 1990 to August 1991.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
OCT											
16...	1645	0.47	--	--	3060	2.0	4.0	--	--	--	--
APR											
04...	1045	3.3	80	1	3530	10.0	4.5	8.2	690	95	110
MAY											
22...	1140	1.7	10	1	6130	20.0	16.0	8.2	1100	150	170
JUL											
10...	1530	2.5	100	61	3480	18.0	20.0	8.1	690	110	100
AUG											
21...	1135	0.75	0	0	4460	28.0	21.0	8.3	1000	110	180

DATE	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)
OCT											
16...	--	--	--	--	--	--	--	--	--	--	--
APR											
04...	610	10	6.1	360	1700	55	0.7	2.4	2800	3.80	24.9
MAY											
22...	1200	16	11	463	3100	120	1.1	0.9	5030	6.84	23.1
JUL											
10...	580	10	6.8	440	1600	62	0.5	7.1	2730	3.71	18.4
AUG											
21...	780	11	7.2	442	2200	76	0.3	0.4	3620	4.92	7.33

MARIAS RIVER BASIN

06099000 CUT BANK CREEK AT CUT BANK, MT

LOCATION.--Lat 48°38'00", long 112°20'46", in SW1/4SE1/4NE1/4 sec.11, T.33 N., R.6 W., Glacier County, Hydrologic Unit 10030202, Blackfeet 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.--1,065 mi^2.

WATER-DISCHARGE RECORDS

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 3,550 ft above National Vertical Datum of 1929, from topographic map. Prior to May 12, 1922, nonrecording gage at several sites 0.5 mi upstream at various datums. May 12, 1922 to Nov. 1, 1924, nonrecording gage at present site and different datum.

REMARKS.--Estimated daily discharges: Nov. 6-9, Nov. 16 to Mar. 30. Water-discharge 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.

AVERAGE DISCHARGE.--48 years (1906-19, 1923-24, 1952-73, 1982-91), 187 ft^3/s, 135,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,600 ft^3/s, June 9, 1964, gage height, 13.93 ft, 14.2 ft, from floodmarks, from rating curve extended above 12,000 ft^3/s, on basis of slope-area measurement of peak flow; minimum, 0.92 ft^3/s, Sept. 10, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 750 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 21	0130	2,320	5.68	June 22	0330	*3,590	*6.95
June 13	1530	1,190	4.39	June 28	2230	1,510	4.86

a--from crest-stage gage.
b--backwater from ice.

Minimum discharge, 14 ft^3/s, Oct. 2, gage height, 1.20 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	112	e120	e33	e50	e70	225	359	648	911	167	63
2	16	169	e120	e30	e70	e70	221	317	673	828	191	59
3	16	178	e130	e30	e100	e80	225	298	760	744	184	60
4	16	159	e150	e30	e150	e80	218	294	792	667	163	63
5	16	147	e150	e30	e150	e75	228	289	848	638	149	57
6	187	e120	e150	e30	e140	e75	408	278	914	618	156	54
7	352	e100	e150	e30	e130	e80	493	269	967	574	179	54
8	247	e110	e160	e32	e120	e85	394	294	919	519	182	50
9	196	e110	e150	e33	e110	e90	334	309	893	466	168	49
10	166	114	e140	e33	e100	e95	295	360	860	424	160	55
11	160	180	e130	e35	e100	e100	285	378	798	402	167	53
12	156	252	e120	e45	e110	e100	271	457	861	387	188	45
13	145	236	e110	e60	e100	e100	258	576	1110	351	201	43
14	135	208	e110	e70	e95	e100	258	717	848	327	211	46
15	126	190	e120	e68	e95	e100	256	740	622	321	190	51
16	117	e160	e120	e65	e100	e100	244	699	509	303	175	57
17	111	e150	e110	e65	e95	e100	225	688	428	293	156	59
18	108	e140	e70	e60	e95	e100	209	715	395	279	139	49
19	102	e130	e50	e50	e100	e100	199	914	377	266	128	46
20	98	e120	e40	e45	e110	e100	192	1610	600	248	120	45
21	94	e100	e30	e50	e100	e110	204	2110	2270	226	107	43
22	89	e110	e25	e50	e95	e120	231	1590	3190	213	97	45
23	86	e120	e30	e45	e90	e110	269	1320	2360	204	92	50
24	85	e80	e35	e40	e90	e110	340	1200	1590	189	91	51
25	83	e70	e35	e38	e95	e100	427	1050	1130	181	84	47
26	78	e65	e35	e36	e95	e95	444	983	982	184	76	42
27	78	e65	e35	e36	e100	e90	412	897	821	178	72	38
28	100	e80	e30	e38	e90	e100	405	756	897	175	71	36
29	106	e100	e28	e35	---	e120	372	669	1190	170	70	37
30	110	e120	e30	e35	---	e150	380	633	930	160	68	40
31	110	---	e35	e40	---	183	---	673	---	155	66	---
TOTAL	3509	3995	2748	1317	2875	3088	8922	22442	30182	11601	4268	1487
MEAN	113	133	88.6	42.5	103	99.6	297	724	1006	374	138	49.6
MAX	352	252	160	70	150	183	493	2110	3190	911	211	63
MIN	16	65	25	30	50	70	192	269	377	155	66	36
AC-FT	6960	7920	5450	2610	5700	6130	17700	44510	59870	23010	8470	2950

CAL YR 1990 TOTAL 66372 MEAN 182 MAX 1060 MIN 10 AC-FT 131600
WTR YR 1991 TOTAL 96434 MEAN 264 MAX 3190 MIN 16 AC-FT 191300

e Estimated

MARIAS RIVER BASIN

06099000 CUT BANK CREEK AT CUT BANK, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1982-89, October 1990 to August 1991.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT							
16...	1600	114	--	--	372	4.0	4.0
DEC							
12...	0920	117	--	--	515	-3.0	0.0
JAN							
24...	0845	40	--	--	583	-7.0	0.0
FEB							
27...	0850	97	--	--	773	1.0	0.0
APR							
03...	1720	233	60	1	832	10.0	7.0
MAY							
20...	2015	2080	--	--	351	13.0	13.0
22...	1410	1540	30	1	324	21.0	13.5
JUL							
10...	0900	398	--	--	398	17.0	18.0
10...	1900	412	80	1	313	17.0	18.0
AUG							
21...	0930	108	0	0	452	25.0	17.5

DATE	TIME	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)
APR								
03...	1720	8.2	240	51	28	95	3	2.1
MAY								
22...	1410	8.2	130	30	13	17	0.7	2.6
JUL								
10...	1900	8.5	120	29	12	19	0.7	0.90
AUG								
21...	0930	8.4	180	39	19	33	1	1.1

DATE	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)
APR								
03...	199	230	10	0.2	3.1	539	0.73	339
MAY								
22...	124	51	1.3	<0.1	6.8	196	0.27	815
JUL								
10...	119	44	1.6	<0.1	3.5	181	0.25	202
AUG								
21...	167	88	5.0	<0.1	2.8	288	0.39	84.0

06099100 SPRING CREEK NEAR CUT BANK, MT

LOCATION.--Lat 48°34'53", long 112°22'35, in SW1/4SE1/4SW1/4 sec.26, T.33 N., R.6 W., Glacier County, Hydrologic Unit 10030202, on Blackfeet Indian Reservation, at Highway 358, approximately 4 river miles upstream from mouth, and 4.5 mi south of Cut Bank.

PERIOD OF RECORD.--Water years 1982-84, October 1990 to August 1991.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
OCT											
17...	1600	2.7	--	1	1470	7.0	4.0	--	--	--	--
APR											
03...	1400	3.2	70	1	2160	9.0	7.0	8.6	450	61	73
MAY											
22...	1000	1.7	0	0	2340	18.0	13.5	8.7	450	53	77
JUL											
11...	0745	1.7	0	0	1720	15.0	14.0	8.5	360	47	59
AUG											
21...	1310	2.4	--	--	1060	30.0	21.0	8.8	270	37	42

DATE	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)
OCT											
17...	--	--	--	--	--	--	--	--	--	--	--
APR											
03...	350	7	5.1	455	760	30	1.1	--	1550	2.11	13.4
MAY											
22...	390	8	4.2	425	850	32	1.0	0.4	1660	2.26	7.63
JUL											
11...	280	6	2.6	343	640	19	0.8	0.6	1250	1.71	5.76
AUG											
21...	140	4	1.9	214	320	12	0.5	0.2	682	0.93	4.42

MARIAS RIVER BASIN

06099300 CUT BANK CREEK AT MOUTH, NEAR CUT BANK, MT

LOCATION.--Lat 48°29'12", long 112°13'39", in SE1/4NE1/4SE1/4 sec.34, T.32., R.5 W., Glacier County, Hydrologic Unit 10030202, along county road approximately 300 ft upstream from mouth, and 9.7 miles southwest of Cut Bank.

PERIOD OF RECORD.--April to august 1991.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
APR											
04...	0845	E222	30	1	885	10.0	4.5	8.1	250	52	29
MAY											
22...	0800	E1700	10	1	334	10.0	12.5	8.0	130	30	14
JUL											
11...	0910	E400	0	0	356	18.0	16.0	8.3	140	31	14
AUG											
21...	1540	112	0	0	471	32.0	24.0	8.6	170	35	20

DATE	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)
APR											
04...	100	3	2.1	208	250	11	0.2	1.3	570	0.78	342
MAY											
22...	20	0.8	3.1	128	54	1.5	0.1	7.2	207	0.28	949
JUL											
11...	25	0.9	0.90	126	59	4.5	<0.1	3.0	213	0.29	230
AUG											
21...	40	1	1.4	149	99	5.9	0.1	1.3	292	0.40	88.3

MARIAS RIVER BASIN

06099500 MARIAS RIVER NEAR SHELBY, MT

LOCATION.--Lat 48°25'38", long 111°53'20", in SE1/4NW1/4SE1/4 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^2, of which 518 mi^2 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. Datum of gage is 3,087.72 ft above National Geodetic Vertical Datum of 1929. 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 datum. Dec. 23, 1947, to Apr. 6, 1976, water-stage recorder at site 150 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Nov. 21 to Mar. 16. 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. U.S. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--83 years, (1902-4, 1905-6, 1911-91), 924 ft^3/s, 669,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 241,000 ft^3/s, June 9, 1964, largely due to failure of Swift Dam, gage height, 23.64 ft, from floodmark, from rating curve extended above 34,000 ft^3/s on basis of slope-area measurement of peak flow; maximum unaffected by dam failure, 75,700 ft^3/s, June 20, 1975, gage height, 18.21 ft; minimum observed, 10 ft^3/s, Aug. 20, 1919.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12,600 ft^3/s, June 22, gage height, 9.25 ft; minimum daily, 150 ft^3/s, Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	185	561	e380	e240	e340	e430	557	1510	3720	4150	613	288
2	171	705	e350	e240	e360	e420	633	1400	3900	3700	662	269
3	167	808	e400	e230	e380	e450	757	1300	4230	3320	715	267
4	167	800	e500	e230	e400	e500	819	1250	4400	3040	671	274
5	172	766	e500	e220	e400	e540	842	1220	4370	2870	623	287
6	508	717	e520	e220	e390	e550	1610	1150	5840	2720	585	295
7	814	703	e550	e220	e380	e550	2120	1150	6310	2540	619	285
8	715	630	e650	e230	e380	e560	1750	1350	5580	2360	596	279
9	569	631	e750	e230	e370	e600	1470	1620	5190	2070	524	286
10	482	632	e700	e250	e360	e650	1290	1810	4880	1800	471	315
11	503	1210	e680	e260	e350	e630	1210	1750	4360	1640	472	337
12	646	1270	e620	e280	e350	e620	1190	2150	4140	1520	504	324
13	623	1170	e600	e320	e360	e580	1100	2870	4160	1430	585	293
14	598	1070	e600	e380	e360	e560	1080	3600	3480	1340	589	276
15	572	997	e600	e400	e370	e550	1060	3730	2730	1320	587	292
16	532	908	e620	e390	e380	e540	1010	3660	2340	1260	539	313
17	522	845	e620	e380	e400	544	957	3650	2110	1160	509	320
18	530	794	e550	e390	e450	537	894	3820	1950	1120	472	338
19	498	740	e350	e400	e550	530	851	5370	1810	1090	436	356
20	479	699	e250	e380	e650	559	824	11300	2120	1030	407	351
21	450	e650	e200	e360	e700	578	873	10200	7670	960	392	330
22	428	e600	e170	e350	e680	613	1020	8570	12100	904	373	339
23	439	e650	e150	e340	e650	629	1240	7270	9520	863	360	367
24	418	e550	e200	e330	e600	625	1670	6340	6830	803	340	364
25	399	e300	e250	e330	e580	583	2120	5730	5160	767	324	348
26	383	e220	e280	e320	e560	430	2140	5340	4470	733	309	336
27	453	e200	e300	e330	e500	420	1900	4720	3910	706	309	329
28	569	e250	e250	e330	e450	580	1770	4150	3650	673	328	322
29	545	e300	e220	e320	---	616	1660	3870	4080	659	315	291
30	568	e400	e200	e300	---	585	1610	3620	4070	631	310	275
31	556	---	e250	e330	---	556	---	3750	---	616	302	---
TOTAL	14661	20776	13260	9530	12700	17115	38027	119220	139080	49795	14841	9346
MEAN	473	693	428	307	454	552	1268	3846	4636	1606	479	312
MAX	814	1270	750	400	700	650	2140	11300	12100	4150	715	367
MIN	167	200	150	220	340	420	557	1150	1810	616	302	267
AC-FT	29080	41210	26300	18900	25190	33950	75430	236500	275900	98770	29440	18540

CAL YR 1990 TOTAL 335240 MEAN 918 MAX 4700 MIN 150 AC-FT 664900
WTR YR 1991 TOTAL 458351 MEAN 1256 MAX 12100 MIN 150 AC-FT 909100

e Estimated

MARIAS RIVER BASIN

06101300 LAKE ELWELL NEAR CHESTER, MT

LOCATION.--Lat 48°19'06", long 111°05'27", in NW1/4 sec.33, T.30 N., R.5 E., Liberty County, Hydrologic Unit 10030203, in control house of river outlet tunnel at Tiber Dam on Marias River, 15 mi southwest of Chester, and at river mile 80.4.

DRAINAGE AREA.--4,923 mi^2, of which 518 mi^2 is probably noncontributing.

PERIOD OF RECORD.--October 1955 to current year (monthend contents only). Daily elevations and contents May to June 1964, published in WSP 1840-B. Prior to October 1975, published as Tiber Reservoir near Chester.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is referenced to National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation). Records of daily elevations on file in Helena district office.

REMARKS.--Reservoir is formed by rolled earthfill dam with concrete spillway chute; construction began in September 1952; completed in March 1956. Storage began Oct. 28, 1955. Usable capacity, 1,347,000 acre-ft between elevation 2,870.00 ft, trashrack sill, and 3,012.50 ft, top of flood control. Dead storage, 21,580 acre-ft below elevation, 2,870.00 ft. Prior to Oct. 1, 1963, usable capacity was 1,313,000 acre-ft and dead storage was 24,000 acre-ft at same elevations. Figures given herein represent usable contents. Water is presently used for recreation and flood control.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 1,193,000 acre-ft, July 12,13, 1965, elevation, 3,005.59 ft; minimum observed since normal operation began, 442,100 acre-ft, Apr. 1, 1968, elevation, 2,953.81 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 992,000 acre-ft, July 3, elevation, 2,995.53 ft; minimum, 662,900 acre-ft, Apr. 6, elevation, 2,974.91 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	2,983.36	785,400	---
Oct. 31	2,981.76	760,900	-24,500
Nov. 30	2,981.94	763,600	+2,700
Dec. 31	2,980.58	743,300	-20,300
CAL YR 1990			-62,300
Jan. 31	2,978.68	715,500	-27,800
Feb. 28	2,977.45	698,000	-17,500
Mar. 31	2,975.31	668,300	-29,700
Apr. 30	2,975.60	672,300	+4,000
May 31	2,985.05	811,900	+139,600
June 30	2,995.10	984,000	+172,100
July 31	2,991.67	922,200	-61,800
Aug. 31	2,987.53	852,100	-70,100
Sept. 30	2,983.45	786,800	-65,300
WTR YR 1991			+1,400

MARIAS RIVER BASIN

06101500 MARIAS RIVER NEAR CHESTER, MT

LOCATION.--Lat 48°18'23", long 111°04'47", in SW1/4SW1/4SW1/4 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^2, of which 518 mi^2 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. Datum of gage is 2,814.03 ft above National Geodetic Vertical Datum of 1929 (U.S. Bureau of Reclamation bench mark). Prior to Oct. 1, 1921, nonrecording gage at bridge 2.5 mi downstream at different datum. Oct. 4, 1945, to Sept. 30, 1946, nonrecording gage at site 3 mi downstream at different datum.

REMARKS.--No estimated daily discharges. Records good. Flow completely regulated by Lake Elwell since Oct. 28, 1955 (see preceding page). U.S. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--38 years (1945-47, 1955-91), 856 ft^3/s, 620,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge not determined, occurred about Mar. 20, 1947; maximum discharge since dam completion, 10,400 ft^3/s, June 16, 1964, gage height, 10.63 ft; minimum probably less than 0.2 ft^3/s during period of no gage-height record Oct. 29 to Nov. 10, 1955, when gates at dam were closed.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1948 reached a stage of 16 ft, present datum.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,250 ft^3/s, July 1, gage height, 6.47 ft; minimum daily, 533 ft^3/s, Dec. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	890	537	535	724	705	1080	1050	1290	2210	2840	1460	1450
2	891	538	534	724	705	1080	1040	1290	2220	3240	1450	1460
3	891	539	534	724	705	1080	1040	1290	2210	3240	1460	1460
4	891	536	535	724	705	1070	1040	1290	2220	3230	1460	1460
5	890	535	533	724	759	1070	1040	1290	2240	3220	1460	1390
6	891	535	534	721	795	1070	1040	1280	2240	3210	1460	1350
7	891	534	534	718	796	1070	1040	1280	2250	3210	1460	1360
8	891	534	534	718	796	1070	1050	1280	2260	3200	1460	1360
9	891	534	534	718	798	1070	1050	1280	2260	3200	1460	1360
10	888	534	534	718	798	1070	1050	1280	2270	3210	1460	1360
11	889	534	650	718	799	1070	1050	1280	2280	3200	1460	1370
12	887	534	723	715	797	1060	1050	1280	2280	3200	1460	1370
13	885	536	724	712	853	1060	1060	1280	2180	3210	1470	1370
14	884	534	722	711	943	1060	1050	1280	1860	3200	1470	1360
15	832	535	718	711	981	1060	1050	1280	1550	3190	1460	1370
16	631	536	718	711	981	1060	1050	1290	1550	3190	1460	1370
17	561	536	720	711	981	1060	1050	1310	1510	3030	1470	1370
18	563	538	723	710	981	1060	1050	1290	1380	2690	1470	1370
19	539	539	731	711	981	1060	1120	1290	1310	2680	1460	1380
20	540	540	731	711	981	1060	1300	1300	1350	2690	1460	1370
21	540	540	731	711	1020	1060	1300	1490	1310	2680	1500	1370
22	539	537	731	710	1080	1060	1300	1920	1310	2450	1580	1370
23	540	537	730	711	1080	1060	1300	1940	1330	2040	1600	1380
24	540	538	726	710	1080	1060	1310	2100	1940	1630	1610	1380
25	540	535	725	709	1080	1060	1310	2190	2550	1470	1620	1220
26	538	535	724	707	1080	1060	1300	2200	2560	1460	1410	1050
27	540	534	724	705	1080	1060	1310	2200	2570	1470	1280	1060
28	538	534	729	705	1070	1050	1310	2210	2570	1460	1330	1060
29	540	535	730	705	---	1050	1300	2210	2580	1460	1420	1060
30	540	534	725	705	---	1050	1300	2210	2580	1460	1450	1060
31	540	---	724	705	---	1050	---	2210	---	1460	1450	---
TOTAL	22051	16077	20500	22117	25410	32960	34310	48610	60930	81120	45480	39720
MEAN	711	536	661	713	907	1063	1144	1568	2031	2617	1467	1324
MAX	891	540	731	724	1080	1080	1310	2210	2580	3240	1620	1460
MIN	538	534	533	705	705	1050	1040	1280	1310	1460	1280	1050
AC-FT	43740	31890	40660	43870	50400	65380	68050	96420	120900	160900	90210	78780

CAL YR 1990 TOTAL 366704 MEAN 1005 MAX 1610 MIN 533 AC-FT 727400
WTR YR 1991 TOTAL 449285 MEAN 1231 MAX 3240 MIN 533 AC-FT 891200

MARIAS RIVER BASIN
06101500 MARIAS RIVER NEAR CHESTER, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1964-72, 1978-86, November 1990 to September 1991 (discontinued).

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1964 to September 1972, January 1978 to September 1981.
WATER TEMPERATURE: October 1964 to September 1972, January 1978 to September 1979.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1965-72, 1978-81): Maximum daily, 791 microsiemens, May 3, 1979; minimum daily, 388 microsiemens, Aug. 17, 18, 21, 1972.
WATER TEMPERATURE (water years 1965-72, 1978-79): Maximum daily, 22.0°C, Aug. 20, 1972; minimum daily, 0.5°C, on several days during December 1978 to February 1979.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)
NOV								
07...	1545	527	--	--	548	7.0	8.0	--
DEC								
17...	1410	798	--	--	622	7.5	3.0	--
FEB								
28...	0950	--	--	--	560	-7.0	3.0	--
APR								
23...	1400	1220	--	--	558	23.5	10.0	--
24...	1330	1320	--	--	558	20.5	9.0	--
JUN								
03...	2020	2190	--	--	518	21.5	15.0	--
AUG								
06...	1300	1460	10	1	459	28.0	22.0	691
SEP								
05...	0845	1460	0	0	510	13.0	15.0	695

DATE	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	PH (STAND-ARD UNITS) (00400)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)
NOV							
07...	--	--	--	--	--	--	--
DEC							
17...	--	--	--	--	--	--	--
FEB							
28...	--	--	--	--	--	--	--
APR							
23...	--	--	--	--	--	--	--
24...	--	--	--	--	--	--	--
JUN							
03...	--	--	--	--	--	--	--
AUG							
06...	10.1	128	8.4	3.4	<1	<1	<10
SEP							
05...	9.6	105	8.4	3.7	<1	<1	10

MARIAS RIVER BASIN

06108000 TETON RIVER NEAR DUTTON, MT

LOCATION.--Lat 47°55'49", long 111°33'07", in SE1/4SW1/4SW1/4 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^2. Area at site used prior to July 17, 1965, 1,308 mi^2.

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

GAGE.--Water-stage recorder. Elevation of gage is 3,235 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to July 17, 1965, water-stage recorder at site 1,800 ft downstream at datum 1.97 ft lower.

REMARKS.--Estimated daily discharges: Nov. 6-9, Dec. 11 to Mar. 15, Mar. 26-29. 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. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--37 years, 148 ft^3/s, 107,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 71,300 ft^3/s, June 9, 1964, gage height, 20.48 ft, present site and datum, from floodmark, from slope-area measurement of peak flow; no flow at times during 1984, 1985, and 1988.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,230 ft^3/s, June 22, gage height, 7.77 ft; minimum daily, 15 ft^3/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	32	37	52	e23	e40	e90	108	171	629	1520	116	69
2	34	38	48	e21	e50	e90	101	162	537	1430	105	62
3	33	38	50	e20	e60	e110	96	161	567	1230	107	57
4	35	38	59	e20	e70	e130	97	163	637	1110	130	54
5	39	39	64	e20	e80	e150	91	171	739	1040	131	52
6	38	e35	61	e20	e90	e140	84	191	1300	980	125	50
7	35	e25	62	e20	e100	e150	82	187	2320	866	121	50
8	32	e35	64	e21	e100	e160	86	163	2130	783	126	49
9	31	e45	67	e22	e110	e170	86	154	1770	738	114	48
10	37	47	68	e25	e110	e180	83	150	1480	694	105	49
11	37	43	e70	e30	e110	e190	88	157	1310	656	105	52
12	35	42	e60	e35	e120	e200	99	193	1230	615	122	59
13	36	41	e50	e34	e130	e180	106	384	1170	558	142	63
14	37	42	e38	e33	e120	e140	165	528	1030	495	170	64
15	34	41	e35	e33	e120	e110	178	431	875	463	153	67
16	34	40	e35	e33	e120	111	176	372	733	420	143	69
17	35	45	e35	e33	e110	108	182	338	640	392	135	70
18	37	44	e30	e32	e110	104	201	339	600	340	127	67
19	38	47	e25	e28	e100	106	235	392	545	314	113	65
20	37	49	e20	e25	e110	115	254	984	579	286	101	67
21	35	48	e17	e27	e120	114	262	2190	1700	271	98	62
22	35	56	e15	e28	e120	122	263	1890	3040	247	95	60
23	34	59	e17	e27	e120	114	249	1590	2840	216	88	59
24	34	57	e20	e26	e110	126	239	1420	2850	205	81	60
25	34	37	e23	e25	e110	117	225	1280	2350	188	75	60
26	35	32	e25	e23	e110	e100	215	1220	1860	176	81	57
27	35	40	e25	e25	e110	e90	208	1120	1680	157	79	55
28	35	46	e22	e22	e100	e95	194	1010	1430	144	81	54
29	35	48	e20	e20	---	e100	186	950	1340	146	84	54
30	35	61	e22	e25	---	116	177	825	1420	151	83	53
31	35	---	e25	e30	---	119	---	696	---	131	76	---
TOTAL	1088	1295	1224	806	2860	3947	4816	19982	41331	16962	3412	1757
MEAN	35.1	43.2	39.5	26.0	102	127	161	645	1378	547	110	58.6
MAX	39	61	70	35	130	200	263	2190	3040	1520	170	70
MIN	31	25	15	20	40	90	82	150	537	131	75	48
AC-FT	2160	2570	2430	1600	5670	7830	9550	39630	81980	33640	6770	3490

CAL YR 1990 TOTAL 37186 MEAN 102 MAX 549 MIN 15 AC-FT 73760
WTR YR 1991 TOTAL 99480 MEAN 273 MAX 3040 MIN 15 AC-FT 197300

e Estimated

MARIAS RIVER BASIN

06108500 TETON RIVER NEAR FORT BENTON, MT

LOCATION.--Lat 47°52'20", long 110°36'50", in SE1/4SE1/4 sec.31, T.25 N., R.9 E., Choteau County, Hydrologic Unit 10030205, 5 mi northeast of Fort Benton, and at site of former gaging station.

DRAINAGE AREA.--1989 mi^2.

PERIOD OF RECORD.--August to September 1991 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)
AUG								
07...	1345	110	0	0	740	33.0	26.0	694
SEP								
05...	1130	34	0	0	858	20.0	17.0	697

DATE	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	PH (STAND-ARD UNITS) (00400)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)
AUG							
07...	7.4	101	8.5	6.3	1	<1	20
SEP							
05...	8.9	101	8.5	12	1	1	30

MISSOURI RIVER MAIN STEM

06109500 MISSOURI RIVER AT VIRGELLE, MT

LOCATION.--Lat 48°00'18", long 110°15'25", in SW1/4SW1/4SE1/4 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^2.

WATER-DISCHARGE RECORDS

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. Datum of gage is 2,507.50 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 30, 1953, water-stage recorder at Loma, 18 mi upstream, 2,543.40 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Nov. 26-28, Dec. 14 to Feb. 13. Water-discharge records good except those for estimated daily discharges, which are fair. 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.

AVERAGE DISCHARGE.--56 years, 8,528 ft^3/s, 6,179,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 122,000 ft^3/s, June 5, 1953, gage height, 23.4 ft, from flood-mark, from rating curve for former site at Loma extended above 66,000 ft^3/s, adjusted to present site; minimum daily, 638 ft^3/s, July 5, 1936.

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.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 26,300 ft^3/s, June 14, gage height, 9.03 ft; minimum, 1,300 ft^3/s, Dec. 20, gage height, 1.38 ft, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5460	5680	5210	e6700	e6400	6030	5460	7660	15100	17200	7690	6920
2	5720	5450	5050	e6600	e7000	5140	5430	7520	14800	17400	7420	6880
3	5280	5070	5130	e7400	e7200	4610	5530	7210	15100	17900	7410	6830
4	5380	4740	4910	e7600	e7400	5900	5580	7320	15600	17300	7180	6940
5	5470	4800	5510	e7600	e7000	7160	5620	7220	16300	16000	7110	6840
6	5360	4850	5850	e7400	e6700	6160	5610	7500	18200	15200	7010	6850
7	4960	4780	6020	e7500	e6800	6070	5700	7740	19300	15200	6980	6620
8	5060	4730	5960	e7300	e6900	6130	5780	7710	21500	14700	7090	6860
9	5260	4610	6090	e7300	e7000	6110	5800	8430	22700	13200	6940	6730
10	5220	4830	5820	e7400	e7100	5970	6040	9210	23000	11800	6970	6900
11	5130	4740	5880	e7200	e7200	5800	6080	9900	22300	12500	6980	6980
12	5140	4830	5940	e7400	e7100	5650	6290	10300	22700	12800	7090	7070
13	5010	4830	5790	e7600	e7300	5620	6300	11600	24500	12200	7180	6930
14	4810	4930	e6000	e7800	6890	5220	6400	13100	25800	11900	7260	7000
15	4800	5060	e5800	e8000	6220	5220	6310	13200	24300	11100	7100	7050
16	4840	4580	e5400	e7600	6490	5160	6200	14100	22200	10700	6980	7100
17	4690	4540	e5400	e7800	6470	5080	6140	14500	20000	10400	6840	7260
18	4670	4280	e5400	e7400	6450	5330	6270	14400	16400	10300	7430	7110
19	4540	4230	e4200	e7300	6290	5240	6350	15900	13500	9890	7390	6920
20	4640	4430	e3400	e7200	6210	5190	6280	17800	12200	9800	7250	6720
21	4580	5000	e3500	e7200	6480	5130	6370	20100	12500	9520	7290	6830
22	4700	5100	e4000	e6800	6350	5390	6460	23300	15100	9080	7230	6840
23	4560	5020	e5000	e6900	6610	5610	6580	23500	18100	8720	7340	6710
24	4620	5070	e6000	e6900	5980	5510	6840	22000	21000	8310	7100	6600
25	4640	4860	e7000	e6900	6250	5680	7370	21400	20500	7890	7040	6890
26	4640	e5000	e7000	e6800	5910	5890	7720	21300	20300	7750	7240	6540
27	4620	e4800	e7500	e6700	5890	5540	8310	21100	18900	7840	7100	6780
28	4550	e4900	e7300	e6600	5930	5290	8280	19800	18000	8170	7670	6500
29	4660	4690	e7400	e6600	---	5540	8030	17700	17900	8120	6680	6550
30	4600	4940	e7200	e6600	---	5420	7980	16400	17900	7840	6950	6370
31	5050	---	e6800	e6300	---	5390	---	15400	---	7690	7180	---
TOTAL	152660	145370	177460	222400	185520	173180	193110	434320	565700	358420	222120	205120
MEAN	4925	4846	5725	7174	6626	5586	6437	14010	18860	11560	7165	6837
MAX	5720	5680	7500	8000	7400	7160	8310	23500	25800	17900	7690	7260
MIN	4540	4230	3400	6300	5890	4610	5430	7210	12200	7690	6680	6370
AC-FT	302800	288300	352000	441100	368000	343500	383000	861500	1122000	710900	440600	406900

CAL YR 1990 TOTAL 2490020 MEAN 6822 MAX 15900 MIN 3400 AC-FT 4939000
WTR YR 1991 TOTAL 3035380 MEAN 8316 MAX 25800 MIN 3400 AC-FT 6021000

e Estimated

MISSOURI RIVER MAIN STEM

06109500 MISSOURI RIVER AT VIRGELLE, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1975-85, November 1990 to September 1991 (discontinued).

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1974 to September 1981.
WATER TEMPERATURE: October 1974 to September 1981.
SUSPENDED-SEDIMENT DISCHARGE:

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1975-79, 1981): Maximum daily, 712 microsiemens, Apr. 8, 1979; minimum daily, 112 microsiemens, Mar. 4, 1975.
WATER TEMPERATURE (water years 1975-81): Maximum, 27.0°C, July 23, 1977; minimum, 0.0°C, on many days during winter periods.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRESSURE (MM OF HG) (00025)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)
NOV 05...	1630	--	--	--	472	-2.0	5.0	--	--	--
FEB 27...	0740	6080	--	--	488	-1.0	3.0	--	--	--
JUN 06...	1700	17400	--	--	376	25.0	14.5	--	--	--
JUL 18...	1250	10400	--	--	451	23.0	21.5	--	--	--
AUG 21...	1055	--	--	--	444	28.0	22.0	--	--	--
SEP 04...	1630	7010	10	1	430	28.0	20.5	700	10.2	124

DATE	TIME	BICARBONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CARBONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STANDARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)
SEP 04...	1630	164	7	144	8.9	180	45	17	23	0.7	2.9

DATE	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)
SEP 04...	147	78	11	0.90	9.0	275	0.37	5200	<0.010	<0.050	0.010

DATE	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	ANTIMONY, DISSOLVED (UG/L AS SB) (01095)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
SEP 04...	<0.010	2	17	16	80	3	52	1	24	454	84

06109500 MISSOURI RIVER AT VIRGELLE, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	PH (STAND-ARD UNITS) (00400)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)
SEP											
04...	1600	7010	444	28.0	20.5	700	10.2	124	8.9	--	13
04...	1700	7010	439	28.0	20.5	700	--	--	--	--	14
04...	1800	6980	440	25.0	20.5	699	10.1	123	--	--	14
04...	1900	6950	439	25.0	20.5	699	9.6	116	--	--	14
04...	2000	6890	441	18.0	20.0	699	9.2	111	--	--	14
04...	2100	6840	444	16.5	20.0	699	9.1	110	--	--	14
04...	2200	6780	445	16.0	19.5	699	8.8	105	--	--	15
04...	2300	6750	448	11.0	19.0	700	8.7	102	--	--	14
04...	2400	6730	449	11.0	19.0	700	8.5	100	--	--	14
05...	0100	6700	449	9.0	18.5	700	8.3	97	--	--	14
05...	0200	6670	451	8.5	18.5	700	8.2	96	--	--	--
05...	0300	6670	452	7.5	18.0	700	8.2	95	8.7	--	13
05...	0400	6670	453	7.0	18.0	700	8.0	92	8.7	--	14
05...	0500	6670	454	6.0	17.5	699	8.1	93	8.7	--	14
05...	0600	6700	454	5.0	17.5	699	8.1	93	8.7	--	13
05...	0700	6750	455	4.5	17.5	699	8.1	93	8.7	--	13
05...	0800	6870	455	7.0	17.0	700	8.2	93	8.7	16	13
05...	0900	6950	453	9.0	17.0	699	8.4	95	8.7	--	13
05...	1000	7010	452	14.5	17.5	699	8.6	98	8.8	--	13
05...	1100	7040	452	18.0	17.5	698	8.9	102	8.8	--	13
05...	1200	7010	449	21.5	18.0	698	9.1	105	8.8	--	13
05...	1300	6980	447	23.0	18.5	698	9.3	109	8.8	--	14
05...	1400	6950	444	26.0	19.0	697	9.6	114	8.8	17	14
05...	1500	6890	442	25.5	19.5	696	9.8	118	8.9	--	15
05...	1600	6890	441	26.0	19.5	696	10.1	121	8.9	--	15
05...	1700	6870	440	26.0	19.5	696	10.1	121	8.9	--	15
05...	1800	6870	438	26.0	20.0	696	10.1	122	8.9	--	16
05...	1900	6840	440	24.5	20.0	695	9.8	119	9.0	--	13
05...	2000	6840	441	22.0	19.5	694	9.4	113	8.9	17	14
05...	2100	6840	443	20.0	19.5	695	9.1	109	8.9	--	14
05...	2200	6840	445	19.5	19.0	695	8.9	106	8.9	--	14
05...	2300	6840	446	19.5	18.5	694	8.6	102	8.9	--	14
05...	2400	6840	447	19.0	18.5	694	8.5	100	8.8	--	15
06...	0100	6840	449	18.5	18.5	694	8.3	98	8.8	--	15
06...	0200	6840	450	17.0	18.5	694	8.2	96	8.7	--	--
06...	0300	6840	451	15.0	18.5	693	8.1	95	8.7	--	13
06...	0400	6840	453	12.5	18.0	693	8.0	94	8.7	--	14
06...	0500	6840	454	10.0	17.5	694	8.0	92	8.7	--	14
06...	0600	6870	455	8.0	17.5	693	8.0	92	8.7	--	13
06...	0700	6870	453	8.0	17.5	694	8.0	93	8.7	--	13
06...	0800	6890	455	10.0	17.5	693	8.1	94	8.7	--	13
06...	0900	6890	454	13.0	17.0	694	8.3	95	8.7	--	13
06...	1000	6890	453	18.0	17.5	694	8.5	98	8.7	--	13

06113500 JUDITH RIVER NEAR WINIFRED, MT

LOCATION.--Lat 47°33'00", long 109°35'00", in SW1/4SW1/4NW1/4SE1/4 sec.30, T.21 N., R.17 E., Fergus County, Hydrologic Unit 10040103, at Anderson Bridge, 10 mi west of Winifred.

DRAINAGE AREA.--2160 mi^2.

PERIOD OF RECORD.--August to September 1991 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRESSURE (MM OF HG) (00025)
AUG								
07...	0930	241	0	0	805	28.0	19.0	695
SEP								
04...	1730	243	10	1	742	26.0	20.5	696

DATE	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	PH (STANDARD UNITS) (00400)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	LITHIUM DISSOLVED (UG/L AS LI) (01130)
AUG							
07...	8.4	100	8.4	3.6	2	1	30
SEP							
04...	8.8	108	8.5	4.0	2	1	30

MISSOURI RIVER MAIN STEM

06115200 MISSOURI RIVER NEAR LANDUSKY, MT
(National stream quality accounting network station)

LOCATION.--Lat 47°37'51", long 108°41'13", in NW1/4NE1/4 sec.31, T.22 N., R.24 E., Fergus County, Hydrologic Unit 10040104, Fort Peck Game Range, on right bank 380 ft upstream from bridge on U.S. Highway 191, 0.9 mi upstream from Armells Creek, 20 mi south of Landusky, and at river mile 1,921.61.

DRAINAGE AREA.--40,987 mi^2. Area at site used prior to Dec. 13, 1968, 40,763 mi^2.

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,239.96 ft above National Geodetic Vertical Datum of 1929 (State Highway bench mark). Prior to Feb. 7, 1935, nonrecording gage, and Feb. 7, 1935, to Dec. 12, 1968, water-stage recorder, at site 16.5 mi upstream at datum 33.06 ft higher.

REMARKS.--Estimated daily discharges: Nov. 27 to Mar. 10. Water-discharge records good except those for estimated daily discharges, which are poor. Flow regulated by 24 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 870,400 acres upstream from station. U. S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--57 years, 9,274 ft^3/s, 6,719,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 137,000 ft^3/s, June 6, 1953, gage height 22.20 ft, from graph based on gage readings, site and datum then in use; maximum gage height, 30.16 ft, Mar. 19, 1947 (ice jam), from floodmark, site and datum then in use; maximum gage height, present site and datum, 34.17 ft, Mar. 26, 1978, (ice jam), from floodmark; minimum discharge, 1,120 ft^3/s, July 8, 1936, gage height, 1.92 ft, site and datum then in use.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 27,600 ft^3/s, June 14, gage height, 22.67 ft; minimum daily, 3,300 ft^3/s, Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5640	4940	e5500	e7600	e7000	e6600	6110	8420	17500	20000	8210	7570
2	5620	5680	e5600	e7400	e7200	e6600	6070	8230	17200	18700	8110	7320
3	5760	5680	e5600	e7400	e7500	e6500	6110	7980	17100	18600	7810	7180
4	5710	5420	e5600	e7800	e7600	e7000	6020	7740	17300	19000	7800	7260
5	5580	5130	e5600	e8200	e7800	e8000	6140	7720	17700	18600	7690	7210
6	5630	5070	e5900	e8200	e7600	e7700	6150	7650	18900	17500	7500	7220
7	5670	5180	e6300	e8000	e7300	e7800	5970	7890	20800	16700	7540	7260
8	5390	5110	e6500	e8000	e7400	e7800	6070	8150	21400	16600	7450	7120
9	5320	5120	e6400	e7900	e7600	e7800	6190	8090	23200	16100	7480	7030
10	5460	4990	e6500	e7900	e7800	e8000	6100	8690	24300	14800	7430	7170
11	5500	5120	e6400	e8000	e7900	8050	6490	9600	24500	13200	7330	7210
12	5420	5020	e6400	e7900	e8000	7190	6630	11200	23600	13700	7480	7360
13	5320	5110	e6400	e8000	e8000	6580	6670	11400	24000	14500	7490	7540
14	5300	5100	e6300	e8200	e8000	6730	6790	13000	26100	13500	7690	7440
15	5260	5230	e6500	e8400	e7700	6250	6770	15000	27100	12900	7680	7490
16	5190	5160	e6400	e8500	e7200	6180	6790	15300	25200	12100	7570	7550
17	5100	5140	e6000	e8400	e7300	6160	6570	16300	23100	11600	7660	7550
18	5170	4850	e6000	e8500	e7400	5970	6690	16600	21200	11400	7240	7480
19	4980	4730	e6000	e8200	e7200	6140	6710	16600	18300	10900	7730	7600
20	4960	4520	e5000	e7900	e7000	6150	6840	18000	16000	10500	7870	7320
21	4880	4610	e4000	e7800	e7000	6070	6790	20000	14900	10300	7700	7220
22	4930	5000	e3500	e7800	e7400	6040	6820	22100	16900	10100	7680	7170
23	4920	5300	e3300	e7600	e7400	6090	6810	25400	16600	9600	7560	7260
24	4960	5230	e3500	e7600	e7500	6380	6940	24900	19300	9320	7650	7100
25	4960	5320	e5000	e7600	e7100	6270	7140	23500	22300	8890	7590	7040
26	4910	5060	e6500	e7600	e7200	6390	7590	23100	21400	8450	7390	7250
27	4900	e4500	e7500	e7500	e7000	6440	7820	22900	21100	8290	7550	7010
28	4930	e5200	e8000	e7400	e6800	6320	8770	22800	20300	8250	7570	7080
29	4880	e5400	e7800	e7300	---	6110	9260	21300	19400	8580	7620	7010
30	4920	e5400	e8000	e7300	---	6200	8620	19700	21100	8600	7800	6890
31	4880	---	e7800	e7300	---	6000	---	18400	---	8340	6910	---
TOTAL	162050	153320	185800	243200	207900	207510	204440	467660	617800	399620	235780	217910
MEAN	5227	5111	5994	7845	7425	6694	6815	15090	20590	12890	7606	7264
MAX	5760	5680	8000	8500	8000	8050	9260	25400	27100	20000	8210	7600
MIN	4880	4500	3300	7300	6800	5970	5970	7650	14900	8250	6910	6890
AC-FT	321400	304100	368500	482400	412400	411600	405500	927600	1225000	792600	467700	432200

CAL YR 1990 TOTAL 2791930 MEAN 7649 MAX 18000 MIN 3300 AC-FT 5538000
WTR YR 1991 TOTAL 3302990 MEAN 9049 MAX 27100 MIN 3300 AC-FT 6551000

e Estimated

06115200 MISSOURI RIVER NEAR LANDUSKY, MT--Continued
(National stream quality accounting network station)

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 current year

REMARKS.--Unpublished records of once-daily water temperature are available in files of the District office. Prior to July 1972, sampling and record computations were under supervision of Corps of Engineers, U.S. Army. Sediment loads estimated for several days during winter period. Flow affected by ice during most of winter period.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1979-81): Maximum daily, 1,240 microsiemens, June 20, 1979; minimum daily, 410 microsiemens, 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: Maximum daily mean, 9,800 mg/L, June 22; minimum daily mean, 21 mg/L, Jan. 12.
SEDIMENT LOAD: Maximum daily, 447,000 tons, June 22; minimum daily, 425 tons, Dec. 22.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, IN CUBIC FEET PER SECOND (00060)	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)
OCT							
10...	1300	--	5540	100	2	470	10.0
DEC							
04...	1120	E5600	--	100	2	488	6.0
JAN							
15...	1330	--	8400	40	1	500	3.0
FEB							
20...	0900	E7000	--	100	2	492	4.0
APR							
01...	1200	--	6090	0	0	530	16.0
MAY							
22...	1000	--	22200	25	1	402	22.0
JUN							
13...	1350	--	24000	25	1	395	20.0
20...	1300	--	15700	100	2	420	19.0
25...	2100	--	21900	--	--	668	--
JUL							
22...	1250	--	10100	35	1	451	26.0
SEP							
16...	1300	--	7570	100	2	451	13.0

DATE	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRESSURE (MM OF HG) (00025)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	COLIFORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT						
10...	9.0	702	10.2	96	K7	K2
DEC						
04...	0.0	698	12.2	91	K2	K4
JAN						
15...	0.0	--	--	--	--	--
FEB						
20...	0.0	703	12.6	94	<1	<1
APR						
01...	8.0	703	10.2	94	<1	K31
MAY						
22...	17.0	--	--	--	--	--
JUN						
13...	18.0	--	--	--	--	--
20...	16.0	--	--	--	--	--
25...	18.0	--	--	--	--	--
JUL						
22...	23.0	714	7.8	97	K5	K4
SEP						
16...	15.0	711	9.0	96	K1	K9

MISSOURI RIVER MAIN STEM

06115200 MISSOURI RIVER NEAR LANDUSKY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	BICARBONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CARBONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STANDARD UNITS) (00400)	TURBIDITY (NTU) (00076)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)
OCT 10...	1300	166	9	143	8.7	8.0	200	48	19	25	0.8
DEC 04...	1120	189	2	157	8.5	2.8	210	53	19	24	0.7
FEB 20...	0900	168	4	143	8.3	25	200	50	19	28	0.9
APR 01...	1200	191	3	158	8.5	25	220	53	21	31	0.9
JUL 22...	1250	172	0	136	8.1	27	190	46	17	24	0.8
SEP 16...	1300	--	--	--	8.6	4.7	190	48	18	23	0.7

DATE	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRATE TOTAL (MG/L AS N) (00620)
OCT 10...	3.8	155	96	7.4	0.6	8.8	284	300	0.39	4250	--
DEC 04...	3.0	165	98	10	0.8	9.9	301	313	0.41	E4550	--
FEB 20...	2.8	145	99	8.9	0.7	11	289	308	0.39	E5460	--
APR 01...	2.9	162	110	11	0.7	8.9	346	335	0.47	5690	0.038
JUL 22...	2.6	147	90	9.2	0.7	6.1	267	281	0.36	7280	--
SEP 16...	2.9	148	94	7.2	0.9	8.8	267	375	0.36	5460	--

DATE	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	NITROGEN, ORGANIC DISSOLVED (MG/L AS N) (00607)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)
OCT 10...	<0.01	<0.01	<0.10	<0.10	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01
DEC 04...	<0.01	<0.01	0.10	0.10	0.02	0.02	--	0.02	0.02	<0.01	<0.01
FEB 20...	<0.01	<0.01	0.29	0.24	0.02	0.03	--	0.04	<0.01	<0.01	<0.01
APR 01...	0.02	<0.01	0.06	<0.05	0.01	<0.01	--	0.04	<0.01	<0.01	<0.01
JUL 22...	<0.01	<0.01	<0.05	<0.05	0.01	0.01	0.39	0.04	<0.01	0.02	<0.01
SEP 16...	0.01	<0.01	<0.05	<0.05	0.01	<0.01	--	0.04	<0.01	0.02	<0.01

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)
OCT 10...	1300	<10	15	53	<0.5	<1	<1	<3	3	4	<1
FEB 20...	0900	<10	10	52	<0.5	<1	<1	<3	2	10	1
JUL 22...	1250	10	13	62	<0.5	<1	<1	<3	4	8	<1
SEP 16...	1300	<10	11	55	<0.5	<1	<1	<3	2	8	<1

MISSOURI RIVER MAIN STEM

06115200 MISSOURI RIVER NEAR LANDUSKY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
OCT										
10...	50	2	0.2	<10	1	<1	<1.0	440	<6	<3
FEB										
20...	50	2	0.1	<10	2	<1	<1.0	400	<6	<3
JUL										
22...	45	1	<0.1	<10	4	<1	<1.0	370	<6	7
SEP										
16...	51	<1	<0.1	<10	<1	<1	<1.0	400	<6	5

DATE	TIME	TEMPER-ATURE WATER (DEG C) (00010)	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)
OCT							
10...	1300	9.0	--	5540	56	838	--
DEC							
04...	1120	0.0	E5600	--	48	E726	--
JAN							
15...	1330	0.0	--	8400	52	1180	--
FEB							
20...	0900	0.0	E7000	--	62	E1170	--
APR							
01...	1200	8.0	--	6090	98	1610	--
MAY							
22...	1000	17.0	--	22200	1700	102000	--
JUN							
13...	1350	18.0	--	24000	609	39500	--
20...	1300	16.0	--	15700	284	12000	--
25...	2100	18.0	--	21900	7000	414000	53
JUL							
22...	1250	23.0	--	10100	239	6520	--
SEP							
16...	1300	15.0	--	7570	86	1760	--

DATE	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .008 MM (70339)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT							
10...	--	--	--	--	--	--	32
DEC							
04...	--	--	--	--	--	--	--
JAN							
15...	--	--	--	--	--	--	38
FEB							
20...	--	--	--	--	--	--	82
APR							
01...	--	--	--	--	--	--	73
MAY							
22...	--	--	--	--	--	--	81
JUN							
13...	--	--	--	--	--	--	73
20...	--	--	--	--	--	--	60
25...	60	62	73	96	99	100	--
JUL							
22...	--	--	--	--	--	--	43
SEP							
16...	--	--	--	--	--	--	42

MISSOURI RIVER MAIN STEM

06115200 MISSOURI RIVER NEAR LANDUSKY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	BED MAT. FALL DIAM. % FINER THAN .004 MM (80157)	BED MAT. FALL DIAM. % FINER THAN .062 MM (80158)	BED MAT. FALL DIAM. % FINER THAN .125 MM (80159)	BED MAT. FALL DIAM. % FINER THAN .250 MM (80160)	BED MAT. FALL DIAM. % FINER THAN .500 MM (80161)	BED MAT. FALL DIAM. % FINER THAN 1.00 MM (80162)
OCT							
10...	1300	--	--	--	--	--	--
APR							
01...	1200	--	--	--	--	--	--
MAY							
22...	1000	24	63	78	88	99	99
JUN							
13...	1350	--	--	--	--	--	--
JUL							
22...	1250	18	--	--	--	--	--
SEP							
16...	1300	--	--	--	--	--	--

DATE	BED MAT. FALL DIAM. % FINER THAN 2.00 MM (80163)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)
OCT							
10...	--	13	75	94	100	--	--
APR							
01...	--	0.1	0.3	10	81	98	100
MAY							
22...	100	--	--	--	--	--	--
JUN							
13...	--	0.2	1	18	94	99	100
JUL							
22...	--	57	92	98	100	--	--
SEP							
16...	--	3	10	33	97	100	--

MISSOURI RIVER MAIN STEM

06115200 MISSOURI RIVER NEAR LANDUSKY, MT--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	50	761	75	1000	42	624	30	616	36	680	182	3240
2	52	789	113	1730	44	665	37	739	50	972	184	3280
3	74	1150	110	1690	47	711	44	879	55	1110	185	3250
4	88	1360	89	1300	45	680	51	1070	56	1150	190	3590
5	81	1220	66	914	45	680	56	1240	57	1200	228	4920
6	72	1090	61	835	45	717	62	1370	56	1150	278	5780
7	76	1160	62	867	45	765	54	1170	55	1080	314	6610
8	114	1660	69	952	45	790	42	907	54	1080	331	6970
9	88	1260	90	1240	45	778	31	661	53	1090	325	6840
10	60	885	93	1250	45	790	25	533	53	1120	305	6590
11	62	921	159	2200	45	778	22	475	53	1130	261	5670
12	65	951	137	1860	45	778	21	448	58	1250	234	4540
13	70	1010	94	1300	45	778	30	648	67	1450	188	3340
14	75	1070	79	1090	45	765	40	886	75	1620	115	2090
15	84	1190	74	1040	45	790	49	1110	71	1480	92	1550
16	102	1430	70	975	45	778	50	1150	65	1260	114	1900
17	101	1390	62	860	45	729	47	1070	59	1160	100	1660
18	76	1060	72	943	45	729	44	1010	70	1400	94	1520
19	58	780	62	792	45	729	40	886	87	1690	109	1810
20	57	763	61	744	45	607	35	747	106	2000	93	1540
21	64	843	69	859	45	486	30	632	127	2400	87	1430
22	75	998	97	1310	45	425	29	611	148	2960	107	1740
23	71	943	109	1560	50	445	28	575	167	3340	139	2290
24	53	710	76	1070	57	539	27	554	173	3500	190	3270
25	64	857	58	833	69	931	30	616	175	3350	156	2640
26	86	1140	52	710	70	1230	33	677	178	3460	117	2020
27	82	1080	47	571	61	1240	36	729	179	3380	127	2210
28	76	1010	42	590	49	1060	35	699	180	3300	152	2590
29	68	896	37	539	36	758	32	631	---	---	152	2510
30	87	1160	39	569	27	583	29	572	---	---	132	2210
31	82	1080	---	---	24	505	28	552	---	---	110	1780
TOTAL	---	32617	---	32193	---	22863	---	24463	---	50762	---	101380
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	103	1700	575	13100	430	20300	2450	132000	101	2240	100	2040
2	124	2030	440	9780	310	14400	1210	61100	119	2610	84	1660
3	163	2690	380	8190	640	29500	770	38700	143	3020	112	2170
4	127	2060	275	5750	1330	62100	570	29200	156	3290	112	2200
5	95	1570	235	4900	700	33500	510	25600	150	3110	90	1750
6	89	1480	220	4540	2930	150000	460	21700	140	2840	72	1400
7	90	1450	210	4470	3300	185000	410	18500	129	2630	72	1410
8	90	1480	225	4950	1220	70500	370	16600	112	2250	95	1830
9	91	1520	225	4910	700	43800	340	14800	100	2020	127	2410
10	127	2090	275	6450	1150	75500	330	13200	99	1990	110	2130
11	665	11700	380	9850	850	56200	355	12700	117	2320	81	1580
12	760	13600	1960	59300	770	49100	460	17000	340	6870	76	1510
13	490	8820	1430	44000	650	42100	495	19400	360	7280	79	1610
14	190	3480	1620	56900	530	37300	400	14600	224	4650	89	1790
15	155	2830	1630	66000	600	43900	370	12900	235	4870	114	2310
16	140	2570	1140	47100	500	34000	378	12300	263	5380	92	1880
17	145	2570	940	41400	380	23700	450	14100	255	5270	122	2490
18	155	2800	1100	49300	330	18900	428	13200	223	4360	104	2100
19	150	2720	850	38100	300	14800	310	9120	199	4150	87	1790
20	140	2590	1020	49600	590	25500	250	7090	174	3700	97	1920
21	150	2750	1350	72900	2600	105000	230	6400	156	3240	150	2920
22	180	3310	1580	94300	9800	447000	225	6140	137	2840	160	3100
23	190	3490	1590	109000	2180	97700	109	2830	118	2410	122	2390
24	195	3650	1680	113000	1350	70300	128	3220	106	2190	87	1670
25	220	4240	1230	78000	5400	325000	235	5640	110	2250	63	1200
26	270	5530	1140	71100	2350	136000	215	4910	137	2730	70	1370
27	320	6760	990	61200	950	54100	164	3670	154	3140	86	1630
28	710	16800	820	50500	1660	91000	153	3410	156	3190	124	2370
29	3500	87500	730	42000	2690	141000	173	4010	172	3540	140	2650
30	1480	34400	615	32700	4440	253000	150	3480	135	2840	120	2230
31	---	---	540	26800	---	---	114	2570	105	1960	---	---
TOTAL	---	240180	---	1280090	---	2750200	---	550090	---	105180	---	59510

TOTAL LOAD FOR YEAR: 5249528 TONS.

MUSSELSHELL RIVER BASIN

06120500 MUSSELSHELL RIVER AT HARLOWTON, MT

LOCATION.--Lat 46°25'48", long 109°50'24", in NE1/4 sec.28, T.8 N., R.15 E., Wheatland County, Hydrologic Unit 10040201, on left bank 350 ft downstream from bridge on U.S. Highway 191, 1.0 mi southwest of Harlowton, 6 mi upstream from American Fork, and at river mile 327.8.

DRAINAGE AREA.--1,125 mi^2.

WATER-DISCHARGE RECORDS

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. Datum of gage is 4,171.46 ft above National Geodetic Vertical Datum of 1929 (levels by Morrison and Maierle, Inc.). Prior to Dec. 8, 1937, nonrecording gages at site 1.2 mi downstream at different datums. Dec. 8, 1937, to Aug. 26, 1955, nonrecording gage at bridge 300 ft upstream at different datums.

REMARKS.--Estimated daily discharges: Nov. 7, 8, 21, 22, Nov. 26 to Mar. 13. Water-discharge records good except those for estimated daily discharges, which are poor. Some regulation by Bair and Martinsdale Reservoirs. Diversions for irrigation of about 30,100 acres upstream from station of which about 2,300 acres is flood irrigated.

AVERAGE DISCHARGE.--81 years (water years 1908-29, 1931-32, 1935-91), 159 ft^3/s, 115,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 7,270 ft^3/s, June 20, 1975, gage height, 10.01 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,530 ft^3/s, June 6, gage height, 7.26 ft; minimum, 16 ft^3/s, Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29	54	e45	e35	e60	e35	43	60	650	328	90	64
2	26	53	e50	e40	e70	e40	48	54	663	303	104	59
3	35	50	e55	e40	e60	e50	45	44	778	251	101	51
4	30	51	e65	e35	e56	e60	47	64	860	209	108	53
5	28	52	e70	e40	e54	e55	44	74	938	189	120	49
6	32	52	e60	e40	e52	e45	48	66	1930	169	115	43
7	36	e45	e65	e45	e50	e45	61	49	1820	148	110	34
8	39	e45	e70	e40	e52	e50	66	51	1440	137	105	36
9	39	60	e75	e40	e52	e50	60	58	1170	147	98	42
10	40	53	e60	e45	e45	e55	57	105	1030	154	95	42
11	40	53	e65	e50	e55	e50	55	189	929	148	91	44
12	43	52	e55	e60	e65	e45	52	356	871	137	96	52
13	61	52	e45	e70	e60	e47	50	425	857	115	96	48
14	64	50	e45	e60	e55	54	49	381	824	114	88	51
15	68	51	e50	e65	e50	51	52	676	764	117	93	55
16	69	48	e45	e60	e60	51	58	890	661	150	90	52
17	73	49	e52	e60	e55	52	69	945	596	187	88	52
18	74	50	e40	e70	e50	50	78	984	540	169	88	45
19	72	51	e25	e65	e45	49	95	1260	482	158	89	45
20	69	51	e23	e50	e50	52	98	1680	467	151	83	43
21	65	e45	e21	e55	e60	56	93	1660	455	149	76	43
22	64	e42	e17	e60	e50	70	91	1570	426	115	71	45
23	62	53	e30	e50	e45	71	88	1400	441	79	69	39
24	62	46	e40	e40	e40	61	80	1320	445	75	66	30
25	60	45	e30	e35	e50	60	89	1360	452	70	65	26
26	57	e45	e40	e40	e45	57	93	1480	417	70	64	25
27	56	e35	e50	e45	e50	49	87	1370	360	61	66	23
28	56	e40	e40	e40	e40	44	77	1060	397	60	64	21
29	55	e50	e25	e30	---	43	74	869	360	59	64	23
30	54	e60	e40	e35	---	40	70	718	334	51	65	23
31	55	---	e55	e45	---	41	---	663	---	81	64	---
TOTAL	1613	1483	1448	1485	1476	1578	2017	21881	22357	4351	2682	1258
MEAN	52.0	49.4	46.7	47.9	52.7	50.9	67.2	706	745	140	86.5	41.9
MAX	74	60	75	70	70	71	98	1680	1930	328	120	64
MIN	26	35	17	30	40	35	43	44	334	51	64	21
AC-FT	3200	2940	2870	2950	2930	3130	4000	43400	44350	8630	5320	2500

CAL YR 1990 TOTAL 32856 MEAN 90.0 MAX 681 MIN 17 AC-FT 65170
WTR YR 1991 TOTAL 63629 MEAN 174 MAX 1930 MIN 17 AC-FT 126200

e Estimated

MUSSELSHELL RIVER BASIN

06120500 MUSSELSHELL RIVER AT HARLOWTON, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1988 to current year (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
NOV										
13...	1110	52	70	1	950	15.0	4.5	654	12.0	109
DEC										
17...	1245	49	--	--	1050	2.5	0.0	--	--	--
FEB										
05...	1250	53	--	--	872	13.5	0.5	--	--	--
MAR										
21...	0825	55	50	3	948	5.5	4.5	647	9.9	91
MAY										
02...	0820	57	100	72	900	0.0	6.5	657	9.4	89
20...	1105	1750	--	--	566	15.5	13.0	--	--	--
21...	1050	1660	--	--	542	16.5	12.5	--	--	--
JUN										
06...	1655	2050	--	--	524	16.5	15.0	--	--	--
20...	0800	461	99	13	591	14.0	14.5	658	7.9	90
JUL										
10...	1045	150	--	--	718	20.5	19.0	--	--	--
25...	0950	68	20	1	801	20.0	18.0	658	7.0	86
AUG										
12...	1150	100	--	--	710	24.0	20.5	--	--	--
SEP										
11...	0900	41	100	52	977	11.0	14.5	658	7.5	86

DATE	TIME	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)
NOV										
13...	1110	--	--	--	8.0	410	95	41	65	1
MAR										
21...	0825	287	0	228	8.1	380	89	38	64	1
MAY										
02...	0820	--	--	--	7.9	380	90	37	53	1
JUN										
20...	0800	--	--	--	7.8	250	64	22	29	0.8
JUL										
25...	0950	253	0	202	8.0	340	79	34	48	1
SEP										
11...	0900	288	0	230	8.1	370	86	37	66	1

DATE	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE TOTAL (MG/L AS N) (00620)
NOV										
13...	2.9	198	320	6.6	0.4	7.4	657	0.89	92.3	--
MAR										
21...	2.7	203	280	4.6	0.3	6.5	627	0.85	93.1	0.035
MAY										
02...	2.3	182	330	6.6	0.3	6.6	635	0.86	97.7	--
JUN										
20...	2.2	189	130	4.9	0.3	9.6	375	0.51	467	0.090
JUL										
25...	2.8	214	240	6.2	0.4	5.2	540	0.73	99.2	--
SEP										
11...	3.1	243	230	10	0.3	7.8	582	0.79	64.4	--

06120500 MUSSELSHELL RIVER AT HARLOWTON, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 13...	<0.01	<0.10	0.04	<0.01	<0.01	100	5	30	4.2	95
MAR 21...	0.02	0.06	0.02	0.01	0.02	400	17	66	9.8	61
MAY 02...	<0.01	<0.05	<0.01	0.01	0.01	70	12	63	9.7	75
JUN 20...	0.01	0.10	0.04	0.05	0.02	50	19	49	61	88
JUL 25...	<0.01	<0.05	<0.01	0.03	<0.01	90	13	77	14	88
SEP 11...	<0.01	<0.05	0.02	0.02	<0.01	120	10	49	5.4	91

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)
JUN 20...	0800	2	<10	<1	3	6	750
JUL 25...	0950	2	<10	<1	3	5	190

DATE	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	SELENIUM, TOTAL (UG/L AS SE) (01147)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)
JUN 20...	4	80	<0.1	3	<1	<10
JUL 25...	4	40	<0.1	2	<1	<10

DATE	TIME	ALDRIN, TOTAL (UG/L) (39330)	CHLORDANE, TOTAL (UG/L) (39350)	CHLORDYRIFOS TOTAL RECOVER (UG/L) (38932)	DDD, TOTAL (UG/L) (39360)	DDE, TOTAL (UG/L) (39365)	DDT, TOTAL (UG/L) (39370)	DEF TOTAL (UG/L) (39040)	DIAZINON, TOTAL (UG/L) (39570)	DICAMBA (MEDIBEN) (BANVEL D) TOTAL (UG/L) (82052)	DIELDRIN TOTAL (UG/L) (39380)	DISYSTON TOTAL (UG/L) (39011)
JUN 20...	0800	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
JUL 25...	0950	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

DATE	ENDOSULFAN, TOTAL (UG/L) (39388)	ENDRIN, TOTAL (UG/L) (39390)	ETHION, TOTAL (UG/L) (39398)	FONOFOS (DYFONATE) WATER WHOLE TOT.REC (UG/L (82614)	HEPTACHLOR, TOTAL (UG/L) (39410)	HEPTACHLOR EPOXIDE TOTAL (UG/L) (39420)	LINDANE TOTAL (UG/L) (39340)	MALATHION, TOTAL (UG/L) (39530)	METHOXYCHLOR, TOTAL (UG/L) (39480)	METHYL PARATHION, TOTAL (UG/L) (39600)	METHYL TRITHION, TOTAL (UG/L) (39790)	MIREX, TOTAL (UG/L) (39755)
JUN 20...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
JUL 25...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01

DATE	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L) (39250)	PARATHION, TOTAL (UG/L) (39540)	PCB, TOTAL (UG/L) (39516)	PERTHANE TOTAL (UG/L) (39034)	PHORATE TOTAL (UG/L) (39023)	PICLORAM (TORDON) (AMDON) TOTAL (UG/L) (39720)	SILVEX, TOTAL (UG/L) (39760)	TOXAPHENE, TOTAL (UG/L) (39400)	TOTAL TRITHION (UG/L) (39786)	2,4-D, TOTAL (UG/L) (39730)	2, 4-DP TOTAL (UG/L) (82183)	2,4,5-T TOTAL (UG/L) (39740)
JUN 20...	<0.10	<0.01	<0.1	<0.1	<0.01	0.04	<0.01	<1	<0.01	0.03	<0.01	<0.01
JUL 25...	<0.10	<0.01	<0.1	<0.1	<0.01	0.02	<0.01	<1	<0.01	<0.01	<0.01	<0.01

MUSSELSHELL RIVER BASIN

06122800 MUSSELSHELL RIVER NEAR SHAWMUT, MT

LOCATION.--Lat 46°21'02", long 109°33'18", in NE1/4NW1/4SE1/4 sec. 23, T.7 S., R.17 E., Wheatland County, Hydrologic Unit 10040201, on left bank 1.6 mi west of Shawmut, 3.2 mi upstream from county bridge located 0.5 mi south of Shawmut, 4.8 mi downstream from diversion to Deadman's Basin Reservoir, and at river mile 304.1.

DRAINAGE AREA.--1,479 mi^2.

PERIOD OF RECORD.--March 1986 to current season (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 3,880 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--No estimated daily discharges this year. Seasonal records good. Diversions for irrigation of about 40,000 acres upstream from station of which about 29,000 acres is downstream from station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,020 ft^3/s, June 7, 1991, gage height, 6.65 ft; minimum daily, 0.04 ft^3/s, Sept. 28-30, 1988.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 3,020 ft^3/s, June 7, gage height, 6.65 ft; minimum daily, 0.18 ft^3/s, Apr. 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.2						.26	.62	351	482	37	19
2	1.7						.35	.58	304	446	27	18
3	2.4						.32	.61	438	389	22	18
4	2.7						.36	.58	650	313	24	18
5	2.6						.24	.56	787	271	25	17
6	3.6						.18	.46	1300	235	28	16
7	3.7						.20	.44	2700	207	28	15
8	3.9						.29	.41	2360	182	20	15
9	3.8						.38	.51	1700	176	19	15
10	3.6						.44	1.1	1290	185	17	16
11	3.6						.49	1.4	986	172	17	15
12	3.7						.50	30	807	135	74	15
13	3.7						.57	93	775	116	45	15
14	3.7						.42	66	792	106	18	15
15	3.6						.35	245	700	104	17	15
16	3.5						.36	513	540	118	17	15
17	3.4						.43	652	584	165	17	12
18	3.2						.61	720	673	150	19	11
19	3.0						.90	1060	591	122	19	10
20	2.8						.80	1690	555	127	17	10
21	2.8						.88	1990	591	116	15	26
22	2.9						.89	1760	662	114	15	33
23	2.7						.82	1560	649	77	15	30
24	2.5						.88	1320	666	76	15	11
25	2.6						.79	1320	658	65	15	9.0
26	2.5						.80	1420	647	58	15	8.6
27	2.4						.75	1530	556	48	14	9.3
28	2.4						.80	1200	615	38	14	12
29	2.3						.77	771	644	37	14	15
30	2.2						.74	553	517	31	14	20
31	2.1						---	410	---	27	16	---
TOTAL	90.8						16.57	18910.27	25088	4888	669	473.9
MEAN	2.93						.55	610	836	158	21.6	15.8
MAX	3.9						.90	1990	2700	482	74	33
MIN	1.2						.18	.41	304	27	14	8.6
AC-FT	180						33	37510	49760	9700	1330	940

06126470 HALFBREED CREEK NEAR KLEIN, MT

LOCATION.--Lat 46°23'14", long 108°32'29", in SW1/4NE1/4SW1/4 sec.1, T.7 N., R.25 E., Musselshell County, Hydrologic Unit 10040201, on left bank, 800 ft upstream from private road bridge, 1.2 mi south of Klein, 3.2 mi upstream from mouth, and 4.1 mi south of Roundup.

DRAINAGE AREA.--53.2 mi^2.

PERIOD OF RECORD.--October 1977 to September 1986, July 1987 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,330 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Dec. 20-23, 28-30. Records fair except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--13 years (water years, 1978-86, 1987-91), 0.91 ft^3/s, 659 acre-ft/yr; median of yearly mean discharges, 0.7 ft^3/s, 507 acre-ft/year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 630 ft^3/s, July 16, 1986, gage height, 8.69 ft, from floodmark, from rating curve extended above 345 ft^3/s based on extension of 1978 slope-area data; no flow Feb. 2-14, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5.0 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Aug. 15	2030	*4.7	*4.57	No peak greater than base discharge this year.			

Minimum discharge, no flow, part or all of each day, Dec. 21-23, 29-31, Jan. 2,3,30,31.

REVISIONS.--The maximum discharge for water year 1990 has been revised to 37 ft^3/s, Aug. 20, 1990, gage height, 5.57 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.20	.73	.24	.01	.02	.47	.39	.64	1.0	.65	.05	.07
2	.17	.70	.24	.01	.04	.49	.39	.59	.76	.57	.06	.08
3	.12	.65	.19	.01	.28	.53	.39	.72	.70	.53	.09	.07
4	.12	.59	.20	.01	.49	.62	.35	.91	.70	.49	.11	.07
5	.12	.58	.20	.01	.70	.79	.35	.84	.65	.51	.11	.07
6	.15	.56	.20	.01	.54	.55	.38	.75	1.8	.47	.13	.08
7	.19	.48	.20	.02	.56	.58	.44	.70	2.4	.40	.12	.09
8	.59	.52	.22	.02	.56	.59	.61	.70	1.3	.42	.09	.10
9	.66	.49	.24	.01	.86	.52	.66	.70	.93	.44	.07	.10
10	.78	.48	.25	.01	.73	.60	.69	.69	.75	.44	.08	.11
11	.88	.42	.27	.01	.79	.64	1.3	.64	.64	.39	.07	.17
12	.93	.39	.26	.01	.88	.59	1.7	.67	.57	.39	.07	.16
13	1.0	.39	.21	.08	.96	.61	1.0	.69	.61	.36	.09	.14
14	1.0	.36	.20	.05	.80	.64	.77	.64	.62	.30	.15	.15
15	1.0	.29	.19	.03	.72	.57	.91	.60	.58	.28	1.2	.39
16	.96	.33	.17	.02	.95	.50	1.3	.63	.53	.25	1.2	.30
17	.93	.35	.16	.05	1.0	.70	1.2	.59	.51	.26	.52	.18
18	1.0	.37	.15	.36	.94	.58	1.7	.59	.49	.21	.25	.13
19	1.1	.39	.16	.16	.79	.58	2.8	.62	.44	.19	.23	.10
20	1.1	.39	e.05	.19	1.1	.54	2.6	.64	.46	.17	.19	.08
21	1.1	.39	e.00	.04	1.0	.59	2.8	.64	.65	.17	.16	.39
22	1.0	.39	e.00	.05	.81	.81	2.0	.59	1.6	.15	.12	.45
23	.95	.36	e.00	.07	.82	.89	1.4	.52	1.7	.14	.12	.22
24	.98	.35	.01	.04	.67	.68	1.0	.98	.95	.13	.12	.09
25	.99	.31	.01	.03	.61	.53	.91	2.0	1.2	.12	.12	.07
26	1.0	.29	.02	.02	.51	.53	.99	1.2	1.2	.19	.10	.06
27	.88	.24	.02	.01	.55	.53	.89	1.1	.94	.19	.10	.08
28	.82	.24	e.01	.01	.58	.53	.81	1.2	.85	.11	.10	.10
29	.83	.24	e.00	.01	---	.48	.76	.93	.81	.04	.09	.19
30	.76	.25	e.00	.01	---	.47	.71	.79	.71	.06	.09	.35
31	.76	---	.01	.01	---	.41	---	1.3	---	.04	.07	---
TOTAL	23.07	12.52	4.08	1.38	19.26	18.14	32.20	24.80	27.05	9.06	6.07	4.64
MEAN	.74	.42	.13	.045	.69	.59	1.07	.80	.90	.29	.20	.15
MAX	1.1	.73	.27	.36	1.1	.89	2.8	2.0	2.4	.65	1.2	.45
MIN	.12	.24	.00	.01	.02	.41	.35	.52	.44	.04	.05	.06
AC-FT	46	25	8.1	2.7	38	36	64	49	54	18	12	9.2

CAL YR 1990 TOTAL 183.67 MEAN .50 MAX 22 MIN .00 AC-FT 364
WTR YR 1991 TOTAL 182.27 MEAN .50 MAX 2.8 MIN .00 AC-FT 362

e Estimated

MUSSELSHELL RIVER BASIN

06126500 MUSSELSHELL RIVER NEAR ROUNDUP, MT

LOCATION.--Lat 46°25'41", long 108°34'19", in NW1/4SE1/4SE1/4 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^2.

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. Datum of gage is 3,188.15 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Sept. 26, 1949, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Nov. 7, 8, 21, 22, 25-28, Dec. 1-3, 6, Dec. 12 to Mar. 9. 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 59,600 acres upstream from station, of which about 11,000 acres is 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.

AVERAGE DISCHARGE.--45 years, 214 ft^3/s, 155,000 acre-ft/yr; median of yearly mean discharges, 180 ft^3/s, 130,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,610 ft^3/s, June 18, 1967, gage height, 12.45 ft; maximum gage height, 13.73 ft, Mar. 9, 1979, ice jam; minimum daily discharge, 0.13 ft^3/s, Sept. 10, 1988; minimum gage height, 0.23 ft, July 31, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,340 ft^3/s, June 8, gage height, 6.25 ft; minimum daily, 7.0 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	27	28	e21	e18	e25	e17	23	66	1000	1050	122	225
2	23	31	e22	e16	e27	e20	23	63	880	734	160	189
3	21	30	e21	e16	e25	e30	24	62	808	609	144	174
4	19	29	26	e16	e23	e35	24	59	788	528	198	168
5	19	29	30	e15	e25	e30	22	59	864	446	223	170
6	21	29	e24	e15	e23	e25	22	61	1360	351	232	161
7	22	e26	30	e18	e25	e26	24	61	1400	295	257	155
8	25	e27	29	e16	e23	e27	32	55	2010	258	243	163
9	26	27	34	e17	e25	e38	39	52	2120	226	196	181
10	26	31	29	e20	e22	34	43	53	1720	211	185	181
11	27	29	31	e25	e23	35	49	85	1480	194	180	154
12	27	27	e20	e30	e25	38	62	272	1280	154	187	150
13	27	27	e19	e35	e22	31	74	452	1100	145	192	145
14	25	27	e20	e33	e20	31	78	490	990	134	435	148
15	25	27	e19	e30	e23	35	80	390	887	177	310	150
16	26	28	e20	e27	e27	34	89	533	811	184	282	146
17	27	30	e22	e25	e25	38	87	890	723	214	269	151
18	33	27	e18	e26	e22	36	96	983	710	229	284	114
19	31	28	e10	e28	e25	35	119	1000	789	223	254	95
20	30	28	e8.0	e22	e30	34	163	1210	739	177	247	87
21	29	e25	e7.0	e21	e25	31	157	1560	709	181	237	96
22	29	e23	e8.0	e24	e22	37	130	1960	829	185	239	102
23	29	23	e10	e22	e23	38	119	1970	946	170	239	94
24	29	29	e14	e20	e21	37	106	1910	933	201	244	97
25	29	e25	e13	e17	e23	32	94	1880	955	187	241	97
26	29	e20	e15	e20	e23	31	97	2030	916	184	237	86
27	28	e21	e19	e25	e25	30	98	1860	855	197	239	78
28	28	e22	e11	e15	e20	28	92	1700	771	182	258	73
29	28	29	e10	e13	---	26	79	1680	921	170	240	61
30	27	30	e15	e15	---	23	72	1420	1090	134	236	54
31	27	---	e20	e20	---	23	---	1170	---	122	233	---
TOTAL	819	812	595.0	660	667	965	2217	26036	31384	8452	7243	3945
MEAN	26.4	27.1	19.2	21.3	23.8	31.1	73.9	840	1046	273	234	131
MAX	33	31	34	35	30	38	163	2030	2120	1050	435	225
MIN	19	20	7.0	13	20	17	22	52	709	122	122	54
AC-FT	1620	1610	1180	1310	1320	1910	4400	51640	62250	16760	14370	7820

CAL YR 1990 TOTAL 28416.9 MEAN 77.9 MAX 1190 MIN 1.9 AC-FT 56360
WTR YR 1991 TOTAL 83795.0 MEAN 230 MAX 2120 MIN 7.0 AC-FT 166200

e Estimated

MUSSELSHELL RIVER BASIN

06127500 MUSSELSHELL RIVER AT MUSSELSHELL, MT

LOCATION.--Lat 46°31'23", long 108°06'30", in SE1/4SW1/4SW1/4 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^2.

WATER-DISCHARGE RECORDS

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. Datum of gage is 2,984.72 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 8, 1949, nonrecording gage at site 1 mi downstream at different datums.

REMARKS.--No estimated daily discharges this year. Water-discharge 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 63,300 acres upstream from station, of which about 12,500 acres is flood irrigated.

AVERAGE DISCHARGE.--37 years (1928-29, 1931-32, 1945-79, 1982-83), 215 ft^3/s, 155,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,850 ft^3/s, June 19, 1967, gage height, 11.57 ft; maximum gage height, 12.96 ft, Mar. 10, 1979, ice jam; no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 2,710 ft^3/s, June 9, gage height, 8.16 ft; minimum daily, 16 ft^3/s, Oct. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36						23	73	1090	1020	62	191
2	30						23	67	941	824	65	175
3	16						21	67	841	642	94	153
4	22						19	66	775	566	103	140
5	24						23	61	806	502	158	140
6	25						23	60	1070	435	181	141
7	25						23	61	1460	368	203	135
8	26						28	61	1840	330	218	135
9	26						33	56	2650	277	197	143
10	29						41	54	2360	250	164	160
11	27						53	56	1790	230	154	172
12	29						63	107	1470	208	148	148
13	29						73	262	1280	178	164	140
14	30						78	409	1130	178	276	138
15	30						80	408	1020	174	290	152
16	31						84	332	940	184	299	144
17	31						92	651	845	187	256	144
18	31						94	845	722	200	258	144
19	34						103	892	910	203	255	120
20	34						119	982	884	180	228	106
21	34						146	1270	713	172	218	105
22	33						134	1720	807	171	207	111
23	32						116	2010	894	150	210	110
24	32						110	1970	880	134	208	105
25	33						102	1910	901	132	215	110
26	32						95	2040	903	123	210	109
27	33						95	1930	837	125	207	101
28	33						97	1960	771	121	208	95
29	33						89	1990	756	114	215	91
30	33						79	1660	963	94	207	80
31	33						---	1310	---	72	193	---
TOTAL	926						2159	25340	33249	8544	6071	3938
MEAN	29.9						72.0	817	1108	276	196	131
MAX	36						146	2040	2650	1020	299	191
MIN	16						19	54	713	72	62	80
AC-FT	1840						4280	50260	65950	16950	12040	7810

MUSSELSHELL RIVER BASIN

06127500 MUSSELSHELL RIVER AT MUSSELSHELL, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1988 to current year (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
NOV										
15...	0815	30	5	0	2320	1.0	4.0	690	10.9	93
MAR										
18...	1125	34	0	0	2490	11.0	7.0	685	10.8	100
APR										
29...	1330	88	100	51	2590	4.0	6.5	686	10.1	92
MAY										
24...	1000	1970	--	--	740	21.0	18.0	--	--	--
JUN										
17...	1315	850	30	1	890	18.0	19.5	687	8.3	101
JUL										
23...	1130	156	10	1	1340	21.5	22.5	695	7.2	92
SEP										
06...	0900	1.4	20	1	1300	15.0	17.0	684	8.0	93

DATE	TIME	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)
NOV										
15...	0815	304	0	246	8.3	780	130	110	290	5
MAR										
18...	1125	--	--	--	8.2	820	130	120	310	5
APR										
29...	1330	345	0	276	8.2	820	130	120	340	5
JUN										
17...	1315	256	0	203	8.2	320	69	35	74	2
JUL										
23...	1130	282	0	224	8.1	460	85	59	140	3
SEP										
06...	0900	261	0	204	8.1	430	77	57	120	3

DATE	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE TOTAL (MG/L AS N) (00620)
NOV										
15...	5.2	268	1100	28	0.5	3.4	1820	2.47	147	--
MAR										
18...	4.8	254	1100	35	0.7	1.8	1850	2.52	170	0.035
APR										
29...	5.9	256	1300	28	0.3	3.7	2100	2.85	498	--
JUN										
17...	3.0	214	270	11	0.3	8.9	597	0.81	1370	0.110
JUL										
23...	4.5	231	490	17	0.4	7.6	942	1.28	397	--
SEP										
06...	4.0	210	510	15	0.4	3.8	916	1.25	3.46	--

06127500 MUSSELSHELL RIVER AT MUSSELSHELL, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 15...	<0.01	<0.10	0.04	0.02	<0.01	240	<10	48	3.9	95
MAR 18...	0.02	0.06	0.02	0.01	0.04	90	40	46	4.2	85
APR 29...	0.01	<0.05	0.02	0.03	<0.01	200	10	84	20	77
JUN 17...	0.04	0.15	0.06	0.09	0.06	100	7	369	847	76
JUL 23...	0.02	<0.05	0.01	0.08	<0.01	160	18	140	59	98
SEP 06...	<0.01	<0.05	0.02	0.03	<0.01	140	10	35	0.13	98

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)
JUN 17...	1315	3	<10	<1	8	19	6400
JUL 23...	1130	2	<10	<1	3	6	1400

DATE	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	SELENIUM, TOTAL (UG/L AS SE) (01147)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)
JUN 17...	6	200	<0.10	12	1	30
JUL 23...	5	90	0.40	12	1	10

DATE	TIME	ALDRIN, TOTAL (UG/L) (39330)	CHLORDANE, TOTAL (UG/L) (39350)	CHLORDYRIFOS TOTAL RECOVER (UG/L) (38932)	DDD, TOTAL (UG/L) (39360)	DDE, TOTAL (UG/L) (39365)	DDT, TOTAL (UG/L) (39370)	DEF TOTAL (UG/L) (39040)	DIAZINON, TOTAL (UG/L) (39570)	DICAMBA (MEDIBEN) (BANVEL D) TOTAL (UG/L) (82052)	DIELDRIN TOTAL (UG/L) (39380)	DISYSTON TOTAL (UG/L) (39011)
JUN 17...	1315	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01
JUL 23...	1130	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01

DATE	ENDOSULFAN, TOTAL (UG/L) (39388)	ENDRIN, TOTAL (UG/L) (39390)	ETHION, TOTAL (UG/L) (39398)	FONOFOS (DYFONATE) WATER WHOLE TOT.REC (UG/L (82614)	HEPTACHLOR, TOTAL (UG/L) (39410)	HEPTACHLOR EPOXIDE TOTAL (UG/L) (39420)	LINDANE TOTAL (UG/L) (39340)	MALATHION, TOTAL (UG/L) (39530)	METHOXYCHLOR, TOTAL (UG/L) (39480)	METHYL PARATHION, TOTAL (UG/L) (39600)	METHYL TRITHION, TOTAL (UG/L) (39790)	MIREX, TOTAL (UG/L) (39755)
JUN 17...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
JUL 23...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01

DATE	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L) (39250)	PARATHION, TOTAL (UG/L) (39540)	PCB, TOTAL (UG/L) (39516)	PERTHANE TOTAL (UG/L) (39034)	PHORATE TOTAL (UG/L) (39023)	PICLORAM (TORDON) (AMDON) TOTAL (UG/L) (39720)	SILVEX, TOTAL (UG/L) (39760)	TOXAPHENE, TOTAL (UG/L) (39400)	TOTAL TRITHION (UG/L) (39786)	2,4-D, TOTAL (UG/L) (39730)	2, 4-DP TOTAL (UG/L) (82183)	2,4,5-T TOTAL (UG/L) (39740)
JUN 17...	<0.10	<0.01	<0.1	<0.1	<0.01	0.05	<0.01	<1	<0.01	0.06	<0.01	<0.01
JUL 23...	<0.10	<0.01	<0.1	<0.1	<0.01	0.01	<0.01	<1	<0.01	0.04	<0.01	<0.01

MUSSELSHELL RIVER BASIN

06130500 MUSSELSHELL RIVER AT MOSBY, MT
(National stream quality accounting network station)

LOCATION.--Lat 46°59'34", long 107°53'34", in NW1/4SW1/4NW/14 sec.11, T.14 N., R.30 E., Petroleum County, Hydrologic Unit 10040205, on left bank 300 ft upstream from 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^2.

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. Datum of gage is 2,495.9 ft above National Geodetic Vertical Datum of 1929. Dec. 6, 1962, to Mar. 14, 1966, water-stage recorder at site 900 ft downstream at different datum. Mar. 15, 1966, to Dec. 11, 1973, water-stage recorder and nonrecording gages at site 400 ft downstream at same datum. Dec. 12, 1973, to Oct. 1, 1981, nonrecording gage at site 300 ft downstream at same datum. See WSP 2116 for history of changes prior to 1962.

REMARKS.--Estimated daily discharges: Nov. 7-9, Nov. 25 to Mar. 7. Water-discharge 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 103,000 acres upstream from station.

AVERAGE DISCHARGE.--59 years (water years 1931-32, 1935-91), 279 ft^3/s, 202,100 acre-ft/yr; median of yearly mean discharges, 200 ft^3/s, 144,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,000 ft^3/s, June 18, 1944, gage height, 14.43 ft; maximum gage height, 15.1 ft, Mar. 12, 1979, from floodmark, backwater from ice jam; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,310 ft^3/s, June 10, gage height, 8.01 ft; minimum daily, 2.0 ft^3/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17	35	e25	e4.0	e10	e10	37	155	1480	1500	57	137
2	18	35	e20	e3.5	e15	e15	36	142	1270	1380	43	133
3	18	35	e20	e3.5	e20	e40	36	142	1130	1160	38	129
4	21	35	e25	e3.5	e15	e70	34	150	1000	957	36	113
5	20	38	e30	e3.5	e15	e65	30	151	914	852	33	102
6	17	37	e20	e3.5	e15	e60	28	153	1230	738	48	101
7	14	e30	e20	e3.5	e15	e70	26	154	2240	641	55	92
8	11	e40	e25	e4.0	e20	62	33	153	2660	569	87	83
9	17	e40	e35	e3.5	e15	50	44	144	2830	483	107	79
10	19	37	e30	e4.0	e15	55	43	157	3220	425	127	91
11	19	38	e25	e4.0	e15	53	65	181	2640	369	109	112
12	22	39	e20	e5.0	e15	40	126	195	1920	328	97	136
13	25	36	e15	e7.0	e15	52	130	232	1600	280	127	136
14	26	35	e15	e6.5	e10	50	126	377	1300	249	122	126
15	25	37	e15	e6.5	e15	46	150	565	1200	226	128	138
16	27	35	e15	e6.0	e15	45	230	599	1150	550	331	142
17	30	34	e15	e6.0	e15	43	210	589	1140	249	339	130
18	32	33	e15	e7.0	e15	40	526	701	1040	192	257	124
19	31	33	e10	e6.0	e15	40	516	923	914	189	206	121
20	32	32	e5.0	e5.5	e20	41	468	1000	1390	205	209	120
21	32	35	e3.0	e10	e15	41	337	1110	1440	181	189	112
22	33	35	e2.0	e9.0	e15	40	306	1320	1690	155	185	115
23	34	36	e3.0	e9.0	e15	38	295	1760	1910	124	156	118
24	34	34	e4.0	e8.0	e15	38	242	2070	1870	94	159	107
25	36	e30	e5.0	e6.5	e15	37	207	2530	1810	81	160	101
26	34	e25	e4.5	e7.0	e15	40	195	2690	1670	75	153	95
27	33	e20	e4.0	e8.0	e15	43	214	2480	1540	83	153	98
28	34	e20	e3.5	e7.0	e15	45	220	2260	1330	77	151	96
29	34	e25	e3.0	e6.0	---	43	202	2230	1180	64	136	91
30	34	e30	e3.5	e8.0	---	40	175	2240	1610	64	142	85
31	34	---	e3.5	e7.5	---	37	---	1850	---	56	139	---
TOTAL	813	1004	439.0	182.0	425	1389	5287	29403	48318	12596	4279	3363
MEAN	26.2	33.5	14.2	5.87	15.2	44.8	176	948	1611	406	138	112
MAX	36	40	35	10	20	70	526	2690	3220	1500	339	142
MIN	11	20	2.0	3.5	10	10	26	142	914	56	33	79
AC-FT	1610	1990	871	361	843	2760	10490	58320	95840	24980	8490	6670

CAL YR 1990 TOTAL 29879.97 MEAN 81.9 MAX 1360 MIN .17 AC-FT 59270
WTR YR 1991 TOTAL 107498.0 MEAN 295 MAX 3220 MIN 2.0 AC-FT 213200

e Estimated

06130500 MUSSELSHELL RIVER AT MOSBY, MT--Continued
(National stream quality accounting network station)

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.
SUSPENDED-SEDIMENT DISCHARGE: October 1982 to current year.
REMARKS.--Unpublished records of once-daily water temperatures are available in files of District office. Flow affected by ice during most of winter months.
EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1975-81): Maximum daily, 4,900 microsiemens, Aug. 14, 1977; minimum daily, 678 microsiemens, Mar. 23, 1978.
WATER TEMPERATURE (water years 1975-79): Maximum daily, 26.0°C, Aug. 7, 9, 1978; minimum daily, 0.0°C on many days during winter periods.
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.--
SEDIMENT CONCENTRATION: Maximum daily mean, 9,300 mg/L, July 16; minimum daily mean, 40 mg/L, Dec. 13.
SEDIMENT LOAD: Maximum daily, 27,400 tons, June 10; minimum daily, 0.66 ton, Dec. 22.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRESSURE (MM OF HG) (00025)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV												
14...	1015	35	50	1	2880	11.0	6.0	694	10.8	96	K8	29
DEC												
18...	1050	16	100	72	3800	-13.5	0.0	--	--	--	--	--
FEB												
06...	1000	16	0	0	4010	13.0	0.0	710	12.0	89	K2	180
MAR												
19...	1025	42	40	1	3270	12.0	7.0	--	--	--	--	--
APR												
18...	1320	589	--	--	2350	6.5	6.0	--	--	--	--	--
30...	1030	173	70	1	2480	6.0	7.0	--	--	--	--	--
JUN												
04...	1300	1110	50	1	1210	21.0	20.5	699	7.0	85	K230	410
11...	1215	2720	--	--	921	29.5	22.0	--	--	--	--	--
13...	1830	1470	10	1	--	24.0	23.0	--	--	--	--	--
22...	1320	1600	--	--	1160	--	21.0	--	--	--	--	--
JUL												
24...	1220	96	20	1	2000	24.0	23.5	705	7.4	95	--	--
AUG												
13...	0900	58	--	--	--	--	21.0	--	--	--	--	--
SEP												
24...	1200	111	0	0	1970	20.0	13.0	705	--	--	350	370

DATE	TIME	BICARBONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CARBONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STANDARD UNITS) (00400)	TURBIDITY (NTU) (00076)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)
NOV											
14...	1015	346	0	278	8.3	8.3	850	140	120	380	6
FEB											
06...	1000	500	0	400	8.2	4.0	1200	180	170	550	7
JUN											
04...	1300	289	0	229	8.2	38	440	93	50	110	2
JUL											
24...	1220	267	0	216	8.1	--	--	--	--	--	--
SEP											
24...	1200	253	0	202	8.2	80	570	100	78	240	4

DATE	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRATE TOTAL (MG/L AS N) (00620)
NOV											
14...	5.8	274	1400	27	0.5	1.6	2290	2250	3.11	216	--
FEB											
06...	7.0	395	1500	76	0.4	5.7	3360	2740	4.57	145	0.57
JUN											
04...	5.1	235	430	11	0.4	7.7	836	857	1.14	2510	0.11
JUL											
24...	--	--	--	--	--	--	--	--	--	--	--
SEP											
24...	5.4	225	880	18	0.4	3.4	1460	1450	1.99	438	--

06130500 MUSSELSHELL RIVER AT MOSBY, MT--Continued
WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOSPHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUMINUM, DIS-SOLVED (UG/L AS AL) (01106)
NOV 14...	<0.01	<0.01	<0.10	<0.10	0.04	0.05	0.02	0.02	<0.01	<0.01	<10
FEB 06...	0.03	0.01	0.60	0.60	0.12	0.12	0.03	0.01	<0.01	<0.01	20
JUN 04...	0.10	<0.01	0.21	1.30	0.02	0.02	0.26	0.06	0.10	0.01	20
JUL 24...	--	--	--	--	--	--	--	--	--	--	--
SEP 24...	0.01	<0.01	<0.05	<0.05	<0.01	0.02	0.09	<0.01	<0.01	<0.01	20

DATE	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BERYLLIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	BERYLLIUM, DIS-SOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	CHROMIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)
NOV 14...	--	<1	<100	--	<10	--	<1	--	<1	1	--
FEB 06...	--	<1	<100	--	<10	--	<1	--	2	1	--
JUN 04...	5	2	47	<10	<0.5	<1	<1	16	<1	<3	21
JUL 24...	1	--	--	<10	--	<1	--	--	--	--	--
SEP 24...	--	<1	45	--	<0.5	--	<1	--	<1	<3	--

DATE	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGANESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MANGANESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG) (71900)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)
NOV 14...	3	--	<10	--	<1	80	--	20	--	<0.1
FEB 06...	2	--	10	--	<1	130	--	70	--	0.2
JUN 04...	5	14000	12	13	2	46	370	5	<0.10	<0.1
JUL 24...	--	--	--	3	--	--	90	--	0.10	--
SEP 24...	4	--	6	--	<1	81	--	4	--	<0.1

DATE	MOLYBDENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRONTIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANADIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
NOV 14...	2	--	3	--	2	<1	2700	1	--	<10
FEB 06...	2	--	2	--	<1	<1	4000	2	--	<10
JUN 04...	<10	25	3	1	<1	<1	1500	<6	40	16
JUL 24...	--	--	--	2	--	--	--	--	<10	--
SEP 24...	<10	--	3	--	1	<1	1800	<6	--	13

DATE	TIME	ALDRIN, TOTAL (UG/L) (39330)	CHLORDANE, TOTAL (UG/L) (39350)	CHLORDYRIFOS TOTAL RECOVER (UG/L) (38932)	DDD, TOTAL (UG/L) (39360)	DDE, TOTAL (UG/L) (39365)	DDT, TOTAL (UG/L) (39370)	DEF TOTAL (UG/L) (39040)	DIAZINON, TOTAL (UG/L) (39570)	DICAMBA (MEDIBEN) (BANVEL D) TOTAL (UG/L) (82052)	DIELDRIN TOTAL (UG/L) (39380)	DISYSTON TOTAL (UG/L) (39011)
JUN 04...	1300	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
JUL 24...	1220	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

06130500 MUSSELSHELL RIVER AT MOSBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	ENDO-SULFAN, TOTAL (UG/L) (39388)	ENDRIN, TOTAL (UG/L) (39390)	ETHION, TOTAL (UG/L) (39398)	FONOFOS (DY-FONATE) WATER WHOLE TOT.REC (UG/L (82614)	HEPTA-CHLOR, TOTAL (UG/L) (39410)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L) (39420)	LINDANE TOTAL (UG/L) (39340)	MALA-THION, TOTAL (UG/L) (39530)	METH-OXY-CHLOR, TOTAL (UG/L) (39480)	METHYL PARA-THION, TOTAL (UG/L) (39600)	METHYL TRI-THION, TOTAL (UG/L) (39790)	MIREX, TOTAL (UG/L) (39755)
JUN 04...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
JUL 24...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01

DATE	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L) (39250)	PARA-THION, TOTAL (UG/L) (39540)	PCB, TOTAL (UG/L) (39516)	PER-THANE TOTAL (UG/L) (39034)	PHORATE TOTAL (UG/L) (39023)	PICLO-RAM (TOR-DON) (AMDON) TOTAL (UG/L) (39720)	SILVEX, TOTAL (UG/L) (39760)	TOX-APHENE, TOTAL (UG/L) (39400)	TOTAL TRI-THION (UG/L) (39786)	2,4-D, TOTAL (UG/L) (39730)	2, 4-DP TOTAL (UG/L) (82183)	2,4,5-T TOTAL (UG/L) (39740)
JUN 04...	<0.10	<0.01	<0.1	<0.1	<0.01	0.01	<0.01	<1	<0.01	0.02	<0.01	<0.01
JUL 24...	<0.10	<0.01	<0.1	<0.1	<0.01	0.03	<0.01	<1	<0.01	0.03	<0.01	<0.01

DATE	TIME	TEMPER-ATURE WATER (DEG C) (00010)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .008 MM (70339)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 14...	1015	6.0	35	76	7.2	--	--	--	--	--	--	93
DEC 18...	1050	0.0	16	122	5.3	--	--	--	--	--	--	76
FEB 06...	1000	0.0	16	45	1.9	--	--	--	--	--	--	87
MAR 19...	1025	7.0	42	87	9.9	--	--	--	--	--	--	81
APR 18...	1320	6.0	589	2580	4100	--	--	--	--	--	--	98
30...	1030	7.0	173	199	93	--	--	--	--	--	--	98
JUN 04...	1300	20.5	1110	623	1870	--	--	--	--	--	--	92
11...	1215	22.0	2720	2140	15700	--	--	--	--	--	--	92
13...	1830	23.0	1470	1230	4880	--	--	--	--	--	--	87
22...	1320	21.0	1600	3080	13300	68	74	82	93	98	100	--
JUL 24...	1220	23.5	96	185	48	--	--	--	--	--	--	99
AUG 13...	0900	21.0	58	96	15	--	--	--	--	--	--	98
SEP 24...	1200	13.0	111	152	46	--	--	--	--	--	--	99

DATE	TIME	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)	BED MAT. SIEVE DIAM. % FINER THAN 32.0 MM (80173)	BED MAT. SIEVE DIAM. % FINER THAN 64.0 MM (80174)
NOV 14...	1015	1.3	1.7	2.5	3.4	4.9	8.8	16	28	52	89	100
MAR 19...	1025	0.8	1.6	3	4.1	5.5	8.3	13	19	36	83	100
APR 30...	1030	0.6	1.1	2	2.9	4.4	7.3	13	22	50	84	100
JUN 04...	1300	1.7	2.4	3.6	4.5	6	10	20	33	53	100	--
SEP 24...	1200	1.4	2.7	5.8	8	10	13	19	28	51	80	100

MUSSELSHELL RIVER BASIN

06130500 MUSSELSHELL RIVER AT MOSBY, MT--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	58	2.7	82	7.7	117	7.9	265	2.9	132	3.6	102	2.8
2	82	4.0	84	7.9	114	6.2	257	2.4	120	4.9	90	3.6
3	64	3.1	91	8.6	112	6.0	232	2.2	140	7.6	84	9.1
4	71	4.0	76	7.2	113	7.6	165	1.6	175	7.1	109	21
5	74	4.0	70	7.2	116	9.4	100	.95	123	5.0	114	20
6	77	3.5	84	8.4	115	6.2	90	.85	92	3.7	121	20
7	74	2.8	107	8.7	110	5.9	89	.84	132	5.3	135	26
8	67	2.0	120	13	113	7.6	97	1.0	125	6.8	108	18
9	88	4.0	119	13	126	12	110	1.0	113	4.6	88	12
10	95	4.9	104	10	107	8.7	109	1.2	130	5.3	95	14
11	88	4.5	89	9.1	83	5.6	90	.97	132	5.3	101	14
12	84	5.0	89	9.4	58	3.1	76	1.0	128	5.2	82	8.9
13	84	5.7	92	8.9	40	1.6	76	1.4	96	3.9	118	17
14	101	7.1	94	8.9	62	2.5	124	2.2	78	2.1	125	17
15	111	7.5	96	9.6	109	4.4	176	3.1	92	3.7	90	11
16	113	8.2	94	8.9	107	4.3	175	2.8	125	5.1	115	14
17	112	9.1	87	8.0	104	4.2	176	2.9	148	6.0	109	13
18	98	8.5	82	7.3	117	4.7	139	2.6	160	6.5	119	13
19	98	8.2	80	7.1	113	3.1	119	1.9	131	5.3	91	9.8
20	111	9.6	70	6.0	135	1.8	116	1.7	133	7.2	95	11
21	109	9.4	64	6.0	151	1.2	111	3.0	149	6.0	72	8.0
22	114	10	74	7.0	123	.66	90	2.2	170	6.9	87	9.4
23	104	9.5	104	10	84	.68	78	1.9	172	7.0	103	11
24	111	10	102	9.4	95	1.0	98	2.1	160	6.5	119	12
25	114	11	96	7.8	133	1.8	148	2.6	162	6.6	108	11
26	105	9.6	88	5.9	176	2.1	117	2.2	244	9.9	103	11
27	94	8.4	84	4.5	218	2.4	93	2.0	189	7.7	103	12
28	96	8.8	97	5.2	240	2.3	82	1.5	122	4.9	105	13
29	108	9.9	116	7.8	213	1.7	85	1.4	---	---	96	11
30	99	9.1	118	9.6	147	1.4	112	2.4	---	---	88	9.5
31	87	8.0	---	---	190	1.8	145	2.9	---	---	108	11
TOTAL	---	212.1	---	248.1	---	129.84	---	59.71	---	159.7	---	394.1
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	100	10	193	81	1000	4000	1910	7740	142	22	103	38
2	89	8.7	186	71	825	2830	960	3580	132	15	115	41
3	95	9.2	144	55	700	2140	620	1940	138	14	107	37
4	103	9.5	106	43	610	1650	541	1400	134	13	83	25
5	104	8.4	132	54	550	1360	523	1200	130	12	71	20
6	60	4.5	140	58	1720	5710	446	889	160	21	72	20
7	75	5.3	153	64	3320	20100	356	616	130	19	81	20
8	100	8.9	180	74	2900	20800	309	475	161	38	86	19
9	78	9.3	165	64	2200	16800	280	365	152	44	75	16
10	92	11	167	71	3150	27400	256	294	168	58	74	18
11	160	28	187	91	2210	15800	240	239	111	33	78	24
12	1040	354	219	115	1550	8040	230	204	101	26	84	31
13	950	333	300	188	1320	5700	220	166	170	58	87	32
14	740	252	800	814	940	3300	200	134	218	72	75	26
15	650	263	1340	2040	690	2240	169	103	575	199	82	31
16	1660	1030	1200	1940	580	1800	9300	13800	634	567	112	43
17	2010	1140	1040	1650	645	1990	3800	2550	571	523	107	38
18	2520	3580	1170	2210	515	1450	382	198	419	291	91	30
19	1580	2200	1740	4340	450	1110	270	138	274	152	81	26
20	1120	1420	1700	4590	1350	5070	273	151	247	139	71	23
21	475	432	4570	13700	1680	6530	272	133	200	102	62	19
22	301	249	2220	7910	2150	9810	237	99	184	92	115	36
23	202	161	3470	16500	1330	6860	197	66	173	73	181	58
24	202	132	3860	21600	1420	7170	180	46	170	73	145	42
25	185	103	3950	27000	1240	6060	171	37	176	76	72	20
26	148	78	3600	26100	825	3720	169	34	173	71	49	13
27	152	88	2590	17300	900	3740	157	35	157	65	46	12
28	224	133	2080	12700	560	2010	152	32	134	55	48	12
29	261	142	1690	10200	490	1560	143	25	117	43	56	14
30	202	95	1540	9310	1560	6780	151	26	103	39	65	15
31	---	---	1250	6240	---	---	140	21	99	37	---	---
TOTAL	---	12297.8	---	187173	---	203530	---	36736	---	3042	---	799

TOTAL LOAD FOR YEAR: 444781.35 TONS.

BIG DRY CREEK BASIN

06131000 BIG DRY CREEK NEAR VAN NORMAN, MT

LOCATION.--Lat 47°20'58", long 106°21'26", in NE1/4SW1/4NW1/4 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^2.

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 above National Geodetic Vertical Datum of 1929, by barometer. Prior to July 24, 1978, at site 400 ft upstream at same datum.

REMARKS.--Estimated daily discharges: Nov. 27 to Mar. 16, 26, 27. Records fair 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.

AVERAGE DISCHARGE.--48 years (1939-47, 1949-68, 1970-91), 50.9 ft^3/s, 36,880 acre-ft/yr; median of yearly mean discharges, 28.9 ft^3/s, 20,940 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,600 ft^3/s, Mar. 21, 1947, gage height, 13.39 ft; maximum gage height, 15.26 ft, Mar. 21, 1947, ice jam; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 20	0700	1,520	3.92	June 30	0300	*1,910	*4.26
June 26	1900	996	3.54				

No flow on many days.

CORRECTIONS.--The average discharge for water year 1990 is 51.5 ft^3/s. The previously published figure was the yearly mean.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.10	e.10	e.00	e.00	e2.5	2.6	31	15	810	3.1	.63
2	.00	.17	e.10	e.00	e.00	e2.0	2.4	28	11	307	3.5	.65
3	.00	.29	e.10	e.00	e.10	e2.0	2.1	23	8.9	169	3.4	.68
4	.00	.33	e.10	e.00	e.10	e2.5	2.0	18	10	114	3.4	.71
5	.00	.33	e.10	e.00	e.10	e2.0	1.9	13	10	86	3.2	.69
6	.00	.35	e.10	e.00	e.10	e2.0	2.0	10	9.2	65	2.7	.68
7	.01	.38	e.10	e.00	e.10	e2.0	2.0	8.6	14	51	2.2	.71
8	.06	.38	e.10	e.00	e.10	e2.5	2.2	8.0	139	41	1.9	.77
9	.07	.38	e.10	e.00	e.10	e3.0	2.8	6.8	72	32	1.6	1.8
10	.06	.38	e.10	e.00	e.10	e3.5	2.4	6.0	49	27	1.2	1.5
11	.04	.38	e.10	e.00	e.10	e3.0	3.7	6.1	35	24	1.5	3.4
12	.07	.38	e.10	e.00	e.10	e2.5	4.4	48	32	21	2.4	6.3
13	.10	.38	e.10	e.00	e.10	e2.0	6.8	27	29	18	2.2	3.3
14	.06	.35	e.10	e.00	e.10	e2.5	8.1	14	32	16	3.6	2.2
15	.08	.33	e.00	e.00	e.10	e2.5	7.7	9.2	18	17	4.1	5.2
16	.14	.35	e.00	e.00	e1.0	e3.0	21	6.5	18	32	4.0	3.0
17	.19	.35	e.00	e.00	e2.0	3.3	19	5.6	13	25	4.2	2.3
18	.16	.35	e.00	e.00	e3.0	3.3	18	4.8	15	22	2.8	2.3
19	.08	.38	e.00	e.00	e4.0	3.2	26	4.0	35	19	1.9	2.0
20	.06	.38	e.00	e.00	e4.5	3.0	29	4.1	359	16	1.4	1.7
21	.10	.38	e.00	e.00	e4.0	3.0	29	4.2	81	13	1.2	5.5
22	.08	.35	e.00	e.00	e4.0	3.6	28	4.7	88	11	1.2	7.7
23	.08	.31	e.00	e.00	e4.0	3.9	22	21	141	10	1.1	7.3
24	.10	.25	e.00	e.00	e3.5	3.7	15	31	254	9.1	1.3	7.7
25	.10	.22	e.00	e.00	e3.5	3.6	8.1	11	315	7.8	1.2	6.1
26	.05	.35	e.00	e.00	e4.0	e3.5	15	21	598	6.9	1.1	5.1
27	.06	e.20	e.00	e.00	e3.5	e3.5	28	77	462	6.7	.99	4.2
28	.08	e.10	e.00	e.00	e3.0	3.3	31	33	431	6.0	.87	4.6
29	.06	e.20	e.00	e.00	---	3.1	23	23	468	5.1	.80	6.7
30	.10	e.10	e.00	e.00	---	2.9	26	25	985	4.2	.76	5.5
31	.10	---	e.00	e.00	---	2.7	---	19	---	3.5	.72	---
TOTAL	2.09	9.18	1.40	0.00	45.30	89.1	391.2	551.6	4747.1	1995.3	65.54	100.92
MEAN	.067	.31	.045	.000	1.62	2.87	13.0	17.8	158	64.4	2.11	3.36
MAX	.19	.38	.10	.00	4.5	3.9	31	77	985	810	4.2	7.7
MIN	.00	.10	.00	.00	.00	2.0	1.9	4.0	8.9	3.5	.72	.63
AC-FT	4.1	18	2.8	.00	90	177	776	1090	9420	3960	130	200

CAL YR 1990 TOTAL 2128.09 MEAN 5.83 MAX 125 MIN .00 AC-FT 4220
WTR YR 1991 TOTAL 7998.73 MEAN 21.9 MAX 985 MIN .00 AC-FT 15870

e Estimated

MISSOURI RIVER MAIN STEM

06131500 FORT PECK LAKE AT FORT PECK, MT

LOCATION.--Lat 48°00'26", long 106°23'49", 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 mi².

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. Datum of gage is referenced to National Geodetic Vertical Datum of 1929. Prior to May 1, 1941, nonrecording gage at same site and datum.

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. 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 at 2400, 12,480,000 acre-ft, July 26, elevation, 2,220.12 ft; minimum, 10,480,000 acre-ft, Apr. 6, elevation, 2,208.68 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

Date	Elevation (feet)	Contents (acre-feet)	Change in Contents (acre-feet)
Sept. 30	2,213.25	11,250,000	---
Oct. 31	2,211.85	11,010,000	-240,000
Nov. 30	2,210.95	10,860,000	-150,000
Dec. 31	2,209.56	10,630,000	-230,000
CAL YR 1990			-840,000
Jan. 31	2,209.29	10,580,000	-50,000
Feb. 28	2,209.25	10,580,000	0
Mar. 31	2,208.81	10,500,000	-80,000
Apr. 30	2,209.30	10,580,000	+80,000
May 31	2,212.34	11,110,000	+530,000
June 30	2,217.97	12,090,000	+980,000
July 31	2,220.06	12,470,000	+380,000
Aug. 31	2,219.73	12,410,000	-60,000
Sept. 30	2,219.36	12,340,000	-70,000
WTR YR 1991			+1,090,000

MISSOURI RIVER MAIN STEM

06132000 MISSOURI RIVER BELOW FORT PECK DAM, MT

LOCATION.--Lat 48°02'39", long 106°21'21", in NW1/4 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 mi^2.

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

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,018.00 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Apr. 14, 1938, at site 0.7 mi upstream at different datum; Apr. 14, 1938, to Sept. 30, 1963, at present site at datum 2.00 ft higher, all water-stage recorders. Since Oct. 1, 1969, published discharge is determined by flowmeters at Fort Peck Dam.

REMARKS.--Flow completely regulated by Fort Peck Lake. Diversions for irrigation of about 880,400 acres upstream from station.

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.

AVERAGE DISCHARGE.--5 years (1934-39, prior to Fort Peck Lake reaching operational level), 6,347 ft^3/s, 4,598,000 acre-ft/yr; 48 years (1943-91, after operational level in Fort Peck Lake was reached), 9,770 ft^3/s, 7,078,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 51,000 ft^3/s including 32,000 ft^3/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 datum then in use; maximum daily reverse flow, 400 ft^3/s, Mar. 29, 1943, backwater from Milk River.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 8,200 ft^3/s, many days in January and February; minimum daily, 3,000 ft^3/s, many days in April and July.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7900	7900	8100	8000	7900	7800	8000	7900	7900	7500	7500	7800
2	7900	7900	8100	8000	7900	7800	8000	7900	7900	6500	7400	7600
3	7900	7900	8200	8200	7900	7800	7900	7900	7900	5500	7400	7800
4	7900	7800	8100	8200	7900	7800	7900	7900	7900	4500	7400	7700
5	7900	3300	8100	8200	7900	7900	7900	7900	7900	3500	7400	4200
6	7900	3500	8100	8200	7900	8000	7900	7900	7700	3000	7400	4200
7	7900	3600	8100	8200	7900	8000	3000	7900	7900	3000	7600	4200
8	7900	3500	8100	8200	7900	8000	3000	7900	7800	3800	7700	4200
9	7900	5000	7600	8200	7900	8000	3000	7900	7600	3900	7700	4200
10	7900	8100	7800	8200	7900	8000	3000	7900	7600	3900	7700	5600
11	7900	8100	7700	8200	7900	8000	3000	7900	7600	3500	7700	8000
12	7900	8100	7700	8200	7900	7900	3000	7900	7600	3000	7700	8000
13	7900	8100	7000	8100	7900	8000	3000	7900	7800	3700	7700	8000
14	7900	8100	7600	7900	7900	8000	3000	7900	7900	4000	7600	7900
15	7900	8000	7400	7900	7800	8000	3000	7900	7900	5100	7600	7700
16	7900	8100	7200	7900	7800	8000	3000	7900	7900	6000	7600	7700
17	7900	8000	7200	7900	7800	8000	6400	7900	7900	7600	7600	7700
18	7900	8100	7300	7900	7800	7900	7900	7900	7900	7700	7600	7700
19	7900	8100	7700	7900	7800	7900	7900	7900	7900	7700	7400	7700
20	7900	8100	8200	7900	7800	8100	7900	7700	7900	7800	7700	7400
21	7900	8100	8200	7900	7800	7900	7900	7800	7900	7800	7700	7600
22	7900	8100	8200	7900	7800	7900	7900	8000	7900	7800	7600	7800
23	7900	8100	8200	7900	7800	7900	7900	8000	7900	7800	7600	7900
24	7900	8100	8200	7900	7800	7800	7900	8000	7900	7800	7600	7700
25	7900	8100	8200	7900	7800	7800	7900	7800	7900	7800	7600	7800
26	7900	3700	8200	7900	7800	8000	7900	7900	7800	7900	7800	7800
27	7900	3600	8000	7900	7800	7900	7900	7900	7800	7900	7900	7700
28	7900	3500	7700	7900	7800	7900	7900	7900	7800	7900	7700	7700
29	7900	3500	8000	7900	---	8000	7900	7900	7800	7900	7700	7800
30	7900	4900	8000	7900	---	8000	7900	7900	7800	7900	7700	7800
31	7800	---	8000	7900	---	8000	---	7900	---	7500	7700	---
TOTAL	244800	199000	244200	248300	219800	246000	186700	244800	234900	187200	236000	212900
MEAN	7897	6633	7877	8010	7850	7935	6223	7897	7830	6039	7613	7097
MAX	7900	8100	8200	8200	7900	8100	8000	8000	7900	7900	7900	8000
MIN	7800	3300	7000	7900	7800	7800	3000	7700	7600	3000	7400	4200
AC-FT	485600	394700	484400	492500	436000	487900	370300	485600	465900	371300	468100	422300

CAL YR 1990 TOTAL 2952200 MEAN 8088 MAX 13100 MIN 3300 AC-FT 5856000
WTR YR 1991 TOTAL 2704600 MEAN 7410 MAX 8200 MIN 3000 AC-FT 5365000

MILK RIVER BASIN

06132200 SOUTH FORK MILK RIVER NEAR BABB, MT

(International gaging station)

LOCATION.--Lat 48°45'14", long 113°10'00", in NE1/4NW1/4NW1/4 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^2.

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 4,731.6 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Mar. 1 to Apr. 5 and Oct. 26-31. Water-discharge records good except those for estimated daily discharges, which are poor. Many 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, 12,000 ft^3/s, June 8, 1964, gage height, 6.61 ft, from rating curve extended above 400 ft^3/s, on basis of slope-area measurement of peak flow at site 3 mi downstream; maximum gage height, 7.17 ft, Feb. 24, 1986; no flow Aug. 23, 1973, June 28 to Aug. 14, 1977, Aug. 26 to Sept. 2, 1984.

EXTREMES FOR CURRENT SEASON.--Peak discharges greater than base discharge of 260 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 19	1330	827	5.82	June 30	0300	551	5.22
June 21	0230	*909	*5.97				

Minimum daily discharge, 12 ft^3/s, Mar. 2.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e14	e65	89	118	236	38	16	18		
2			e12	e80	78	112	163	47	15	16		
3			e14	e82	71	111	143	41	16	18		
4			e15	e100	79	107	126	37	17	22		
5			e14	e150	78	135	117	36	16	23		
6			e15	179	76	235	108	47	16	22		
7			e15	125	86	176	105	126	15	20		
8			e16	91	97	138	104	58	17	20		
9			e17	77	104	120	100	42	29	19		
10			e20	64	93	110	98	38	28	18		
11			e18	45	97	113	96	44	24	17		
12			e17	54	160	153	89	80	21	17		
13			e18	68	138	120	84	91	18	17		
14			e19	78	141	106	80	57	23	17		
15			e20	71	140	99	77	46	31	16		
16			e20	52	138	93	74	40	25	16		
17			e20	44	138	88	70	37	26	20		
18			e23	39	164	87	65	44	29	24		
19			e30	43	559	93	62	35	25	22		
20			e44	69	364	473	57	28	20	22		
21			e40	94	249	780	53	25	22	22		
22			e38	106	224	467	51	23	35	26		
23			e35	125	203	298	50	23	28	27		
24			e32	143	194	211	48	21	25	26		
25			e30	138	176	198	45	21	22	27		
26			e25	109	154	179	44	22	22	e22		
27			e22	98	141	156	41	20	21	e20		
28			e20	96	135	310	41	19	19	e20		
29			e20	97	129	280	39	19	19	e18		
30			e24	104	125	426	38	18	19	e18		
31			e50	---	129	---	37	16	---	e18		
TOTAL			717	2686	4749	6092	2541	1239	659	628		
MEAN			23.1	89.5	153	203	82.0	40.0	22.0	20.3		
MAX			50	179	559	780	236	126	35	27		
MIN			12	39	71	87	37	16	15	16		
AC-FT			1420	5330	9420	12080	5040	2460	1310	1250		

e Estimated

PERIOD OF RECORD.--Water years 1990 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
FEB							
28...	1235	15	--	--	378	-13.0	0.0
MAR							
12...	1245	17	--	--	420	7.0	0.0
21...	1120	40	--	--	373	11.0	0.0
APR							
01...	1100	56	--	--	348	15.0	0.0
16...	1230	55	100	71	370	3.0	1.5
MAY							
22...	1045	236	--	--	309	17.0	11.0
JUN							
12...	1240	153	10	1	350	12.0	11.0
14...	1330	105	--	--	355	11.0	11.0
20...	2115	762	--	--	314	7.0	9.0
21...	1815	680	--	--	297	20.0	14.0
26...	1140	174	--	--	369	18.0	12.0
AUG							
13...	1255	91	5	1	419	24.0	16.0

DATE	TIME	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)
APR											
16...	1230	190	45	18	8.3	0.3	1.0	199	8.7	0.3	<0.1
JUN											
12...	1240	190	46	19	4.2	0.1	0.70	196	2.8	0.2	0.1
AUG											
13...	1255	220	52	22	5.3	0.2	0.90	228	2.5	0.3	0.1

DATE	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)
APR										
16...	7.7	208	0.28	31.0	<0.01	<0.05	0.01	<0.01	<1	<0.5
JUN										
12...	7.5	199	0.27	82.1	<0.01	0.07	0.20	<0.01	<1	<0.5
AUG										
13...	9.0	229	0.31	56.2	<0.01	<0.05	<0.01	<0.01	1	<0.5

DATE	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
APR										
16...	20	<1.0	<1	1	28	<1	24	1	<1	14
JUN										
12...	<10	<1.0	1	3	25	3	22	1	<1	4
AUG										
13...	<10	<1.0	<1	1	29	<1	26	<1	<1	14

MILK RIVER BASIN

06133000 MILK RIVER AT WESTERN CROSSING OF INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°00'27", long 112°32'42", in NE1/4 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^2.

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, from topographic map. 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 datums.

REMARKS.--Estimated daily discharges: Mar. 1 to Apr. 2 and Oct. 23-31. Records good except those for estimated daily discharges, which are poor. Several diversions for irrigation upstream from station. U.S. Bureau of Reclamation 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 discharge, 7,930 ft^3/s, June 9, 1964, gage height, 9.77 ft; maximum gage height, 12.55 ft, Mar. 18, 1976, backwater from ice; no flow at times.

EXTREMES FOR CURRENT SEASON.--Peak discharges greater than base discharge of 430 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 20	2030	1,040	5.32	July 1	1130	780	4.90
June 22	0330	*3,040	*7.21				

Minimum daily discharge, 12 ft^3/s, Sept. 4,5.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e31	e228	254	219	713	33	15	26		
2			e31	e256	213	204	427	36	14	25		
3			e32	302	185	190	284	43	13	27		
4			e33	250	176	182	240	48	12	26		
5			e33	277	191	190	208	41	12	27		
6			e34	330	180	230	182	42	13	31		
7			e34	360	171	337	162	50	13	31		
8			e35	287	200	282	149	84	14	31		
9			e35	226	227	231	147	85	15	29		
10			e35	190	230	199	142	55	17	28		
11			e38	178	211	179	141	50	25	27		
12			e42	150	268	172	136	48	28	26		
13			e44	145	406	211	125	84	25	25		
14			e43	181	320	187	114	135	26	24		
15			e42	201	307	162	104	92	25	24		
16			e44	192	294	147	95	68	28	23		
17			e49	160	283	137	87	56	36	24		
18			e50	131	283	128	80	52	33	25		
19			e50	117	334	126	73	44	32	29		
20			e54	117	749	222	69	45	34	36		
21			e56	159	706	1190	66	36	33	35		
22			e52	205	441	2670	62	30	31	34		
23			e48	234	385	1300	58	26	32	e29		
24			e45	270	343	717	55	24	46	e28		
25			e44	297	329	491	54	22	40	e28		
26			e38	285	304	523	50	21	34	e27		
27			e35	245	273	403	47	19	30	e27		
28			e35	248	251	371	43	18	29	e26		
29			e79	258	241	579	41	17	28	e26		
30			e127	272	231	554	38	16	27	e26		
31			e170	---	221	---	35	16	---	e26		
TOTAL			1518	6751	9207	12733	4227	1436	760	856		
MEAN			49.0	225	297	424	136	46.3	25.3	27.6		
MAX			170	360	749	2670	713	135	46	36		
MIN			31	117	171	126	35	16	12	23		
AC-FT			3010	13390	18260	25260	8380	2850	1510	1700		

e Estimated

06133500 NORTH FORK MILK RIVER ABOVE ST. MARY CANAL, NEAR BROWNING, MT

(International gaging station)

LOCATION.--Lat 48°58'15", long 113°03'19", in NE1/4NW1/4NE1/4 sec.16, T.37 N., R.11 W., Glacier County, Hydrologic Unit 10050001, Blackfeet Indian Reservation, on left bank 1.7 mi upstream from outlet of canal, 1.9 mi south of international boundary, 29 mi north of Browning, and at river mile 57.8.

DRAINAGE AREA.--60.2 mi^2.

WATER DISCHARGE RECORDS

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-discharge recorder. Concrete control since 1936. Elevation of gage is 4,220 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to June 20, 1921, nonrecording gages at several sites within 1 mi of present site at different datums.

REMARKS.--Estimated daily discharges: Mar. 1-31 and Oct. 27-31. Water-discharge records good except those for estimated daily discharges, which are poor. Many small diversions for irrigation upstream from station. U.S. 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 discharge, 3,090 ft^3/s, May 8, 1967, gage height, 7.95 ft, from rating curve extended above 130 ft^3/s, on basis of slope-area measurements at gage heights 7.55 ft and 7.95 ft; maximum gage height, 8.24 ft, Feb. 24, 1986, backwater from ice and snow; no flow Oct. 29, 1942.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 243 ft^3/s, June 21, gage height, 3.44 ft; maximum gage height, 3.48 ft, Mar. 22, backwater from ice; minimum daily discharge, 11 ft^3/s, Mar. 2.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e13	27	34	22	28	14	14	17		
2			e11	31	28	23	23	17	14	16		
3			e12	27	27	21	21	16	15	18		
4			e12	29	30	20	19	15	15	19		
5			e12	40	29	26	19	15	15	19		
6			e13	42	29	33	17	15	15	18		
7			e13	30	35	24	17	15	15	17		
8			e14	25	39	21	17	15	16	17		
9			e14	23	36	21	16	15	23	17		
10			e15	23	30	20	18	15	18	17		
11			e14	22	33	20	20	15	17	18		
12			e13	22	49	21	17	15	16	18		
13			e13	26	46	18	16	15	16	18		
14			e13	27	44	17	16	15	22	18		
15			e14	29	38	16	16	15	20	18		
16			e15	25	36	16	15	15	18	18		
17			e16	21	36	16	15	15	19	19		
18			e18	20	42	16	15	15	18	19		
19			e20	21	58	16	15	14	17	19		
20			e25	26	42	52	15	14	17	19		
21			e30	30	35	139	14	14	19	19		
22			e29	33	35	40	14	14	22	20		
23			e28	37	31	31	15	15	19	26		
24			e26	38	34	27	14	14	18	20		
25			e24	35	29	52	14	14	17	20		
26			e22	30	26	58	14	14	17	19		
27			e20	31	24	33	14	14	17	e19		
28			e22	36	23	45	14	14	17	e18		
29			e23	40	23	37	14	14	17	e18		
30			e24	36	23	45	14	15	17	e17		
31			e26	---	22	---	14	14	---	e17		
TOTAL			564	882	1046	946	510	456	520	572		
MEAN			18.2	29.4	33.7	31.5	16.5	14.7	17.3	18.5		
MAX			30	42	58	139	28	17	23	26		
MIN			11	20	22	16	14	14	14	16		
AC-FT			1120	1750	2070	1880	1010	904	1030	1130		

e Estimated

MILK RIVER BASIN

06133500 NORTH FORK MILK RIVER ABOVE ST MARY CANAL, NEAR BROWNING, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1965, 1973, 1982-83, 1990 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)
OCT							
30...	1520	13	--	--	410	10.0	6.0
FEB							
27...	1410	16	--	--	401	3.0	0.0
MAR							
22...	0740	29	--	--	402	0.5	0.0
APR							
01...	1630	28	--	--	431	18.0	7.0
MAY							
01...	1500	32	85	71	405	5.0	6.0
JUN							
21...	1610	92	--	--	385	19.0	9.0
27...	0815	33	80	1	--	10.0	12.0
SEP							
04...	1230	14	5	2	390	17.0	12.0

DATE	TIME	PH LAB (STANDARD UNITS) (00403)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)
MAY											
01...	1500	8.5	220	53	21	12	0.4	2.0	229	13	3.5
JUN											
27...	0815	8.1	240	59	23	13	0.4	2.0	254	11	1.0
SEP											
04...	1230	8.4	220	47	25	8.3	0.2	1.2	229	4.9	3.0

DATE	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRATE DISSOLVED (MG/L AS N) (00618)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	ARSENIC DISSOLVED (UG/L AS AS) (01000)
MAY											
01...	0.2	7.7	250	0.34	21.6	--	<0.01	0.13	0.01	<0.01	<1
JUN											
27...	0.2	12	275	0.37	24.5	0.23	0.01	0.24	0.02	<0.01	2
SEP											
04...	0.2	9.2	237	0.32	8.97	--	<0.01	0.28	0.02	<0.01	1

DATE	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	BORON, DISSOLVED (UG/L AS B) (01020)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
MAY											
01...	<0.5	<10	<1	<1	<1	30	1	39	<1	<1	11
JUN											
27...	<0.5	20	<1	<1	<1	41	<1	31	2	<1	7
SEP											
04...	<0.5	<10	<1	<1	<1	8	<1	4	<1	<1	7

MILK RIVER BASIN

06134000 NORTH MILK RIVER NEAR INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°01'19", long 112°58'16", in SW1/4NE1/4 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^2. Area at site used Apr. 12, 1930, to Aug. 15, 1962, 97.4 mi^2.

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. Datum of gage is 4,112.16 ft above mean sea level (Geodetic Surveys of Canada datum). Prior to May 1913, nonrecording gage at site 2 mi downstream at different datum. May 1, 1913, to Apr. 11, 1930, water-stage recorder 700 ft downstream at different datum. Apr. 12, 1930, to Aug. 15, 1962, water-stage recorder 1,500 ft downstream at different datum.

REMARKS.--Estimated daily discharges: Mar. 1 to Apr. 2 and Oct. 21-31. 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. U.S. Bureau of Reclamation 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 discharge, 2,950 ft^3/s, June 17, 1948, gage height, 6.47 ft, site and datum then in use, from rating curve extended above 1,500 ft^3/s; no flow Mar. 1, 2, 1940.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 1,280 ft^3/s, June 21, gage height, 5.17 ft; minimum daily, 13 ft^3/s, Mar. 2-4,13.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e14	e351	703	706	579	685	593	255		
2			e13	e367	689	703	569	685	590	154		
3			e13	456	692	699	569	689	590	87		
4			e13	530	696	667	561	692	590	58		
5			e14	593	689	678	561	692	590	44		
6			e15	597	689	667	561	689	593	39		
7			e16	565	692	607	565	667	558	37		
8			e17	590	696	636	579	650	544	32		
9			e18	607	643	650	636	646	547	31		
10			e18	618	523	653	653	646	544	26		
11			e18	643	487	660	653	646	547	26		
12			e16	646	533	664	639	664	547	26		
13			e13	650	544	657	646	653	547	26		
14			e14	650	501	660	667	643	558	26		
15			e17	650	526	646	671	636	544	25		
16			e20	650	636	636	667	629	530	25		
17			e22	643	696	611	682	622	530	26		
18			e24	646	745	593	692	622	530	27		
19			e25	671	759	593	696	614	526	27		
20			e26	710	607	703	699	607	523	27		
21			e27	727	614	957	699	611	533	e26		
22			e29	727	622	523	696	607	533	e25		
23			e30	720	667	505	696	607	526	e24		
24			e30	724	710	526	692	607	523	e23		
25			e91	717	689	593	689	604	519	e22		
26			e100	692	671	597	682	604	516	e21		
27			e138	703	660	530	675	600	519	e20		
28			e201	706	660	547	675	600	470	e19		
29			e388	731	678	576	671	597	406	e18		
30			e381	717	696	607	671	593	357	e17		
31			e332	---	710	---	682	593	---	e17		
TOTAL			2093	18997	20123	19050	20073	19700	16023	1256		
MEAN			67.5	633	649	635	648	635	534	40.5		
MAX			388	731	759	957	699	692	593	255		
MIN			13	351	487	505	561	593	357	17		
AC-FT			4150	37680	39910	37790	39810	39070	31780	2490		

e Estimated

MILK RIVER BASIN

06134500 MILK RIVER AT MILK RIVER, ALBERTA

(International gaging station)

LOCATION.--Lat 49°08'37", long 112°04'44", in NE1/4 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^2.

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. Datum of gage is 3,402.78 ft above mean sea level (Geodetic Survey of Canada datum). 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 datum 0.61 ft higher. Nov. 3, 1921, to Aug. 28, 1947, water-stage recorder at site 60 ft upstream at present datum. Aug. 29, 1947, to Nov. 10, 1976, water-stage recorder located 700 ft downstream on left bank at present datum.

REMARKS.--Estimated daily discharges: Nov. 3-6, 11, Nov. 15 to Apr. 1. 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.

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

AVERAGE DISCHARGE.--75 years (1916-91), 326 ft^3/s, 236,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,850 ft^3/s, Feb. 25, 1986, gage height, 12.46 ft, from flood-marks, from rating curve extended above 8,600 ft^3/s; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,200 ft^3/s, June 22, gage height, 6.81 ft; minimum daily, 1.1 ft^3/s, Jan. 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	516	57	e25	e5.9	e71	e102	e286	1020	897	1300	671	607
2	516	56	e18	e5.5	e95	e103	583	953	883	1190	678	607
3	512	e49	e17	e5.0	e102	e94	735	908	862	953	675	604
4	512	e44	e17	e4.8	e98	e85	897	883	848	872	682	607
5	523	e46	e20	e4.0	e89	e79	819	879	833	823	685	604
6	519	e60	e22	e3.2	e81	e78	893	879	879	770	699	604
7	533	57	e26	e2.6	e81	e75	957	858	925	735	710	604
8	554	73	e26	e1.5	e84	e72	922	869	925	724	678	572
9	583	69	e25	e1.1	e84	e73	883	897	883	735	703	569
10	544	72	e24	e2.3	e82	e76	840	858	855	791	685	565
11	452	e69	e25	e2.1	e80	e78	862	752	837	795	682	561
12	344	65	e28	e1.9	e81	e77	862	759	819	784	682	572
13	266	72	e31	e2.6	e83	e75	816	975	823	773	689	576
14	209	78	e35	e4.7	e82	e77	840	946	848	766	735	586
15	164	e53	e38	e8.7	e81	e78	872	833	812	763	756	583
16	134	e47	e40	e16	e87	e78	876	844	788	756	703	565
17	111	e42	e40	e16	e95	e76	858	918	766	745	682	558
18	92	e38	e36	e16	e102	e78	826	957	749	745	675	561
19	82	e34	e32	e13	e103	e82	812	1020	735	738	660	558
20	77	e31	e27	e6.3	e102	e117	823	1130	848	731	650	554
21	74	e30	e21	e5.7	e99	e157	855	1370	1480	724	643	558
22	71	e32	e16	e6.4	e99	e151	911	1120	2880	717	636	569
23	69	e33	e15	e6.2	e100	e157	943	1020	2330	710	629	554
24	63	e29	e13	e6.0	e101	e166	978	1020	1410	703	625	544
25	58	e27	e12	e5.2	e102	e169	1010	1020	1150	703	625	551
26	55	e26	e11	e4.8	e99	e181	1020	982	1140	699	618	544
27	53	e28	e9.7	e4.4	e96	e189	996	943	1110	689	614	537
28	52	e28	e7.7	e4.2	e89	e174	1020	908	1000	682	614	533
29	51	e29	e6.7	e4.6	---	e185	1010	883	1050	675	614	491
30	52	e29	e6.2	e13	---	e184	1020	886	1200	667	614	438
31	56	---	e6.0	e27	---	e186	---	897	---	667	611	---
TOTAL	7897	1403	676.3	210.7	2548	3552	26025	29187	31565	24125	20623	16936
MEAN	255	46.8	21.8	6.80	91.0	115	867	942	1052	778	665	565
MAX	583	78	40	27	103	189	1020	1370	2880	1300	756	607
MIN	51	26	6.0	1.1	71	72	286	752	735	667	611	438
AC-FT	15660	2780	1340	418	5050	7050	51620	57890	62610	47850	40910	33590

CAL YR 1990 TOTAL 138361.3 MEAN 379 MAX 1370 MIN 6.0 AC-FT 274400
WTR YR 1991 TOTAL 164748.0 MEAN 451 MAX 2880 MIN 1.1 AC-FT 326800

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", in NW1/4 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^2, of which 130 mi^2 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, from topographic map.

REMARKS.--Estimated daily discharges: Mar. 1 to Apr. 7. 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.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 62 ft^3/s, June 11, 1989, gage height, 6.27 ft; no flow at times most years.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 27 ft^3/s, June 21, gage height, 4.88 ft; no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	e1.6	.11	10	21	9.7	11	16		
2			e.00	e2.3	.04	10	20	9.5	12	16		
3			e.00	e3.3	.07	9.9	19	11	13	16		
4			e.00	e2.4	.07	10	18	10	13	16		
5			e.00	e.88	.04	11	19	9.2	12	15		
6			e.00	e1.2	.00	13	19	9.4	12	15		
7			e.00	e1.0	.00	14	19	9.2	12	15		
8			e.00	.81	.00	12	19	9.3	12	16		
9			e.00	.46	.00	12	19	9.1	13	15		
10			e.25	1.8	.00	12	19	10	13	15		
11			e.46	3.9	.00	12	18	11	12	15		
12			e.18	.67	7.3	12	18	13	12	3.4		
13			e.21	.21	6.1	12	18	13	13	1.7		
14			e.11	.07	2.2	12	17	16	14	1.2		
15			e.21	1.7	2.4	12	17	15	15	1.0		
16			e.32	.46	1.6	12	17	15	15	.78		
17			e.28	.28	1.1	12	17	15	15	.42		
18			e.14	.14	1.3	13	16	14	15	.32		
19			e.18	.04	4.9	12	17	14	14	.28		
20			e.28	.00	6.0	14	17	15	14	.25		
21			e.57	.00	6.0	25	16	15	15	.21		
22			e.74	.00	8.3	19	15	14	16	.11		
23			e.67	.00	8.7	16	15	14	15	.07		
24			e.53	.04	8.6	17	15	13	16	.04		
25			e.32	.14	9.1	17	14	13	16	.04		
26			e.00	.85	9.7	17	13	13	15	.00		
27			e.07	5.1	9.9	17	12	12	15	.00		
28			e.21	12	9.7	18	12	12	15	.00		
29			e.53	1.4	10	18	11	11	15	.00		
30			e1.2	.25	10	21	9.9	12	16	.00		
31			e1.5	---	10	---	10	11	---	.00		
TOTAL			8.96	43.00	133.23	421.9	506.9	377.4	416	179.82		
MEAN			.29	1.43	4.30	14.1	16.4	12.2	13.9	5.80		
MAX			1.5	12	10	25	21	16	16	16		
MIN			.00	.00	.00	9.9	9.9	9.1	11	.00		
AC-FT			18	85	264	837	1010	749	825	357		

e Estimated

MILK RIVER BASIN

06135000 MILK RIVER AT EASTERN CROSSING OF INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 48°59'03", long 110°28'10", in SE1/4NE1/4NW1/4 sec.7, T.37 N., R.10 E., Hill County, Hydrologic Unit 10050002, on right bank 1.1 mi south of international boundary, 6.5 mi upstream from Lost River, 12.5 mi northwest of Simpson, 29.5 mi north of Rudyard, and at river mile 484.1.

DRAINAGE AREA.--2,506 mi^2.

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: 1921-13, 1921-22, 1929(M). W 1983: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,659.64 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 1, 1970, water-stage recorder or nonrecording gages of several sites within 10.5 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Mar. 1-20, 25-28, and Oct. 15-31. 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). Many diversions for irrigation upstream from station. Several observations of water temperature and specific conductance were made during the year. U.S. 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 discharge, 10,700 ft^3/s, Apr. 9, 1965, gage height, 9.53 ft, site and datum then in use, but may have been higher Mar. 28, 1952; maximum gage height, 13.65 ft, Mar. 28, 1952 (backwater from ice), site and datum then in use; no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 3,690 ft^3/s, June 23, gage height, 7.42 ft; minimum daily, 20 ft^3/s, Oct. 31.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e90	292	1010	1090	1280	681	557	553		
2			e70	312	1020	1120	1310	727	564	491		
3			e80	299	1030	1170	1310	727	559	445		
4			e90	538	955	1200	1220	710	556	420		
5			e85	733	878	1230	993	686	553	357		
6			e80	1010	834	1380	877	676	558	279		
7			e85	876	828	1160	799	691	563	232		
8			e85	898	865	1020	730	698	585	191		
9			e90	942	878	1010	754	746	588	158		
10			e90	882	879	1020	753	722	567	142		
11			e100	860	881	977	747	660	526	132		
12			e95	813	1240	944	783	736	526	118		
13			e95	800	1230	931	833	727	521	110		
14			e95	806	1110	886	834	794	525	101		
15			e95	768	1160	853	806	709	557	e95		
16			e95	763	1260	825	772	718	597	e90		
17			e100	806	1080	767	777	762	581	e85		
18			e100	808	1060	734	778	732	579	e80		
19			e100	820	1120	705	761	656	558	e75		
20			e105	765	1210	737	731	633	548	e70		
21			117	747	1410	1110	744	607	552	e65		
22			121	757	1460	963	757	587	557	e60		
23			122	823	1730	2330	761	580	571	e55		
24			122	932	1350	2880	733	572	568	e50		
25			e120	999	1770	1800	740	575	564	e45		
26			e110	1060	1190	1500	705	576	547	e40		
27			e90	1160	1180	1170	689	581	550	e35		
28			e75	1270	1130	1190	693	592	559	e30		
29			149	1230	1080	1200	661	586	550	e24		
30			242	1050	1040	1070	659	572	553	e22		
31			243	---	1060	---	656	560	---	e20		
TOTAL			3336	24819	34928	34972	25646	20579	16739	4670		
MEAN			108	827	1127	1166	827	664	558	151		
MAX			243	1270	1770	2880	1310	794	597	553		
MIN			70	292	828	705	656	560	521	20		
AC-FT			6620	49230	69280	69370	50870	40820	33200	9260		

e Estimated

06137400 BIG SANDY CREEK AT RESERVATION BOUNDARY, NEAR ROCKY BOY, MT

LOCATION.--Lat 48°10'21", long 109°49'31", in SE1/4NE1/4NW1/4 sec. 20, T.28 N., R.15 E., Chouteau County, Hydrologic Unit 10050005, on left bank 1.0 mi downstream from Muddy Creek, 6.0 mi south of Rocky Boy Agency, and at river mile 90.5.

DRAINAGE AREA.--24.7 mi^2.

PERIOD OF RECORD.--May 1982 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,830 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 6, 19, 22, Nov. 24 to Dec. 8, Dec. 12 to Jan. 14, Jan. 24 to Feb. 11, Feb. 15, Feb. 23 to Mar. 7, Mar. 9, 12, 26, 27. Records fair except those for estimated daily discharges, which are poor. No known regulation or diversions upstream of station. Several observations of water temperatures and specific conductance were made during the year.

AVERAGE DISCHARGE.--9 years, 7.66 ft^3/s, 5,550 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 371 ft^3/s, May 23, 1986, gage height, 4.84 ft; minimum, 0.29 ft^3/s, Mar. 31, Aug. 11, 20, 1988, gage height, 2.10 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 30 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 16	0730	ice jam	*3.80	June 6	0415	36	3.16
May 20	2230	41	3.21	June 21	0700	*44	3.35

Minimum discharge, 0.50 ft^3/s, Apr. 30, gage height, 2.32 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.0	4.5	e2.5	e2.0	e3.0	e2.2	5.0	5.3	12	19	10	4.0
2	4.6	4.4	e2.2	e1.7	e3.5	e2.5	5.3	5.6	12	16	11	3.7
3	5.3	4.2	e2.5	e1.5	e4.0	e2.8	5.4	5.0	13	16	10	4.0
4	5.1	4.6	e3.2	e1.4	e3.8	e3.0	5.1	4.5	12	15	9.5	4.2
5	4.9	4.6	e3.0	e1.5	e3.6	e2.9	6.4	5.5	12	15	8.9	3.9
6	4.7	e3.3	e2.8	e1.5	e3.5	e2.8	6.6	8.8	24	14	8.7	3.6
7	4.6	2.0	e3.0	e1.6	e3.5	e2.8	4.9	10	16	14	10	3.7
8	4.4	3.6	e3.2	e1.6	e3.4	2.9	4.7	12	14	13	8.7	3.8
9	4.4	3.9	3.3	e1.7	e3.4	e3.1	4.0	14	13	13	8.3	4.5
10	4.3	4.2	3.3	e1.8	e3.3	3.3	4.3	13	13	14	7.7	4.1
11	4.6	4.0	3.3	e1.9	e3.2	3.7	5.8	13	13	13	7.2	4.1
12	4.7	4.1	e3.0	e2.0	3.2	e3.6	5.2	18	13	13	8.0	4.1
13	4.3	3.8	e2.7	e2.5	3.3	3.4	5.4	19	12	13	7.9	3.7
14	4.1	3.6	e2.8	e2.8	3.3	3.7	4.7	17	12	13	9.4	5.0
15	4.1	3.5	e3.0	2.6	e3.4	3.9	4.4	16	12	14	7.7	6.1
16	4.3	3.1	e3.0	2.5	3.5	4.1	4.3	14	11	13	7.5	5.0
17	4.6	3.4	e2.5	3.4	3.7	3.4	4.3	13	11	16	6.8	5.4
18	4.5	3.6	e2.0	3.4	3.8	3.6	4.2	13	11	13	6.7	4.8
19	4.6	e2.5	e1.5	3.5	4.1	4.2	4.3	13	11	13	6.0	4.9
20	4.3	3.4	e1.2	3.3	4.6	4.6	4.5	17	24	12	5.5	4.6
21	3.9	2.4	e1.1	3.3	4.4	4.6	4.5	22	27	12	5.5	4.7
22	4.2	e2.5	e1.0	3.5	3.8	5.0	4.5	15	17	11	5.1	6.2
23	4.3	3.2	e1.5	2.9	e3.6	4.4	4.4	13	14	12	5.0	5.3
24	4.1	e3.0	e1.5	e2.5	e3.4	4.1	4.5	12	15	11	5.0	4.9
25	4.5	e2.5	e1.1	e2.3	e3.3	3.6	4.3	13	18	11	5.1	4.7
26	4.4	e2.0	e1.3	e2.2	e3.2	e3.0	3.8	12	18	11	4.8	4.6
27	4.4	e2.5	e2.0	e2.2	e3.0	e2.5	4.7	12	15	11	4.4	4.5
28	4.8	e3.0	e1.7	e1.8	e2.7	3.4	6.8	15	17	10	4.8	3.4
29	4.7	e3.5	e1.5	e2.0	---	3.8	1.7	14	15	10	4.7	3.5
30	4.7	e3.0	e1.8	e2.2	---	3.9	.96	13	19	10	4.3	3.4
31	4.6	---	e2.2	e2.5	---	4.5	---	13	---	10	4.1	---
TOTAL	139.0	101.9	70.7	71.6	98.5	109.3	138.96	390.7	446	401	218.3	132.4
MEAN	4.48	3.40	2.28	2.31	3.52	3.53	4.63	12.6	14.9	12.9	7.04	4.41
MAX	5.3	4.6	3.3	3.5	4.6	5.0	6.8	22	27	19	11	6.2
MIN	3.9	2.0	1.0	1.4	2.7	2.2	.96	4.5	11	10	4.1	3.4
AC-FT	276	202	140	142	195	217	276	775	885	795	433	263

CAL YR 1990 TOTAL 4254.2 MEAN 11.7 MAX 84 MIN 1.0 AC-FT 8440
WTR YR 1991 TOTAL 2318.36 MEAN 6.35 MAX 27 MIN .96 AC-FT 4600

e Estimated

MILK RIVER BASIN

06137570 BOXELDER CREEK NEAR ROCKY BOY, MT

LOCATION.--Lat 48°18'07", long 109°50'37", in SW1/4SW1/4NW1/4 sec.6, T.29 N., R.15 E., Hill County, Hydrologic Unit 10050005, on Rocky Boy Indian Reservation, on right bank 1,000 ft upstream from Bonneau Reservoir, 4,000 ft downstream from Wolf Creek, 4.1 mi northwest of Rocky Boy Agency, and at river mile 14.0.

DRAINAGE AREA.--48.2 mi^2.

PERIOD OF RECORD.--October 1975 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,225 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 5-7, Nov. 25 to Feb. 18, Feb. 22 to Mar. 9, 26, 27. Records fair except those for estimated daily discharges, which are poor. Other than beaver dams no known regulation or diversions upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--16 years, 9.13 ft^3/s, 6,610 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 898 ft^3/s, May 23, 1986, gage height, 10.95 ft, from outside highwater mark; no flow July 26 to Oct. 20, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 30 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 20	2300	*258	*10.18	June 20	1700	78	7.72
May 28	1950	47	7.26	June 25	1630	43	7.23
May 31	0700	46	7.24	July 1	0600	41	7.23
June 6	0600	205	9.78	July 17	0600	31	7.11

Minimum discharge, 0.73 ft^3/s, Oct. 1, gage height, 5.95 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.78	2.9	e2.5	e1.8	e3.5	e2.5	3.7	7.4	28	39	8.5	3.7
2	.79	3.0	e2.2	e1.6	e6.0	e2.7	3.5	7.6	24	33	10	3.6
3	.90	2.9	e2.0	e1.5	e7.0	e3.3	3.3	7.2	22	30	10	3.7
4	1.1	2.8	e2.3	e1.5	e6.0	e3.5	3.1	6.8	21	28	9.3	4.1
5	1.1	e2.7	e2.5	e1.5	e5.5	e3.2	3.1	6.4	21	26	8.3	4.3
6	1.1	e2.8	e2.6	e1.6	e5.0	e3.0	3.1	8.8	113	24	7.8	4.4
7	1.1	e3.0	e2.8	e1.8	e4.7	e3.1	3.0	13	52	22	7.6	4.5
8	1.2	3.2	e2.9	e2.5	e4.3	e3.2	2.9	12	39	22	7.6	4.5
9	1.2	3.3	e3.0	e2.8	e4.0	e3.3	3.0	13	35	20	6.9	4.8
10	1.3	3.3	e2.9	e3.0	e3.5	3.5	3.0	15	33	21	6.4	5.0
11	1.3	3.3	e2.8	e3.2	e3.2	3.7	9.7	15	31	25	5.9	5.1
12	1.3	3.2	e2.6	e3.5	e3.3	3.6	9.8	22	32	21	7.3	5.2
13	1.2	3.0	e2.3	e4.0	e3.5	3.3	6.1	25	27	17	8.1	4.8
14	1.5	2.9	e2.7	e3.5	e3.2	3.3	5.2	23	25	24	9.7	4.6
15	1.7	2.9	e2.7	e3.2	e3.0	3.8	4.8	24	23	19	10	4.7
16	1.9	3.0	e2.6	e3.0	e3.5	3.5	4.3	20	22	15	10	4.4
17	2.1	3.0	e2.5	e2.8	e3.2	3.4	4.4	17	20	26	9.1	4.4
18	2.0	3.1	e2.0	e2.7	e3.5	3.3	4.5	16	19	18	8.0	3.9
19	2.0	3.0	e1.5	e2.6	3.6	3.3	4.3	15	21	14	7.5	3.8
20	2.1	3.2	e1.3	e2.5	3.8	3.3	4.1	49	53	13	6.7	3.5
21	2.2	3.0	e1.2	e2.7	3.6	3.3	3.8	104	57	12	6.2	3.7
22	2.2	3.1	e1.0	e2.6	e3.5	3.7	3.5	48	35	11	5.9	5.2
23	2.1	3.2	e1.5	e2.5	e3.2	3.8	3.4	41	27	11	5.5	4.9
24	2.2	3.0	e2.0	e2.3	e3.0	3.6	3.8	36	27	11	5.2	4.5
25	2.2	e2.5	e1.5	e2.3	e3.2	3.6	3.4	32	37	9.8	5.2	4.1
26	2.3	e2.2	e2.0	e2.4	e3.3	e3.2	3.2	30	36	9.8	4.8	3.7
27	2.4	e2.0	e2.0	e2.5	e3.4	e3.5	5.0	27	24	9.6	4.7	3.6
28	2.4	e2.5	e1.5	e2.2	e3.0	3.7	8.8	39	29	9.1	4.7	3.6
29	2.5	e3.0	e1.3	e2.0	---	3.9	7.9	39	29	9.1	4.5	3.6
30	2.5	e2.8	e1.7	e2.2	---	3.8	6.8	31	30	8.5	4.3	4.1
31	2.7	---	e2.0	e2.5	---	3.6	---	39	---	8.3	4.0	---
TOTAL	53.37	87.8	66.4	76.8	109.5	105.5	138.5	789.2	992	566.2	219.7	128.0
MEAN	1.72	2.93	2.14	2.48	3.91	3.40	4.62	25.5	33.1	18.3	7.09	4.27
MAX	2.7	3.3	3.0	4.0	7.0	3.9	9.8	104	113	39	10	5.2
MIN	.78	2.0	1.0	1.5	3.0	2.5	2.9	6.4	19	8.3	4.0	3.5
AC-FT	106	174	132	152	217	209	275	1570	1970	1120	436	254

CAL YR 1990 TOTAL 3506.00 MEAN 9.61 MAX 69 MIN .71 AC-FT 6950
WTR YR 1991 TOTAL 3332.97 MEAN 9.13 MAX 113 MIN .78 AC-FT 6610

e Estimated

MILK RIVER BASIN

06139500 BIG SANDY CREEK NEAR HAVRE, MT

LOCATION.--Lat 48°31'36", long 109°50'27", in SW1/4SW1/4SW1/4 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^2.

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 above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--No estimated daily discharges this year. Records fair except those for September, which are poor. Diversions for irrigation of about 1,000 acres upstream from station. U.S. Bureau of Reclamation satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--7 years (water years, 1947-53), 25.2 ft^3/s, 18,240 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,570 ft^3/s, Apr. 3, 1952, gage height, 14.70 ft, from floodmarks; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 30, 1978, reached a stage of 15.15 ft, from floodmarks, discharge, about 6,000 ft^3/s.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 87 ft^3/s, May 23, gage height, 3.85 ft; maximum gage height, 4.27 ft, June 7 (backwater); minimum daily discharge, 0.51 ft^3/s, Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1							2.7	7.2	26	69	8.1	7.0
2							2.4	8.4	21	69	10	3.8
3							2.0	8.6	19	69	12	1.1
4							1.9	8.3	18	64	12	.65
5							2.0	7.1	18	59	11	.55
6							1.4	5.5	21	58	14	.60
7							1.2	4.1	58	57	12	.74
8							1.3	3.7	56	57	10	.96
9							1.2	4.3	64	56	9.1	.68
10							1.1	4.7	52	56	7.6	.82
11							2.3	5.4	41	54	6.3	1.0
12							2.7	8.0	35	52	7.7	.81
13							1.9	7.7	30	48	5.1	1.7
14							1.4	7.3	28	36	4.9	1.4
15							1.1	8.2	28	26	4.4	.80
16							1.2	8.3	26	20	3.7	.97
17							7.1	9.3	26	18	3.8	.87
18							6.0	9.2	26	16	4.1	1.0
19							5.3	8.5	24	14	4.0	1.2
20							4.3	9.6	28	22	3.8	1.6
21							2.7	11	32	34	3.6	2.1
22							1.7	9.0	37	32	3.4	1.4
23							1.2	57	49	26	3.6	1.1
24							1.3	57	58	17	3.6	.87
25							2.6	30	50	13	3.2	.52
26							2.4	24	42	12	3.6	.70
27							2.5	18	44	9.6	3.9	.70
28							5.0	17	57	7.3	4.7	.70
29							5.8	18	67	6.2	5.2	.60
30							5.6	19	69	5.3	3.7	.51
31							---	19	---	6.0	5.8	---
TOTAL							81.3	422.4	1150	1088.4	197.9	37.45
MEAN							2.71	13.6	38.3	35.1	6.38	1.25
MAX							7.1	57	69	69	14	7.0
MIN							1.1	3.7	18	5.3	3.2	.51
AC-FT							161	838	2280	2160	393	74

MILK RIVER BASIN

06140500 MILK RIVER AT HAVRE, MT

LOCATION.--Lat 48°33'50", long 109°41'42", in SE1/4NE1/4NE1/4 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^2, of which 670 mi^2 is probably noncontributing.

PERIOD OF RECORD.--May to November 1898, April 1899 to November 1922, March, April 1923, March, April 1952 (gage heights only, in WSP 1260-B), June 1953 (in WSP 1320-B), August 1954 to current year. Monthly discharge only for some periods, published in WSP 1309.

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. Datum of gage is 2,465.24 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 4, 1902, nonrecording gage at site 0.75 mi downstream at different datum. Nov. 4, 1902, to Aug. 6, 1980, nonrecording gages 1.25 mi downstream on 7th Avenue East highway bridges, all at datums then in use.

REMARKS.--Estimated daily discharges: Nov. 26, Dec. 2, 3, Dec. 12 to Mar. 14. Records good 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). Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--17 years (water years, 1900-1916), prior to operation of St. Mary Canal, 273 ft^3/s, 197,800 acre-ft/yr; 43 years (water years, 1917-22, 1955-91), 418 ft^3/s, 302,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 20,000 ft^3/s, Apr. 12, 1899, gage height, 19.3 ft, site and datum then in use, from floodmarks, from rating curve extended above 5,200 ft^3/s; no flow at times in several years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,800 ft^3/s, June 27, gage height, 6.33 ft; minimum daily, 3.0 ft^3/s, Oct. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	271	49	64	e33	e42	e52	198	422	981	1710	1370	779
2	262	47	e60	e30	e45	e50	195	388	990	1630	1360	778
3	258	47	e65	e28	e48	e50	194	393	976	1600	1360	779
4	222	47	80	e26	e50	e52	196	428	963	1580	1350	776
5	217	47	74	e25	e52	e52	197	427	960	1580	1340	808
6	219	41	62	e26	e55	e52	194	442	1040	1490	1330	807
7	222	46	65	e27	e55	e54	198	570	1080	1390	1030	852
8	222	61	66	e28	e55	e56	199	706	1120	1250	889	857
9	223	63	58	e29	e55	e58	98	707	1110	1110	875	856
10	221	50	53	e30	e55	e60	63	723	1090	886	872	855
11	191	45	50	e30	e55	e58	213	733	972	872	874	846
12	191	46	e48	e32	e55	e56	213	770	968	840	888	801
13	187	46	e45	e38	e55	e56	209	766	960	833	866	786
14	194	45	e47	e42	e52	e58	210	734	952	848	875	740
15	197	45	e50	e45	e50	58	234	752	937	841	846	733
16	197	44	e50	e48	e52	59	372	745	920	819	848	726
17	142	45	e45	e50	e50	57	399	769	918	1010	860	693
18	159	45	e35	e54	e47	54	405	914	918	1110	864	619
19	183	45	e30	e54	e48	54	409	927	920	1020	858	601
20	82	46	e25	e52	e50	53	411	952	957	1190	849	543
21	20	47	e20	e50	e50	51	410	990	979	1220	777	541
22	16	49	e22	e49	e47	51	415	996	969	1220	768	541
23	14	57	e25	e48	e50	50	433	997	975	1200	770	545
24	12	38	e30	e47	e48	47	509	1040	994	1190	772	545
25	10	28	e25	e46	e55	50	575	1010	1260	1170	768	520
26	12	e50	e30	e45	e55	50	590	983	1650	1170	764	439
27	3.3	72	e35	e44	e55	184	762	973	1780	1280	761	437
28	3.1	73	e32	e43	e54	193	803	1020	1760	1260	760	378
29	3.0	76	e30	e42	---	194	740	994	1710	1250	775	371
30	3.2	73	e32	e41	---	194	480	985	1730	1240	777	366
31	44	---	e35	e40	---	195	---	985	---	1240	778	---
TOTAL	4200.6	1513	1388	1222	1440	2358	10524	24241	33539	37049	28874	19918
MEAN	136	50.4	44.8	39.4	51.4	76.1	351	782	1118	1195	931	664
MAX	271	76	80	54	55	195	803	1040	1780	1710	1370	857
MIN	3.0	28	20	25	42	47	63	388	918	819	760	366
AC-FT	8330	3000	2750	2420	2860	4680	20870	48080	66520	73490	57270	39510

CAL YR 1990 TOTAL 172118.6 MEAN 472 MAX 1760 MIN 3.0 AC-FT 341400
WTR YR 1991 TOTAL 166266.6 MEAN 456 MAX 1780 MIN 3.0 AC-FT 329800

e Estimated

06141600 LITTLE BOXELDER CREEK AT MOUTH, NEAR HAVRE, MT

LOCATION.--Lat 48°33'43", long 109°31'53", in SE1/4SE1/4NW1/4 sec.4, T.32 N., R.17 E., Hill County, Hydrologic Unit 10050004, on right bank, attached to downstream pier of railroad bridge (number 423.2) 0.6 mi upstream from Milk River, and 7 mi east of Havre, MT.

DRAINAGE AREA.--95.9 mi^2.

PERIOD OF RECORD.--March 1986 to current year (seasonal records only).

GAGE.--Water-stage recorder and concrete weir. Elevation of gage is 2,455 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Mar. 1-20, 25-29, July 27-30, Aug. 6-13, 16-20. Records good except those for estimated discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 425 ft^3/s, Sept. 25, 1986, gage height, 9.09 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 124 ft^3/s, June 4, gage height, 5.23 ft; no flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00					e1.5	4.7	9.8	20	64	10	2.3
2	.00					e1.0	3.3	8.4	16	57	11	1.8
3	.00					e1.5	1.4	10	14	49	12	1.6
4	.00					e2.0	.83	13	63	44	12	1.8
5	.00					e2.0	.70	14	24	40	11	2.1
6	.00					e1.5	.65	14	28	37	e9.5	1.5
7	.00					e1.5	.72	17	97	34	e8.5	1.4
8	.00					e2.0	.69	22	82	33	e7.8	1.8
9	.00					e3.0	.62	25	63	31	e7.2	2.0
10	.00					e5.0	.64	34	53	29	e6.8	2.2
11	.00					e4.5	2.6	39	48	31	e6.4	2.6
12	.00					e4.0	8.5	61	46	29	e6.0	2.8
13	.00					e4.8	8.5	81	42	24	e7.0	2.4
14	.00					e5.0	5.8	87	38	21	11	1.9
15	.00					e4.5	4.2	85	35	23	10	1.1
16	.00					e4.3	4.2	76	33	21	e8.5	.61
17	.00					e4.4	4.2	68	31	20	e6.5	.40
18	.00					e4.0	6.0	57	29	21	e5.0	.25
19	.00					e4.2	5.8	49	27	19	e4.0	.72
20	.00					e4.3	6.4	40	33	18	e3.2	1.4
21	.00					4.3	5.5	92	53	17	2.4	1.4
22	.00					4.3	4.5	75	49	15	3.0	1.1
23	.00					3.4	3.0	47	38	12	4.5	1.9
24	.00					2.8	.88	30	33	11	4.3	2.8
25	.00					e2.5	.88	18	34	11	4.1	2.1
26	.00					e2.0	1.2	20	38	9.4	4.0	1.9
27	.00					e1.5	1.2	20	33	e9.0	3.8	1.8
28	.00					e2.0	1.9	31	32	e8.0	3.8	1.4
29	.00					e2.5	6.6	55	37	e8.0	3.5	2.4
30	.00					3.3	11	26	57	e9.0	3.2	1.2
31	.00					4.2	---	22	---	10	3.0	---
TOTAL	0.00					97.8	107.11	1246.2	1226	764.4	203.0	50.68
MEAN	.000					3.15	3.57	40.2	40.9	24.7	6.55	1.69
MAX	.00					5.0	11	92	97	64	12	2.8
MIN	.00					1.0	.62	8.4	14	8.0	2.4	.25
AC-FT	.00					194	212	2470	2430	1520	403	101

e Estimated

MILK RIVER BASIN

06142400 CLEAR CREEK NEAR CHINOOK, MT

LOCATION.--Lat 48°34'44", long 109°23'26", in SE1/4NW1/4NW1/4 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^2.

PERIOD OF RECORD.--June 1984 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 2,470 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--No estimated daily discharges this year. Records good. Diversions for irrigation of about 2,000 acres upstream from station. U.S. Bureau of Reclamation satellite telemeter at station. Several observations of water termperatures and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 571 ft^3/s, Sept. 25, 1986, gage height, 8.23 ft, from rating curve extended above 312 ft^3/s; no flow at times most years.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 159 ft^3/s, June 7, gage height, 3.73 ft; minimum daily, 0.76 ft^3/s, Apr. 8.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				1.2	6.2	40	92	9.9	1.8			
2				1.1	9.1	31	75	11	1.6			
3				.98	9.7	27	61	13	1.3			
4				.91	12	32	53	13	1.3			
5				.89	13	32	47	10	1.3			
6				.86	11	42	43	10	1.3			
7				.80	15	133	40	10	1.3			
8				.76	23	121	38	9.9	1.3			
9				.77	24	93	36	8.5	1.2			
10				.80	37	78	35	6.6	1.3			
11				1.1	48	70	38	4.9	1.6			
12				3.6	69	65	36	5.0	1.6			
13				9.6	83	61	31	7.0	1.6			
14				5.5	88	54	30	10	1.6			
15				3.3	86	51	28	9.8	1.9			
16				2.5	77	49	26	11	2.5			
17				1.9	67	46	24	11	3.0			
18				2.1	57	42	25	10	3.1			
19				2.3	53	41	22	8.5	3.4			
20				1.7	44	47	20	6.7	3.5			
21				1.3	63	65	19	5.3	3.1			
22				1.2	55	69	17	4.4	3.3			
23				1.2	40	55	17	3.9	4.0			
24				1.3	32	49	16	3.5	4.2			
25				1.0	26	49	15	3.0	3.5			
26				.91	25	52	14	2.8	3.2			
27				.82	25	46	13	2.8	3.1			
28				1.4	32	47	12	2.8	2.8			
29				5.5	59	56	11	2.4	2.7			
30				7.4	49	64	10	2.2	2.6			
31				---	56	---	10	2.1	---			
TOTAL				64.70	1294.0	1707	954	221.0	70.0			
MEAN				2.16	41.7	56.9	30.8	7.13	2.33			
MAX				9.6	88	133	92	13	4.2			
MIN				.76	6.2	27	10	2.1	1.2			
AC-FT				128	2570	3390	1890	438	139			

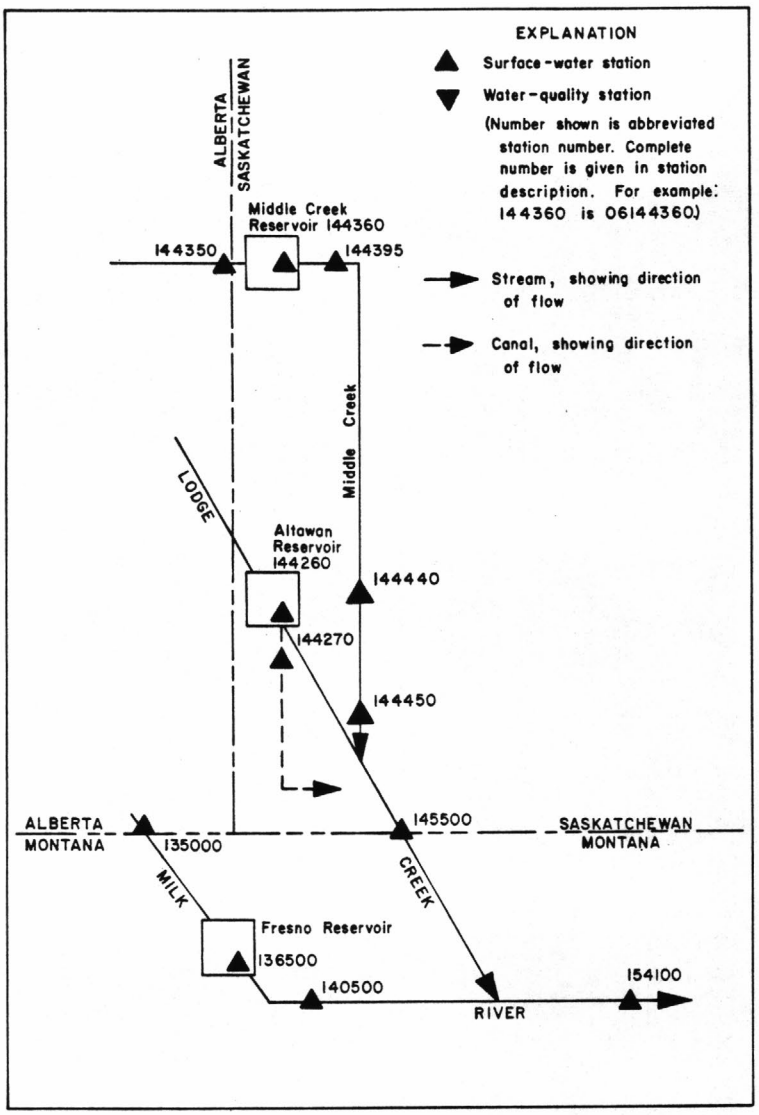

Figure 12.--Schematic diagram showing diversions and storage in Lodge Creek Basin.

MILK RIVER BASIN

06144270 SPANGLER DITCH NEAR GOVENLOCK, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°09'16", long 109°54'58", in NW1/4 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). 1915 to 1936, March 1950 to current season, in reports of Department of the Environment, Canada. Estimates of seasonal diversion only in most years prior to March 1950.

GAGE.--Water-stage recorder. Elevation of gage is 2,920 ft, from topographic map. Prior to March 1950, non-recording gages at several sites within 2 mi of present site at different datums. March 1950 to July 8, 1960, water-stage recorder at site 350 ft downstream at different datum.

REMARKS.--No estimated daily discharges this year. Records good. Canal diverts water from right bank of Lodge Creek in SW1/4 sec.35, T.2, R.30 W., third meridian, for irrigation of 1,320 acres in Spangler irrigation project.

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^3/s, Apr. 22, 1950, July 9, 1985; no flow most of each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	.00	.00	35	.00	.00		
2			.00	.00	.00	.00	.00	33	.00	.00		
3			.00	.00	.00	.00	.00	33	.00	.00		
4			.00	.00	.00	.00	.00	32	.00	.00		
5			.00	.00	.00	.00	.00	32	.00	.00		
6			.00	.00	.00	.00	.00	32	.00	.00		
7			.00	.00	.00	.00	.00	31	.00	.00		
8			.00	.00	.00	.00	.00	29	.00	.00		
9			.00	.00	.00	.00	.00	19	.00	.00		
10			.00	.00	.00	.00	.00	19	.00	.00		
11			.00	.00	.00	.00	.00	19	.00	.00		
12			.00	.00	.00	.00	.00	19	.00	.00		
13			.00	.00	.00	.00	.00	18	.00	.00		
14			.00	.00	25	.00	.00	17	.00	.00		
15			.00	.00	37	.00	.00	10	.00	.00		
16			.00	.00	37	.00	.00	11	.00	.00		
17			.00	.00	37	.00	.00	.00	.00	.00		
18			.00	.00	36	.00	.00	.00	.00	.00		
19			.00	.00	35	.00	.00	.00	.00	.00		
20			.00	.00	35	.00	.00	.00	.00	.00		
21			.00	.00	34	.00	.00	.00	.00	.00		
22			.00	.00	34	.00	.00	.00	.00	.00		
23			.00	.00	34	.00	.00	.00	.00	.00		
24			.00	.00	34	.00	16	.00	.00	.00		
25			.00	.00	16	.00	29	.00	.00	.00		
26			.00	.00	1.8	.00	28	.00	.00	.00		
27			.00	.00	23	.00	28	.00	.00	.00		
28			.00	.00	33	.00	24	.00	.00	.00		
29			.00	.00	16	.00	35	.00	.00	.00		
30			.00	.00	.00	.00	35	.00	.00	.00		
31			.00	---	.00	---	35	.00	---	.00		
TOTAL			0.00	0.00	467.80	0.00	230.00	389.00	0.00	0.00		
MEAN			.000	.000	15.1	.000	7.42	12.5	.000	.000		
MAX			.00	.00	37	.00	35	35	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.00	.00	928	.00	456	772	.00	.00		

MILK RIVER BASIN

06144350 MIDDLE CREEK NEAR SASKATCHEWAN BOUNDARY

(International gaging station)

LOCATION.--Lat 49°25'30", long 110°03'08", in SW1/4 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^2.

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. Datum of gage is 3,381.13 ft above mean sea level (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 datums.

REMARKS.--Estimated daily discharges: Mar. 1-26, Oct. 21-31. Records good. Minor diversions for irrigation upstream from 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 discharge, 4,980 ft^3/s, Apr. 15, 1952, gage height, 10.27 ft, site and datum then in use, from rating curve extended above 600 ft^3/s on basis of slope-area measurement of peak flow; no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 222 ft^3/s, May 13, gage height, 6.25 ft; minimum daily, 0.07 ft^3/s, Mar. 1-13.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.07	3.3	1.1	2.0	2.8	.64	.39	.39		
2			e.07	31	.92	1.7	2.6	.71	.35	.39		
3			e.07	31	.88	1.7	5.3	.64	.35	.42		
4			e.07	26	.85	1.6	5.5	.60	.39	.46		
5			e.07	18	1.8	1.6	3.6	.57	.39	.46		
6			e.07	15	1.4	1.8	2.4	.57	.39	.42		
7			e.07	19	3.2	1.9	1.6	.60	.39	.42		
8			e.07	13	16	1.7	1.2	.57	.42	.42		
9			e.07	7.2	30	1.8	.99	.49	.42	.39		
10			e.07	4.8	50	1.9	.95	.46	.42	.39		
11			e.07	3.3	43	2.1	.88	.49	.42	.35		
12			e.07	2.5	45	1.9	.81	.64	.39	.35		
13			e.07	1.6	159	1.8	.74	.64	.39	.35		
14			e.21	1.3	148	1.7	.71	.78	.39	.35		
15			e.32	.99	105	1.6	.71	.92	.39	.35		
16			e.35	.92	38	1.6	.64	.92	.39	.35		
17			e.64	.85	19	1.6	.60	.71	.42	.35		
18			e1.3	.74	11	1.5	.60	.53	.39	.32		
19			e1.2	.71	6.7	1.4	.60	.46	.39	.35		
20			e1.8	.71	4.8	1.3	.64	.42	.35	.35		
21			e2.5	.60	5.7	1.3	.64	.42	.35	e.42		
22			e3.8	.60	4.3	1.3	.60	.42	.39	e.42		
23			e3.2	.57	9.3	1.1	.60	.39	.39	e.39		
24			e3.4	.57	5.5	1.0	.60	.39	.39	e.42		
25			e4.4	.57	12	3.9	.57	.39	.39	e.39		
26			e2.7	.57	4.4	4.0	.64	.42	.39	e.42		
27			1.7	.64	2.9	1.7	.60	.42	.39	e.42		
28			1.2	.81	3.5	1.3	.60	.46	.39	e.42		
29			1.2	.99	3.6	3.1	.57	.42	.39	e.39		
30			1.8	1.1	2.9	3.9	.53	.42	.39	e.35		
31			2.5	---	2.3	---	.57	.39	---	e.35		
TOTAL			35.13	188.94	742.05	56.8	40.39	16.90	11.69	12.02		
MEAN			1.13	6.30	23.9	1.89	1.30	.55	.39	.39		
MAX			4.4	31	159	4.0	5.5	.92	.42	.46		
MIN			.07	.57	.85	1.0	.53	.39	.35	.32		
AC-FT			70	375	1470	113	80	34	23	24		

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", in SW1/4 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^2.

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, from topographic map. Prior to April 1972, non-recording gages at two sites within 2 mi of present site, at different datums.

REMARKS.--No estimated daily discharges this year. 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.

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^3/s, May 3, 1985; no flow at times most seasons.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	34	3.0	.00	.00	.00		
2			.00	.00	.00	2.6	.42	.00	.00	.00		
3			.00	.00	.00	.18	.07	.00	.00	.00		
4			.00	.00	.00	.81	.00	.00	.00	.00		
5			.00	.00	.00	.14	.00	.00	.00	.00		
6			.00	.00	.00	.07	.00	.00	.00	.00		
7			.00	.00	.00	.07	.00	.00	.00	.00		
8			.00	.00	.00	.14	.00	.00	.00	.00		
9			.00	.00	.00	.04	.00	.00	.00	.00		
10			.00	.00	.00	.00	2.0	.00	.00	.00		
11			.00	.00	.00	.00	4.3	.00	.00	.00		
12			.00	.00	.00	.00	.39	.00	.00	.00		
13			.00	.00	.00	.00	.07	.00	.00	.00		
14			.00	.00	.00	.00	.00	.00	.00	.00		
15			.00	.00	.00	.00	.00	.00	.00	.00		
16			.00	.00	.00	.00	.00	.00	.00	.00		
17			.00	.00	.00	.00	.00	.00	.00	.00		
18			.00	.00	.00	.00	.00	.00	.00	.00		
19			.00	.00	.00	.00	.00	.00	.00	.00		
20			.00	.00	.00	.00	.00	.00	.00	.00		
21			.00	.00	.00	.00	.00	.00	.00	.00		
22			.00	.00	.00	.00	.00	.00	.00	.00		
23			.00	.00	.00	.00	.00	.00	.00	.00		
24			.00	.00	.00	.00	.00	.00	.00	.00		
25			.00	.00	.00	.00	.00	.00	.00	.00		
26			.00	.00	.00	.00	.00	.00	.00	.00		
27			.00	.00	.00	.00	.00	.00	.00	.00		
28			.00	.00	.00	.00	.00	.00	.00	.00		
29			.00	.00	.00	.00	.00	.00	.00	.00		
30			.00	.00	27	4.8	.00	.00	.00	.00		
31			.00	---	55	---	.00	.00	---	.00		
TOTAL			0.00	0.00	82.00	42.85	10.25	0.00	0.00	0.00		
MEAN			.000	.000	2.65	1.43	.33	.000	.000	.000		
MAX			.00	.00	55	34	4.3	.00	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.00	.00	163	85	20	.00	.00	.00		

MILK RIVER BASIN

06144440 MIDDLE CREEK NEAR GOVENLOCK, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°13'42", long 109°48'57", in NW1/4 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^2.

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, from topographic map.

REMARKS.--Estimated daily discharges: Mar. 1 to Apr. 7, July 5 to Aug. 4, Aug. 9 to Oct. 8, Oct. 26-31. Records fair except those for estimated daily discharges which are poor. 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.

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 discharge, 1,190 ft^3/s, Sept. 25, 1986, gage height, 9.81 ft; no flow at times each season.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 47 ft^3/s, June 2, gage height, 4.67 ft; no flow many days.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.71	e.99	1.2	3.1	1.1	e.00	e.00	e.00		
2			e1.0	e1.1	1.1	32	1.2	e2.6	e.00	e.00		
3			e.42	e4.4	1.2	33	1.4	e.18	e.00	e.00		
4			e.14	e3.7	1.2	21	1.6	e.04	e.00	e.00		
5			e.04	e4.3	1.2	12	e1.6	.00	e.00	e.00		
6			e.00	e14	1.3	10	e1.4	.00	e.00	e.00		
7			e.00	e3.7	1.3	9.9	e1.3	.00	e.00	e.00		
8			e.00	1.2	1.1	7.3	e1.1	.00	e.00	e.00		
9			e.00	1.1	1.0	5.2	e.99	e.00	e.00	.00		
10			e.04	.99	.81	3.7	e.85	e.00	e.00	.00		
11			e.11	.78	.60	2.9	e.71	e.14	e.00	.00		
12			e.07	3.1	.71	2.4	e.57	e.07	e.00	.00		
13			e.21	10	.99	2.2	e.42	e.11	e.00	.00		
14			e.49	5.7	1.0	1.9	e.28	e.07	e.00	.00		
15			e1.3	2.8	.88	1.7	e.14	e.04	e.00	.00		
16			e1.5	2.5	.74	1.4	e.07	e.04	e.00	.00		
17			e.99	2.4	.53	1.2	e.07	e.00	e.00	.00		
18			e1.8	2.3	.99	.99	e.04	e.00	e.00	.00		
19			e2.6	2.3	1.4	.81	e.04	e.00	e.00	.00		
20			e6.4	2.2	1.7	.78	e.00	e.00	e.00	.00		
21			e13	2.0	1.5	.88	e.00	e.00	e.00	.00		
22			e13	1.9	4.5	.99	e.00	e.00	e.00	.00		
23			e7.9	1.7	1.9	1.1	e.00	e.00	e.00	.00		
24			e5.9	1.7	1.5	1.1	e.00	e.00	e.00	.00		
25			e4.3	1.8	2.6	1.1	e.00	e.00	e.00	.00		
26			e1.5	1.5	3.5	.99	e.00	e.00	e.00	e.00		
27			e1.3	1.4	1.8	.92	e.00	e.00	e.00	e.07		
28			e1.9	1.3	1.4	.92	e.00	e.00	e.00	e.14		
29			e1.7	1.3	2.0	.92	e.00	e.00	e.00	e.14		
30			e1.7	1.2	1.7	.95	e.00	e.00	e.00	e.11		
31			e1.3	---	7.5	---	e.00	e.00	---	e.04		
TOTAL			71.32	85.36	50.85	163.35	14.88	3.29	0.00	0.50		
MEAN			2.30	2.85	1.64	5.44	.48	.11	.000	.016		
MAX			13	14	7.5	33	1.6	2.6	.00	.14		
MIN			.00	.78	.53	.78	.00	.00	.00	.00		
AC-FT			141	169	101	324	30	6.5	.00	1.0		

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", in NE1/4 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^2.

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, from topographic map. Prior to Mar. 1, 1962, nonrecording gage at site 1,000 ft downstream at different datum.

REMARKS.--Estimated daily discharges: Mar. 1-28. 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.

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 discharge, 738 ft^3/s, Sept. 26, 1986, gage height, 13.84 ft; no flow at times each season.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 88 ft^3/s, May 25, gage height, 5.86 ft; no flow many days.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.00	.00	.00	.04	.04	.00	.00	.00		
2			e.00	.00	.00	.00	.04	.00	.00	.00		
3			e.00	.00	.00	.00	.00	.00	.00	.00		
4			e.00	.00	.00	.00	.00	.00	.00	.00		
5			e.00	.00	.00	.00	.00	.00	.00	.00		
6			e.00	.00	.00	.39	.00	.00	.00	.00		
7			e.00	.00	.00	.32	.00	.00	.00	.00		
8			e.00	.00	.00	1.9	.00	.00	.00	.00		
9			e.00	.00	.00	2.4	.00	.00	.00	.00		
10			e.00	.00	.00	1.1	.00	.00	.00	.00		
11			e.00	.00	.00	1.3	.00	.00	.00	.00		
12			e.00	.00	.00	.95	.00	.00	.00	.00		
13			e.00	.00	.00	1.2	.00	.00	.00	.00		
14			e.00	.00	.00	1.1	.00	.00	.00	.00		
15			e.00	.00	.00	1.2	.00	.00	.00	.00		
16			e.00	.00	.00	1.1	.00	.00	.00	.00		
17			e.00	.00	.00	1.1	.00	.00	.00	.00		
18			e.00	.00	.00	1.0	.00	.00	.00	.00		
19			e.00	.00	.00	1.1	.00	.00	.00	.00		
20			e.00	.00	.00	.92	.00	.00	.00	.00		
21			e.00	.00	.00	.67	.00	.00	.00	.00		
22			e.00	.00	.00	.49	.00	.00	.00	.00		
23			e.00	.00	.00	.32	.00	.00	.00	.00		
24			e.00	.00	.00	.21	.00	.00	.00	.00		
25			e.00	.00	26	.18	.00	.00	.00	.00		
26			e.00	.00	.53	.11	.00	.00	.00	.00		
27			e.00	.00	.07	.07	.00	.00	.00	.00		
28			e.00	.00	5.4	.07	.00	.00	.00	.00		
29			.00	.00	2.2	.07	.00	.00	.00	.00		
30			.00	.00	.28	.07	.00	.00	.00	.00		
31			.00	---	.11	---	.00	.00	---	.00		
TOTAL			0.00	0.00	34.59	19.38	0.08	0.00	0.00	0.00		
MEAN			.000	.000	1.12	.65	.003	.000	.000	.000		
MAX			.00	.00	26	2.4	.04	.00	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.00	.00	69	38	.2	.00	.00	.00		

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", in SW1/4 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^2.

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. Datum of gage is 2,731.0 ft above mean sea level (International Boundary Survey datum).

REMARKS.--No estimated daily discharges this year. Records good. Natural flow affected by numerous storage reservoirs, diversions for irrigation of about 3,000 acres, and return flow from irrigated areas. 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.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,890 ft^3/s, Sept. 25, 1986, gage height, 16.36 ft, from rating curve extended above 4,100 ft^3/s on basis of slope-area measurement of peak flow; no flow at times each season.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 259 ft^3/s, May 16, gage height, 4.56 ft; no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	3.5	63	.95	3.9	.21	.00		
2			.00	.00	2.2	57	.74	2.6	.14	.00		
3			.00	.04	1.6	55	.60	1.8	.07	.00		
4			.00	.18	1.2	57	.46	1.2	.07	.00		
5			.00	.07	.88	54	.35	.88	.04	.00		
6			.00	.04	.64	57	.25	.81	.04	.00		
7			.00	.07	.53	63	.18	1.2	.04	.00		
8			.00	.04	.42	55	.14	1.2	.04	.00		
9			.00	.04	.35	55	.11	.85	.04	.00		
10			.00	.04	.25	53	.07	.60	.04	.00		
11			.00	.04	.18	52	.07	.39	.00	.00		
12			.00	.04	.32	51	.07	.46	.00	.00		
13			.00	.04	.39	49	27	.49	.00	.00		
14			.00	.04	38	49	43	.53	.00	.00		
15			.00	.04	190	45	43	.53	.00	.00		
16			.00	.04	244	20	43	.60	.00	.00		
17			.00	.04	156	9.0	43	21	.04	.00		
18			.00	.04	90	5.3	42	75	.00	.00		
19			.00	.04	50	3.8	25	78	.00	.00		
20			.00	.00	30	3.1	9.5	77	.00	.00		
21			.00	.00	20	3.5	4.8	40	.00	.00		
22			.00	.00	12	4.2	3.0	13	.00	.00		
23			.00	.00	8.1	3.0	2.0	6.1	.00	.00		
24			.00	.00	5.4	2.4	1.3	3.9	.00	.00		
25			.00	.00	58	2.0	.81	2.5	.00	.00		
26			.00	.00	110	1.7	.57	1.7	.00	.00		
27			.00	.00	76	1.3	.39	1.1	.00	.00		
28			.00	.00	77	1.2	.25	.81	.00	.00		
29			.00	.00	196	1.2	1.2	.57	.00	.00		
30			.00	3.7	156	1.1	6.4	.42	.00	.00		
31			.00	---	80	---	5.8	.28	---	.00		
TOTAL			0.00	4.58	1608.96	877.8	306.01	339.42	0.77	0.00		
MEAN			.000	.15	51.9	29.3	9.87	10.9	.026	.000		
MAX			.00	3.7	244	63	43	78	.21	.00		
MIN			.00	.00	.18	1.1	.07	.28	.00	.00		
AC-FT			.00	9.1	3190	1740	607	673	1.5	.00		

MILK RIVER BASIN

RESERVOIRS IN LODGE CREEK BASIN IN SASKATCHEWAN

(International gaging stations)

06144260 ALTAWAN RESERVOIR.--Lat 49°10'00", long 109°55'00", in SW1/4 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^2. PERIOD OF RECORD, February 1966 to current season (seasonal records only). February 1960 to current season in reports of Department of the Environment, Canada. Water-stage recorder. Datum of gage is at mean sea level (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. 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. 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, 6,120 acre-ft, May 15, elevation, 2,953.53 ft; minimum, 1,770 acre-ft, Oct. 18, elevation, 2,941.19 ft.

06144360 MIDDLE CREEK RESERVOIR.--Lat 49°24'22", long 109°59'02", in NE1/4 sec.21, T.5, R.30 W., third meridian, Hydrologic Unit 10050007, at dam on Middle Creek, 0.7 mi east of Alberta-Saskatchewan boundary, 6.3 mi west of Battle Creek, 15 mi northwest of Govenlock, and at river mile 66.7. DRAINAGE AREA, 143 mi^2. PERIOD OF RECORD, February 1966 to current season. Occasional nonrecording gage readings in 1937 and 1939-51, March 1952 to current season in reports of Department of the Environment, Canada. Seasonal records only. Water-stage recorder. Datum of gage is at mean sea level (Geodetic Survey of Canada datum). Prior to July 7, 1967, nonrecording gage in gate well read every ten days during irrigation season.
REMARKS.--Reservoir is formed by earthfill dam with concrete control works and sod spillway at elevation 3,383.0 ft on Middle Creek and at Ducks Unlimited outlet, constructed in 1937. The following capacity figures are from revised capacity table effective Jan. 1, 1987. Usable capacity, 12,660 acre-ft between elevation 3,368.60 ft, bottom of outlet works on Middle Creek, and 3,383.0 ft, natural spillway. Invert of outlet pipe at Ducks Unlimited outlet is at elevation 3,372.04 ft. No dead storage. Water is used for irrigation and to maintain levels of Orleans Lakes. Water may be released to Lodge Creek via Ducks Unlimited outlet, Simms Lake and Walburger Coulee. Spillway does not return water to Middle Creek, may return to Lodge Creek via Walburger Coulee. This is one of a number of stations which are maintained jointly by Canada and the United States. REVISED RECORDS, W 1984: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 23,080 acre-ft, Apr. 13, 1952, elevation, 3,387.92 ft; no contents at various times.
EXTREMES FOR CURRENT SEASON: Maximum contents, 1,150 acre-ft, May 16, elevation, 3,371.35 ft; minimum, 88 acre-ft, Oct. 31, elevation, 3,369.49 ft.

Monthend contents, in acre-ft, October 1990 to October 1991

Date	Altawan Reservoir	Middle Creek Reservoir
Oct. 31	2,790	0
Nov. 30	-	-
Dec. 31	-	-
Jan. 31	-	-
Feb. 28	2,770	-
Mar. 31	3,620	140
Apr. 30	4,680	322
May 31	4,880	782
June 30	4,020	867
July 31	3,460	604
Aug. 31	1,930	510
Sept. 30	1,830	322
Oct. 31	1,770	88

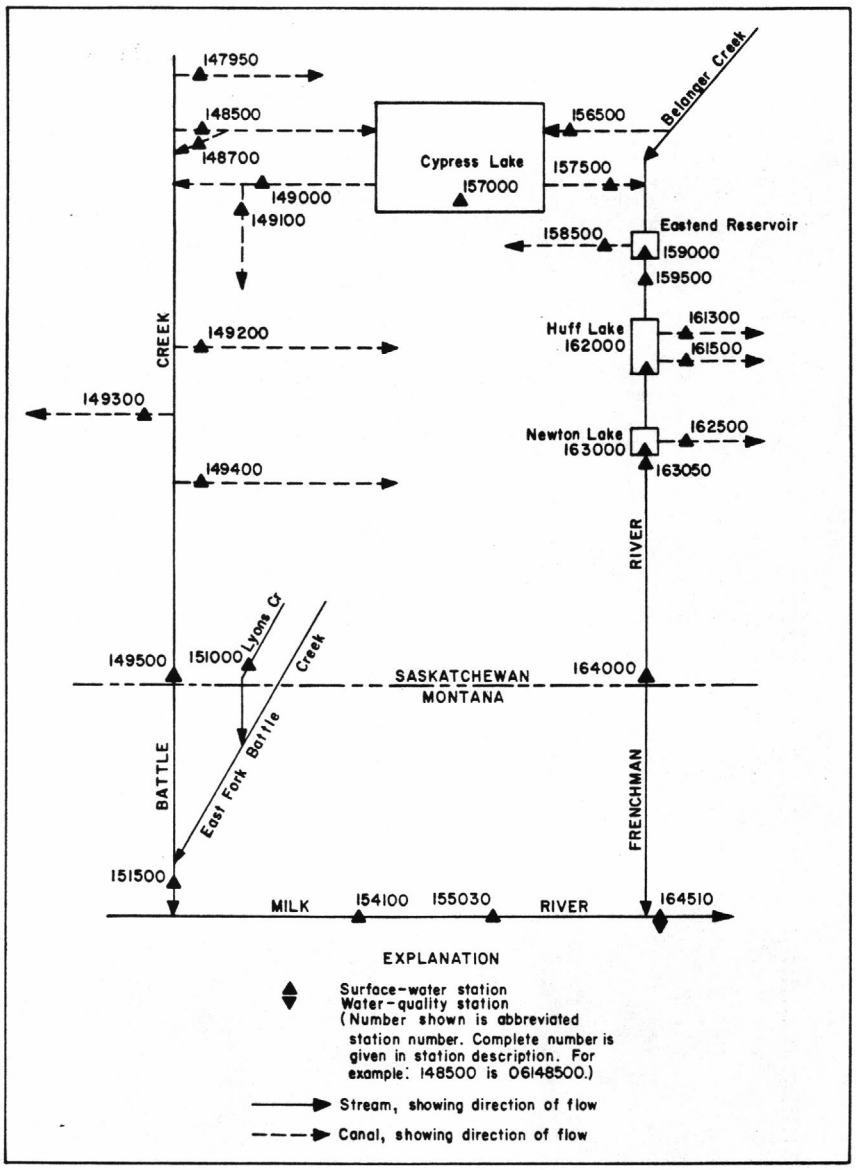

Figure 13.--Schematic diagram showing diversions and storage in Battle Creek and Frenchman River basins.

MILK RIVER BASIN

06147950 GAFF DITCH NEAR MERRYFLAT, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°26'05", long 109°50'07", in NW1/4 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, from topographic map.

REMARKS.--Estimated daily discharges: Mar. 1 to Apr. 6, June 13-19, July 23 to Aug. 29, Sept. 3-30, and Oct. 25-31. Records fair. Water is diverted from left bank of Battle Creek in NW1/4 sec.34, T.5. R.29 W., third meridian, for irrigation of about 890 acres along Battle Creek.

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^3/s, Apr. 22, 1971; no flows at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.00	e.07	20	.04	.04	e.00	.04	.00		
2			e.00	e.04	17	.00	.04	e.00	.04	.00		
3			e.00	e.00	17	.00	.04	e.00	e.00	.00		
4			e.00	e3.1	18	.00	.04	e.00	e.00	.00		
5			e.00	e12	16	.00	.00	e.00	e.00	.00		
6			e.00	e16	16	.00	.00	e.00	e.00	.00		
7			e.00	24	13	.00	.00	e.00	e.00	.00		
8			e.00	25	4.4	.00	.00	e.00	e.00	.00		
9			e.00	23	1.7	.00	.00	e.00	e.00	.00		
10			e.00	20	1.5	.00	.00	e.00	e.00	.00		
11			e.00	20	1.6	.00	.00	e.00	e.00	.00		
12			e.00	17	1.6	.00	.00	e.00	e.00	.00		
13			e.00	18	1.7	e.00	.00	e.00	e.00	.00		
14			e.00	22	1.6	e.00	.00	e.00	e.00	.00		
15			e.00	23	1.5	e.00	.00	e.00	e.00	.00		
16			e.00	23	1.3	e.00	.00	e.00	e.00	.00		
17			e.00	22	.18	e.00	.00	e.00	e.00	.00		
18			e.00	22	.11	e.00	.00	e.00	e.00	.00		
19			e.00	22	.11	e.00	.00	e.00	e.00	.00		
20			e.00	22	.11	.04	.00	e.00	e.00	.00		
21			e.00	22	.11	.04	.00	e.00	e.00	.00		
22			e.00	23	.11	.04	.00	e.00	e.00	.00		
23			e.00	24	.07	.00	e.00	e.00	e.00	.00		
24			e.00	24	.07	.00	e.00	e.00	e.00	.00		
25			e.00	24	.07	.00	e.00	e.00	e.00	e.00		
26			e.00	24	.07	.00	e.00	e.00	e.00	e.00		
27			e.00	24	.04	.00	e.00	e.00	e.00	e.00		
28			e.04	24	.04	.00	e.00	e.00	e.00	e.00		
29			e.14	23	.04	.00	e.00	e.04	e.00	e.00		
30			e.25	21	.04	.04	e.00	.04	e.00	e.00		
31			e.14	---	.04	---	e.00	.04	---	e.00		
TOTAL			0.57	567.21	135.11	0.20	0.16	0.12	0.08	0.00		
MEAN			.018	18.9	4.36	.007	.005	.004	.003	.000		
MAX			.25	25	20	.04	.04	.04	.04	.00		
MIN			.00	.00	.04	.00	.00	.00	.00	.00		
AC-FT			1.1	1130	268	.4	.3	.2	.2	.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", in SE1/4 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, from topographic map. Prior to Oct. 16, 1956, at site 2.3 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Mar. 1 to Apr. 7. Records fair except those for estimated daily discharges, which are poor. Canal diverts water from Battle Creek in NW1/4 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.

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^3/s, Apr. 27, 1965; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e1.4	e.00	45	30	74	.00	.00	.00		
2			e1.9	e.53	61	29	82	.00	.00	.00		
3			e2.0	e1.3	65	29	79	.00	.00	.00		
4			e2.0	e.71	47	30	65	.00	.00	.00		
5			e2.0	e1.1	22	30	57	.00	.00	.00		
6			e2.0	e.32	9.2	29	52	.00	.00	.00		
7			e2.0	e.14	7.3	29	47	.00	.00	.00		
8			e1.3	.04	15	29	36	.00	.00	.00		
9			e.95	.04	15	29	23	.00	.00	.00		
10			e.92	.00	7.8	29	22	.00	.00	.00		
11			e.53	.00	5.6	25	23	.00	.00	.00		
12			e.28	.00	27	13	27	.00	.00	.00		
13			e.28	.00	63	13	32	.00	.00	.00		
14			e.11	.00	73	14	25	.74	.00	.00		
15			e.18	.00	116	14	21	.14	.00	.00		
16			e.67	.00	120	13	20	.11	.00	.00		
17			e.35	.00	35	9.9	18	.04	.00	.00		
18			e.04	.00	15	10	16	.00	.00	.00		
19			e.04	.00	8.4	12	15	.00	.00	.00		
20			e.04	.00	1.6	14	15	.00	.00	.00		
21			e1.2	.00	.78	14	13	.00	.00	.00		
22			e3.1	.00	.25	14	13	.00	.00	.00		
23			e3.0	.00	28	14	11	.00	.00	.00		
24			e.74	.00	34	28	11	.00	.00	.00		
25			e.28	.00	12	35	9.3	.00	.00	.00		
26			e.14	.00	14	30	.25	.00	.00	.00		
27			e.04	.00	6.1	53	.00	.00	.00	.00		
28			e.00	.07	4.9	55	.00	.00	.00	.00		
29			e.00	.32	4.0	51	.00	.00	.00	.00		
30			e.00	7.2	1.4	58	.00	.00	.00	.00		
31			e.00	---	3.9	---	.00	.00	---	.00		
TOTAL			27.49	11.77	868.23	782.9	806.55	1.03	0.00	0.00		
MEAN			.89	.39	28.0	26.1	26.0	.033	.000	.000		
MAX			3.1	7.2	120	58	82	.74	.00	.00		
MIN			.00	.00	.25	9.9	.00	.00	.00	.00		
AC-FT			55	23	1720	1550	1600	2.0	.00	.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", in NW1/4 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, from topographic map.

REMARKS.--Estimated daily discharges: Mar. 1 to Apr. 12. 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^3/s, Apr. 20, 1955; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.00	e.14	.00	.00	.07	.00	.00	.00		
2			e.11	e.11	.00	.00	.04	.00	.00	.00		
3			e.25	e.11	.00	.00	.04	.00	.00	.00		
4			e.60	e.11	.14	.00	.04	.00	.00	.00		
5			e1.4	e.11	.18	.00	.04	.00	.00	.00		
6			e1.9	e.07	.18	.00	.04	.00	.00	.00		
7			e2.5	e.07	.14	.00	.04	.00	.00	.00		
8			e3.1	e.07	.14	.00	.04	.00	.00	.00		
9			e3.6	e.04	.11	.00	.00	.00	.00	.00		
10			e4.0	e.04	.11	.00	.04	.00	.00	.00		
11			e2.9	e.04	.07	.00	.04	.00	.00	.00		
12			e2.8	e.00	.11	.00	.04	.00	.00	.00		
13			e2.5	.00	.07	.00	.04	.00	.00	.00		
14			e2.4	.00	.04	.00	.04	.04	.00	.00		
15			e1.4	.00	.07	.00	.04	.00	.00	.00		
16			e.85	.00	.07	.00	.00	.00	.00	.00		
17			e.85	.00	.04	.00	.00	.00	.00	.00		
18			e.81	.00	.04	.00	.00	.00	.00	.00		
19			e.81	.00	.04	.00	.00	.00	.00	.00		
20			e.81	.00	.04	.04	.00	.00	.00	.00		
21			e.81	.00	.00	.04	.04	.00	.00	.00		
22			e.81	.00	.00	.00	.04	.00	.00	.00		
23			e.81	.00	.00	.00	.04	.00	.00	.00		
24			e.64	.00	.04	.04	.04	.00	.00	.00		
25			e.53	.00	.04	.04	.00	.00	.00	.00		
26			e.42	.00	.00	.04	.00	.00	.00	.00		
27			e.35	.00	.00	.04	.00	.00	.00	.00		
28			e.28	.00	.00	.04	.00	.00	.00	.00		
29			e.25	.00	.00	.04	.00	.00	.00	.00		
30			e.21	.00	.00	.04	.00	.00	.00	.00		
31			e.18	---	.00	---	.00	.00	---	.00		
TOTAL			38.88	0.91	1.67	0.36	0.75	0.04	0.00	0.00		
MEAN			1.25	.030	.054	.012	.024	.001	.000	.000		
MAX			4.0	.14	.18	.04	.07	.04	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			77	1.8	3.3	.7	1.5	.08	.00	.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", in SW1/4 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, from topographic map. Prior to Sept. 18, 1952, at site 1 mi upstream and 300 ft downstream from Cypress Lake West Dam at different datum.

REMARKS.--Estimated daily discharges: Mar. 1-31. Records fair except those below 1.0 ft^3/s, which are poor. Canal diverts water from Cypress Lake in NW1/4 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.

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^3/s, May 4, 1951; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.00	.18	1.0	6.2	13	.00	.00	.00		
2			e.00	.21	4.4	5.7	7.6	.07	.00	.00		
3			e.00	.21	6.7	1.8	5.5	.04	.00	.00		
4			e.00	.21	.88	4.1	4.4	.00	.00	.00		
5			e.00	.25	.95	3.1	2.6	.00	.00	.00		
6			e.00	.35	1.5	1.3	.32	.00	.00	.00		
7			e.00	.35	2.3	3.9	.18	.00	.00	.00		
8			e.00	.32	3.4	4.4	.14	.00	.00	.00		
9			e.00	.32	31	2.8	.14	.00	.00	.00		
10			e.04	.28	31	1.6	2.7	.00	.00	.00		
11			e.04	.39	23	.92	7.8	.00	.00	.00		
12			e.04	.28	24	.64	7.5	.00	.00	.00		
13			e.04	.25	67	.39	5.9	.00	.00	.00		
14			e.04	1.6	93	.21	6.3	.00	.00	.00		
15			e.07	3.3	115	.14	4.5	.00	.00	.00		
16			e.04	1.9	118	.07	5.4	.00	.00	.00		
17			e.00	1.4	92	.00	5.2	.00	.00	.00		
18			e.00	1.0	77	.00	5.5	.00	.00	.00		
19			e.00	.81	75	.00	6.5	.00	.00	.00		
20			e.00	.71	63	.04	6.0	.00	.00	.00		
21			e.00	.53	67	8.7	2.3	.00	.00	.00		
22			e.07	.35	62	23	.35	.00	.00	.00		
23			e.07	.28	64	19	.18	.00	.00	.00		
24			e.07	.21	74	17	.11	.00	.00	.00		
25			e.04	.18	49	16	.07	.00	.00	.00		
26			e.04	.14	15	16	.07	.00	.00	.00		
27			e.04	.14	7.2	16	.04	.00	.00	.00		
28			e.04	.32	7.0	15	.04	.00	.00	.00		
29			e.18	1.0	6.8	15	.00	.00	.00	.00		
30			e.21	1.6	6.7	15	.00	.00	.00	.00		
31			e.18	---	6.6	---	.00	.00	---	.00		
TOTAL			1.25	19.07	1195.43	198.01	100.34	0.11	0.00	0.00		
MEAN			.040	.64	38.6	6.60	3.24	.004	.000	.000		
MAX			.21	3.3	118	23	13	.07	.00	.00		
MIN			.00	.14	.88	.00	.00	.00	.00	.00		
AC-FT			2.5	38	2370	393	199	.2	.00	.00		

e Estimated

MILK RIVER BASIN

06149100 VIDORA DITCH NEAR CONSUL, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°27'27", long 109°35'30", in SW1/4 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, from topographic map. Prior to Aug. 1, 1963, at datum 1.0 ft higher.

REMARKS.--Estimated daily discharges: Mar. 1 to Apr. 16. Records fair. Canal diverts water from Cypress Lake west outflow canal in NE1/4 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.

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^3/s, May 26, 1988; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.00	e.00	.00	.07	.04	.00	.00	.00		
2			e.00	e.00	.00	.04	.04	.00	.00	.00		
3			e.00	e.00	1.5	.07	.00	.00	.00	.00		
4			e.00	e.00	.71	.14	.00	.00	.00	.00		
5			e.00	e.00	.42	.00	.00	.00	.00	.00		
6			e.00	e.00	.99	.00	.00	.00	.00	.00		
7			e.00	e.00	1.6	.00	.00	.00	.00	.00		
8			e.00	e.00	.18	.00	.00	.00	.00	.00		
9			e.00	e.00	.35	.00	.00	.00	.00	.00		
10			e.00	e.00	.28	.00	.00	.00	.00	.00		
11			e.00	e.00	.21	.00	.07	.00	.00	.00		
12			e.00	e.00	.25	.00	.04	.00	.00	.00		
13			e.00	e.00	28	.00	.00	.00	.00	.00		
14			e.00	e.00	54	.00	.00	.00	.00	.00		
15			e.00	e.32	66	.00	.00	.00	.00	.00		
16			e.00	e.21	69	.00	.00	.00	.00	.00		
17			e.00	.18	59	.00	.00	.00	.00	.00		
18			e.00	.14	59	.00	.00	.00	.00	.00		
19			e.00	.14	64	.00	.00	.00	.00	.00		
20			e.00	.14	58	.00	.00	.00	.00	.00		
21			e.00	.04	57	.07	.00	.00	.00	.00		
22			e.00	.00	54	.28	.00	.00	.00	.00		
23			e.00	.00	56	.21	.00	.00	.00	.00		
24			e.00	.00	65	.18	.00	.00	.00	.00		
25			e.00	.00	49	.14	.00	.00	.00	.00		
26			e.00	.00	17	.11	.00	.00	.00	.00		
27			e.00	.00	.25	.07	.00	.00	.00	.00		
28			e.00	.00	.21	.07	.00	.00	.00	.00		
29			e.00	.00	.11	.07	.00	.00	.00	.00		
30			e.00	.00	.07	.07	.00	.00	.00	.00		
31			e.00	---	.07	---	.00	.00	---	.00		
TOTAL			0.00	1.17	762.20	1.59	0.19	0.00	0.00	0.00		
MEAN			.000	.039	24.6	.053	.006	.000	.000	.000		
MAX			.00	.32	69	.28	.07	.00	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.00	2.3	1510	3.2	.4	.00	.00	.00		

e Estimated

MILK RIVER BASIN

06149200 RICHARDSON DITCH NEAR CONSUL, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°21'50", long 109°32'12", near center of south line of sec.11, T.5, R.27 W., third meridian, Hydrologic Unit 10050008, on left bank 420 ft downstream from headgate, 4.8 mi north of Consul.

PERIOD OF RECORD.--March 1963 to current season (seasonal records only). 1910-12, 1914, 1916-20, 1922-33, 1935, July 1946 to current season in reports of Department of the Environment, Canada. Estimates of seasonal diversion only in most seasons prior to 1946.

GAGE.--Water-stage recorder. Prior to June 26, 1949, nonrecording gages at different sites and datums. June 26, 1949, to Aug. 28, 1963, water-stage recorder at present site at datum 1.00 ft higher.

REMARKS.--No estimated daily discharges this year. Records good. Ditch diverts from left bank of Battle Creek in SW1/4 sec.11, T.5, R.27 W., third meridian, for irrigation of about 1,330 acres along Battle Creek.

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, 72 ft^3/s, June 15, 1974; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	.00	.00	.00	.00	.00		
2			.00	.00	.00	.00	.00	.00	.00	.00		
3			.00	.00	.00	.00	.00	.00	.00	.00		
4			.00	.00	.00	.00	.00	.00	.00	.00		
5			.00	.00	.00	.00	.00	.00	.00	.00		
6			.00	.00	.00	.00	.00	.00	.00	.00		
7			.00	.00	.00	.00	.00	.00	.00	.00		
8			.00	.00	.00	.00	.00	.00	.00	.00		
9			.00	.00	.00	.00	.00	.00	.00	.00		
10			.00	.00	.00	.00	.00	.00	.00	.00		
11			.00	.00	.00	.00	.00	.00	.00	.00		
12			.00	.00	.00	.00	.00	.00	.00	.00		
13			.00	.00	.00	.00	.00	.00	.00	.00		
14			.00	.00	48	.00	.00	.00	.00	.00		
15			.00	.00	59	.00	.00	.00	.00	.00		
16			.00	.00	59	.00	.00	.00	.00	.00		
17			.00	.00	67	.00	.00	.00	.00	.00		
18			.00	.00	71	.00	.00	.00	.00	.00		
19			.00	.00	43	.00	.00	.00	.00	.00		
20			.00	.00	33	.00	.00	.00	.00	.00		
21			.00	.00	.57	.00	.00	.00	.00	.00		
22			.00	.00	.21	.00	.00	.00	.00	.00		
23			.00	.00	.14	.00	.00	.00	.00	.00		
24			.00	.00	.00	.00	.00	.00	.00	.00		
25			.00	.00	.14	.00	.00	.00	.00	.00		
26			.00	.00	.04	.00	.00	.00	.00	.00		
27			.00	.00	.00	.00	.00	.00	.00	.00		
28			.00	.00	.11	.00	.00	.00	.00	.00		
29			.00	.00	.00	.00	.00	.00	.00	.00		
30			.00	.00	.00	.00	.00	.00	.00	.00		
31			.00	---	.00	---	.00	.00	---	.00		
TOTAL			0.00	0.00	381.21	0.00	0.00	0.00	0.00	0.00		
MEAN			.000	.000	12.3	.000	.000	.000	.000	.000		
MAX			.00	.00	71	.00	.00	.00	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.00	.00	756	.00	.00	.00	.00	.00		

MILK RIVER BASIN

06149300 MCKINNON DITCH NEAR CONSUL, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°20'00", long 109°29'40", in NW1/4 sec.30, T.4, R.26 W., third meridian, Hydrologic Unit 10050008, on right bank 1.0 mi downstream from headgate on Battle Creek, and 2.7 mi northeast of Consul.

PERIOD OF RECORD.--March 1963 to current season (seasonal records only). 1911-26, 1929-31, and March 1938 to current season in reports of Department of the Environment, Canada. Estimates of seasonal diversions only in many years prior to 1947.

GAGE.--Water-stage recorder. Prior to September 1949, nonrecording gages at various sites and datums. Sept. 4, 1949, to Aug. 29, 1963, water-stage recorder at present site at datum 1.00 ft higher.

REMARKS.--No estimated daily discharges this year. Records good. Ditch diverts from right bank of Battle Creek in NE1/4 sec.30, T.4, R.26 W., third meridian, for irrigation of about 1,320 acres along Battle Creek.

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^3/s, June 18, 1975; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	.00	.00	.00	.00	.00		
2			.00	.00	.00	.00	.00	.00	.00	.00		
3			.00	.00	.00	.00	.00	.00	.00	.00		
4			.00	.00	.00	.00	.00	.00	.00	.00		
5			.00	.00	.00	.00	.00	.00	.00	.00		
6			.00	.00	.00	.00	.00	.00	.00	.00		
7			.00	.00	.00	.00	.00	.00	.00	.00		
8			.00	.00	.00	.00	.00	.00	.00	.00		
9			.00	.00	.00	.00	.00	.00	.00	.00		
10			.00	.00	.00	.00	.00	.00	.00	.00		
11			.00	.00	.00	.00	.00	.00	.00	.00		
12			.00	.00	.00	.00	.00	.00	.00	.00		
13			.00	.00	.00	.00	.00	.00	.00	.00		
14			.00	.00	40	.00	.00	.00	.00	.00		
15			.00	.00	52	.00	.00	.00	.00	.00		
16			.00	.00	51	.00	.00	.00	.00	.00		
17			.00	.00	34	.00	.00	.00	.00	.00		
18			.00	.00	50	.00	.00	.00	.00	.00		
19			.00	.00	37	.00	.00	.00	.00	.00		
20			.00	.00	46	.00	.00	.00	.00	.00		
21			.00	.00	27	.00	.00	.00	.00	.00		
22			.00	.00	3.7	.00	.00	.00	.00	.00		
23			.00	.00	.32	.00	.00	.00	.00	.00		
24			.00	.00	.04	.00	.00	.00	.00	.00		
25			.00	.00	.28	.00	.00	.00	.00	.00		
26			.00	.00	.04	.00	.00	.00	.00	.00		
27			.00	.00	.00	.00	.00	.00	.00	.00		
28			.00	.00	.21	.00	.00	.00	.00	.00		
29			.00	.00	.07	.00	.00	.00	.00	.00		
30			.00	.00	.00	.00	.00	.00	.00	.00		
31			.00	---	.00	---	.00	.00	---	.00		
TOTAL			0.00	0.00	341.66	0.00	0.00	0.00	0.00	0.00		
MEAN			.000	.000	11.0	.000	.000	.000	.000	.000		
MAX			.00	.00	52	.00	.00	.00	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.00	.00	678	.00	.00	.00	.00	.00		

MILK RIVER BASIN

06149400 NASHLYN CANAL NEAR CONSUL, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°13'57", long 109°33'27", in NE1/4 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 datums.

REMARKS.--Estimated daily discharges: Mar. 1-31. Records fair. Ditch diverts water from left bank of Battle Creek in SW1/4 sec.27, T.3, R.27 W., third meridian, for irrigation of about 1,880 acres along Battle Creek.

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^3/s, Apr. 14, 1952; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.00	24	.00	.00	.00	.00	.00	.04		
2			e.00	24	.00	.00	.00	.00	.00	.00		
3			e.00	21	.00	.00	.00	.00	.00	.00		
4			e.00	20	.00	.00	.00	.00	.00	.00		
5			e.00	19	.00	.00	.00	.00	.00	.00		
6			e.00	17	.00	.00	.00	.00	.00	.00		
7			e.00	20	.00	.00	.00	.00	.00	.00		
8			e.57	30	.00	.00	.00	.00	.00	.00		
9			e.39	31	2.9	.00	.00	.00	.00	.00		
10			e.25	30	25	.00	.00	.00	.00	.00		
11			e.21	25	48	.00	.00	.00	.00	.00		
12			e.42	22	51	.00	.00	.00	.00	.00		
13			e.95	25	50	.00	.00	.00	.00	.00		
14			e2.5	19	49	.00	.00	.00	.00	.00		
15			e3.7	16	44	.00	.00	.00	.00	.00		
16			e5.4	12	13	.00	.00	.00	.00	.00		
17			e5.3	12	.78	.00	.00	.00	.00	.00		
18			e4.9	16	.21	.00	.00	.00	.00	.00		
19			e5.7	16	.11	.00	.00	.00	.00	.00		
20			e5.6	15	.04	.00	.00	.00	.00	.00		
21			e5.6	13	.04	.00	.00	.00	.00	.00		
22			e11	11	.00	.00	.00	.00	.00	.00		
23			e18	6.4	.00	.00	.00	.00	.00	.00		
24			e22	1.4	.00	.00	.00	.00	.00	.00		
25			e22	.00	.00	.00	.00	.00	.00	.00		
26			e17	.00	.00	.00	.00	.00	1.1	.00		
27			e16	.00	.00	.00	.00	.00	7.0	.00		
28			e15	.00	.00	.00	.00	.00	1.7	.00		
29			e16	.00	.00	.00	.00	.00	.60	.00		
30			e18	.00	.00	.00	.00	.00	.21	.00		
31			e19	---	.00	---	.00	.00	---	.00		
TOTAL			215.49	445.80	284.08	0.00	0.00	0.00	10.61	0.04		
MEAN			6.95	14.9	9.16	.000	.000	.000	.35	.001		
MAX			22	31	51	.00	.00	.00	7.0	.04		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			427	884	563	.00	.00	.00	21	.08		

e Estimated

MILK RIVER BASIN

06149500 BATTLE CREEK AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°00'07", long 109°25'18", in SE1/4 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^2, of which 378 mi^2 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 (montlhy discharge only). W 1983: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,729.8 ft above mean sea level (International Boundary Survey datum, adjustment of 1928).

REMARKS.--Estimated daily discharges: Mar. 16,22, Mar. 31 to Apr. 2, May 16-21, Oct. 25-31. Records good except those for estimated daily discharges, which are fair. 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. 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.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,780 ft^3/s, Sept. 25, 1986, gage height, 11.57 ft, from rating curve extended above 4,400 ft^3/s on basis of slope-area measurement of peak flow; no flow at times most seasons.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 234 ft^3/s, May 29, gage height, 5.00 ft; no flow Aug. 4-13.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.18	e20	9.4	95	25	.04	2.4	4.5		
2			.88	e20	12	78	24	.04	2.1	3.8		
3			4.3	37	16	68	18	.04	2.3	2.9		
4			2.6	37	16	48	18	.00	3.0	2.2		
5			3.5	44	15	30	16	.00	2.6	4.8		
6			2.8	42	14	29	17	.00	2.3	5.3		
7			3.1	44	21	29	13	.00	2.0	5.5		
8			1.9	42	21	29	9.5	.00	1.4	5.0		
9			1.3	34	19	31	7.8	.00	1.2	4.3		
10			1.2	17	17	24	6.4	.00	.88	4.0		
11			1.2	21	15	17	5.9	.00	.88	5.9		
12			1.1	21	29	11	5.0	.00	.92	8.0		
13			1.3	14	54	9.6	4.3	.00	.88	8.3		
14			2.6	10	59	8.9	3.8	3.8	1.1	9.6		
15			20	11	72	9.9	3.3	5.5	1.1	9.9		
16			e48	19	e71	8.4	2.8	5.6	1.2	9.5		
17			24	17	e64	7.2	2.3	8.8	1.1	9.1		
18			15	14	e57	5.8	1.7	29	1.2	9.2		
19			15	14	e51	4.4	1.5	33	1.4	8.9		
20			17	9.3	e45	6.0	.95	34	1.3	9.0		
21			23	7.3	e40	6.4	.71	32	1.1	9.4		
22			e30	7.3	32	9.0	.57	22	1.5	9.1		
23			28	6.9	58	13	.49	17	2.6	10		
24			23	5.9	77	22	.35	14	2.6	10		
25			21	5.7	88	26	.25	11	2.6	e10		
26			8.3	5.2	75	26	.28	8.4	3.2	e7.8		
27			10	5.1	63	36	.42	6.6	2.9	e6.0		
28			12	9.0	93	38	.32	5.4	3.0	e6.4		
29			9.7	10	183	29	.25	4.5	5.0	e6.7		
30			9.5	11	138	28	.14	3.8	5.2	e4.9		
31			e19	---	115	---	.11	3.2	---	e6.5		
TOTAL			360.46	560.7	1639.4	782.6	190.14	247.72	60.96	216.5		
MEAN			11.6	18.7	52.9	26.1	6.13	7.99	2.03	6.98		
MAX			48	44	183	95	25	34	5.2	10		
MIN			.18	5.1	9.4	4.4	.11	.00	.88	2.2		
AC-FT			715	1110	3250	1550	377	491	121	429		

e Estimated

MILK RIVER BASIN

06151000 LYONS CREEK AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49° 00'17", long 109°13'48", in SW1/4 sec.1, T.1, R.25 W., third meridian, Hydrologic Unit 10050008, on right bank 0.3 mi north of international boundary, 8 mi south of Arena, Saskatchewan, 28 mi north of Chinook, MT, and at river mile 20.5.

DRAINAGE AREA.--66.7 mi^2.

PERIOD OF RECORD.--March 1927 to current season (seasonal records only in most seasons). Monthly discharge only for February, March 1934, published in WSP 1309. Prior to March 1962, published as Lyons Coulee at international boundary.

REVISED RECORDS.--WSP 1389: 1929(M), 1936, 1937(M), 1939, 1940-41(M), 1946(M). WSP 1629: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,800 ft, from international boundary map. Prior to Oct. 19, 1935, nonrecording gages at site 0.5 mi south of international boundary at different datum. Oct. 19, 1935, to Oct. 31, 1940, nonrecording gage at site 1.2 mi north of international boundary at different datum. Nov. 1, 1940, to Aug. 4, 1958, nonrecording gages at sites within 300 ft of present site at present datum.

REMARKS.--Estimated daily discharges: Mar. 15-17. Records fair. Natural flow of stream affected by small stockwater and irrigation dams upstream from 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 discharge, 1,400 ft^3/s, Sept. 25, 1986, gage height, 6.78 ft, from rating curve extended above 300 ft^3/s on basis of slope-area measurement of peak flow; no flow most of each season.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 9.2 ft^3/s, Mar. 13, gage height, 1.92 ft; no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	.00	.00	.00	.00	.00		
2			.00	.00	.00	.00	.00	.00	.00	.00		
3			.00	.00	.00	.00	.00	.00	.00	.00		
4			.00	.00	.00	.00	.00	.00	.00	.00		
5			.00	.00	.00	.00	.00	.00	.00	.00		
6			.00	.00	.00	.00	.00	.00	.00	.00		
7			.00	.00	.00	.00	.00	.00	.00	.00		
8			.00	.00	.00	.00	.00	.00	.00	.00		
9			.00	.00	.00	.00	.00	.00	.00	.00		
10			.78	.00	.00	.00	.00	.00	.00	.00		
11			3.1	.00	.00	.00	.00	.00	.00	.00		
12			3.0	.00	.00	.00	.00	.00	.00	.00		
13			3.7	.00	.00	.00	.00	.00	.00	.00		
14			5.8	.00	.00	.00	.00	.00	.00	.00		
15			e5.3	.00	.00	.00	.00	.00	.00	.00		
16			e4.9	.00	.00	.00	.00	.00	.00	.00		
17			e4.5	.00	.00	.00	.00	.00	.00	.00		
18			7.6	.00	.00	.00	.00	.00	.00	.00		
19			6.2	.00	.00	.00	.00	.00	.00	.00		
20			5.2	.00	.00	.00	.00	.00	.00	.00		
21			4.3	.00	.00	.00	.00	.00	.00	.00		
22			3.6	.00	.00	.00	.00	.00	.00	.00		
23			2.5	.00	.00	.00	.00	.00	.00	.00		
24			1.7	.00	.00	.00	.00	.00	.00	.00		
25			1.3	.00	.00	.00	.00	.00	.00	.00		
26			1.1	.00	.00	.00	.00	.00	.00	.00		
27			1.1	.00	.00	.00	.00	.00	.00	.00		
28			.92	.00	.00	.00	.00	.00	.00	.00		
29			.46	.00	.00	.00	.00	.00	.00	.00		
30			.25	.00	.00	.00	.00	.00	.00	.00		
31			.11	---	.00	---	.00	.00	---	.00		
TOTAL			67.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
MEAN			2.17	.000	.000	.000	.000	.000	.000	.000		
MAX			7.6	.00	.00	.00	.00	.00	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			134	.00	.00	.00	.00	.00	.00	.00		

e Estimated

MILK RIVER BASIN

06151500 BATTLE CREEK NEAR CHINOOK, MT

LOCATION.--Lat 48°39'05", long 109°13'47", in NW1/4SW1/4NE1/4 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^2.

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 above National Geodetic Vertical Datum of 1929, from topographic map. 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 datum but different from present datum.

REMARKS.--Estimated daily discharges: Apr. 11-18, May 17-21. Records fair except those for estimated daily discharges and those below 1.0 ft^3/s, which are poor. Diversions for irrigation of about 11,000 acres upstream from station. U.S. 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 discharge, 19,400 ft^3/s, Sept. 26, 1986, gage height, 22.91 ft, from rating curve extended above 900 ft^3/s, on basis of slope-area measurement of peak flow; no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 552 ft^3/s, May 26, gage height, 4.81 ft result of upstream release; minimum daily, 0.03 ft^3/s, July 19,20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1							2.0	.08	128	37	.06	.04
2							.30	.08	104	18	.06	.04
3							.20	.99	93	14	.06	.04
4							.16	.09	84	6.6	.06	.04
5							.11	.09	75	5.5	.06	.04
6							.13	.09	65	3.4	.06	.04
7							.11	.08	51	2.1	.08	.04
8							.12	.08	45	1.1	.08	.04
9							.11	.08	33	.16	.06	.05
10							37	.08	26	.09	.06	.04
11							e1.6	.93	25	.08	.05	.04
12							e.14	13	25	.08	.06	.05
13							e.14	11	11	.08	.08	.06
14							e.13	9.9	.82	.06	.10	.06
15							e.10	19	.29	.07	.08	.06
16							e.10	35	.16	.06	.08	.05
17							e.10	e73	.29	.06	.07	.04
18							e.10	e29	17	.05	.04	.04
19							.10	e24	12	.03	.04	.04
20							.09	e36	13	.03	.04	.05
21							.08	e57	23	.05	.04	.05
22							.08	16	12	.04	.04	.06
23							.08	5.2	11	.05	.04	.06
24							.08	22	22	.06	.04	.06
25							.08	35	30	.06	.04	.06
26							.08	109	15	.06	.04	.06
27							.10	79	.41	.06	.05	.06
28							.19	70	.19	.06	.07	.06
29							.10	77	13	.04	.04	.06
30							.08	127	35	.04	.05	.06
31							---	173	---	.06	.04	---
TOTAL							43.79	1022.77	970.16	89.13	1.77	1.49
MEAN							1.46	33.0	32.3	2.88	.057	.050
MAX							37	173	128	37	.10	.06
MIN							.08	.08	.16	.03	.04	.04
AC-FT							87	2030	1920	177	3.5	3.0

e Estimated

MILK RIVER BASIN

06154100 MILK RIVER NEAR HARLEM, MT

LOCATION.--Lat 48°29'22", long 108°45'28", in NE1/4SE1/4NE1/4 sec.32, T.32 N., R.23 E., Blaine County, Hydrologic Unit 10050004, Fort Belknap Indian Reservation, on right bank 30 ft downstream from U.S. Highway 2 bridge, 0.6 mi northeast of unincorporated community of Fort Belknap Agency, 3.5 mi southeast of Harlem, and at river mile 332.2.

DRAINAGE AREA.--9,822 mi^2.

PERIOD OF RECORD.--October 1959 to September 1969, October 1982 to current year. Gage heights only for period Apr. 3-25, 1952, published as "at Fort Belknap" in 1260-B.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,319.48 ft above National Geodetic Vertical Datum of 1929. Apr. 3-25, 1952, nonrecording gage on old bridge 200 ft downstream at different datum. Nov. 1, 1959, to Mar. 12, 1968, nonrecording gage or water-stage recorder at several sites within 0.5 mi of present site at different datum.

REMARKS.--Estimated daily discharges: Nov. 25 to Mar. 22. Records good except those for estimated daily discharges, which are poor. Flow increased during irrigation season by water from St. Mary Canal (station number 05018500). Flow mainly regulated by Fresno Reservoir (station number 06136500) since 1939. Diversions for irrigation of about 60,000 acres of which about 13,000 acres lie downstream from station. Several observations of water temperature and specific conductance were made during the year. U. S. Bureau of Reclamation satellite telemeter at station.

AVERAGE DISCHARGE.--19 years (1960-69, 1983-91), 356 ft^3/s, 257,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,900 ft^3/s, Sept. 29, 1986, gage height, 25.73 ft; no flow on many days August, September 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 1952 reached a stage of about 23.5 ft, present site and datum.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,730 ft^3/s, June 30, gage height, 13.87 ft; minimum daily, 25 ft^3/s, Dec. 22, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	230	38	e50	e35	e70	e50	239	663	626	1650	572	477
2	245	35	e45	e30	e80	e50	240	507	582	1600	605	473
3	284	34	e40	e30	e80	e55	239	458	545	1570	676	465
4	268	55	e45	e30	e75	e60	236	437	533	1470	701	463
5	257	64	e50	e30	e75	e60	233	438	512	1400	716	444
6	234	50	e55	e30	e70	e65	232	439	511	1370	728	424
7	214	39	e60	e35	e70	e70	230	416	576	1340	765	441
8	212	50	e65	e35	e65	e75	229	410	698	1270	781	441
9	232	63	e70	e35	e60	e80	230	450	811	1140	626	457
10	224	67	e60	e35	e60	e85	236	560	794	989	500	463
11	245	83	e55	e40	e60	e80	229	567	749	870	488	477
12	249	76	e50	e45	e60	e80	173	619	711	775	495	514
13	243	88	e45	e50	e55	e85	141	693	610	720	511	524
14	227	88	e45	e50	e50	e90	229	690	557	641	525	503
15	223	75	e50	e45	e50	e100	240	624	520	615	540	505
16	225	65	e45	e45	e55	e105	251	600	513	584	543	497
17	231	53	e40	e45	e55	e100	251	576	500	520	530	597
18	235	70	e35	e45	e55	e100	341	562	494	483	532	556
19	223	58	e30	e45	e60	e105	399	560	482	534	534	533
20	188	61	e30	e45	e65	e110	416	579	494	580	540	506
21	202	64	e30	e45	e60	e100	427	545	540	548	555	495
22	211	33	e25	e50	e55	e100	431	590	626	595	543	461
23	146	55	e30	e45	e50	99	433	548	697	596	504	449
24	94	75	e35	e40	e50	93	430	461	683	565	484	447
25	78	e50	e30	e40	e55	89	350	422	725	565	481	442
26	67	e50	e35	e45	e60	88	487	422	856	553	476	437
27	60	e45	e35	e45	e60	84	537	444	1000	548	463	417
28	51	e45	e30	e40	e55	88	586	471	1200	590	453	349
29	47	e50	e30	e40	---	101	707	501	1370	644	443	325
30	44	e50	e35	e50	---	221	732	576	1620	634	450	298
31	41	---	e40	e60	---	238	---	578	---	599	476	---
TOTAL	5730	1729	1320	1280	1715	2906	10134	16406	21135	26558	17236	13880
MEAN	185	57.6	42.6	41.3	61.2	93.7	338	529	704	857	556	463
MAX	284	88	70	60	80	238	732	693	1620	1650	781	597
MIN	41	33	25	30	50	50	141	410	482	483	443	298
AC-FT	11370	3430	2620	2540	3400	5760	20100	32540	41920	52680	34190	27530

CAL YR 1990 TOTAL 137407 MEAN 376 MAX 1130 MIN 25 AC-FT 272500
WTR YR 1991 TOTAL 120029 MEAN 329 MAX 1650 MIN 25 AC-FT 238100

e Estimated

06154140 FIFTEENMILE CREEK TRIBUTARY NEAR HARLEM, MT

LOCATION.--Lat 48°19'29", long 108°42'49", in SW1/4NW1/4SW1/4 sec.26, T.30 N., R.23 E., Blaine County, Hydrologic Unit 10050004, just downstream of culvert on State Highway 66, 1.7 mi upstream of mouth, and 15.5 mi south of Harlem.

DRAINAGE AREA.--2.31 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,650 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--No estimated daily discharges this year. Records excellent except those for June 29,30, which are fair. No known regulation or diversion upstream of station.

AVERAGE DISCHARGE.--8 years (1983-91), 0.09 ft^3/s, 65.2 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 180 ft^3/s, Feb. 25, 1986,, gage height, 3.61 ft; no flow most days each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 0.76 ft^3/s, June 29, gage height, 0.76 ft; no flow most days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.00	.00	.03	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	.10	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00
MEAN	.000	.000	.000	.000	.000	.000	.000	.000	.004	.000	.000	.000
MAX	.00	.00	.00	.00	.00	.00	.00	.00	.10	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.00	.00	.00	.00	.00	.00	.00	.00	.3	.00	.00	.00

CAL YR 1990 TOTAL 3.37 MEAN .009 MAX .68 MIN .00 AC-FT 6.7
WTR YR 1991 TOTAL 0.13 MEAN .000 MAX .10 MIN .00 AC-FT .3

06154400 PEOPLES CREEK NEAR HAYS, MT

LOCATION.--Lat 48°13'25", long 108°42'48", in SW1/4 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^2.

PERIOD OF RECORD.--December 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,714.10 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Nov. 23 to Mar. 20, 25-28. Records fair except those for estimated daily discharges, which are poor. Some storage in numerous stock and beaver ponds and diversions for irrigation of about 1,300 acres upstream of station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--24 years (water years 1968-91), 14.1 ft^3/s, 10,220 acre-ft/yr; median of yearly mean discharges, 8.07 ft^3/s, 5,850 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,460 ft^3/s, June 8, 1972, gage height, 15.03 ft, from floodmark, from rating curve extended above 490 ft^3/s on basis of slope-area measurement of peak flow; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 100 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 8	1800	105	5.02	June 30	1400	*555	*6.87
June 25	1400	105	5.06				

No flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.03	.05	e.10	e.00	e.00	e.05	.89	11	10	99	.91	.02
2	.03	.05	e.10	e.00	e.00	e.05	.57	14	6.8	95	2.6	.01
3	.03	.05	e.10	e.00	e.00	e.05	.34	11	6.6	65	4.3	.01
4	.04	.05	e.10	e.00	e.00	e.10	.10	9.3	6.0	40	3.3	.02
5	.04	.05	e.10	e.00	e.00	e.10	.06	12	7.2	30	4.3	.02
6	.04	.05	e.10	e.00	e.00	e.10	.04	10	17	25	5.1	.03
7	.04	.05	e.10	e.00	e.00	e.20	.02	15	42	21	3.9	.02
8	.04	.05	e.10	e.00	e.00	e.30	.01	20	86	19	3.7	.03
9	.04	.04	e.10	e.00	e.00	e.40	.00	24	69	19	4.2	.03
10	.04	.04	e.10	e.00	e.00	e.50	.00	32	33	19	1.5	.05
11	.04	.04	e.10	e.00	e.00	e.50	.07	44	21	20	.32	.06
12	.04	.04	e.10	e.00	e.00	e.60	.52	48	17	19	.21	.08
13	.04	.04	e.05	e.00	e.00	e.60	2.7	46	15	19	.22	.07
14	.04	.04	e.05	e.00	e.00	e.60	1.6	52	13	16	.94	.10
15	.04	.04	e.05	e.00	e.00	e.60	.56	56	11	15	2.3	.11
16	.04	.03	e.05	e.00	e.05	e.60	.23	46	11	12	.95	.11
17	.04	.03	e.05	e.00	e.05	e.70	.07	34	11	11	2.1	.15
18	.04	.03	e.05	e.00	e.10	e.70	.06	27	11	10	3.3	.15
19	.04	.03	e.05	e.00	e.10	e.80	.05	20	8.8	11	4.2	.13
20	.05	.03	e.00	e.00	e.10	e.80	.09	16	9.3	11	4.2	.15
21	.05	.03	e.00	e.00	e.10	.79	.24	16	11	7.5	2.4	.18
22	.05	.03	e.00	e.00	e.10	.82	1.4	16	22	8.2	.97	.12
23	.05	e.02	e.00	e.00	e.10	.59	1.2	12	30	8.6	.42	.09
24	.05	e.02	e.00	e.00	e.10	.49	.94	9.0	26	9.7	.22	.08
25	.05	e.02	e.00	e.00	e.10	e.50	.60	9.6	43	9.1	1.6	3.4
26	.04	e.01	e.00	e.00	e.10	e.60	.48	8.2	36	7.2	.46	5.3
27	.05	e.01	e.00	e.00	e.10	e.70	.16	6.3	38	5.3	.08	5.3
28	.05	e.03	e.00	e.00	e.05	e.90	.11	5.8	43	4.6	.12	4.7
29	.05	e.05	e.00	e.00	---	.97	.41	8.7	39	4.3	.05	3.9
30	.05	e.10	e.00	e.00	---	1.2	.79	9.7	124	3.4	.05	3.5
31	.05	---	e.00	e.00	---	.96	---	10	---	2.2	.02	---
TOTAL	1.32	1.15	1.55	0.00	1.15	16.87	14.31	658.6	823.7	646.1	58.94	27.92
MEAN	.043	.038	.050	.000	.041	.54	.48	21.2	27.5	20.8	1.90	.93
MAX	.05	.10	.10	.00	.10	1.2	2.7	56	124	99	5.1	5.3
MIN	.03	.01	.00	.00	.00	.05	.00	5.8	6.0	2.2	.02	.01
AC-FT	2.6	2.3	3.1	.00	2.3	33	28	1310	1630	1280	117	55

CAL YR 1990 TOTAL 1385.66 MEAN 3.80 MAX 25 MIN .00 AC-FT 2750
WTR YR 1991 TOTAL 2251.61 MEAN 6.17 MAX 124 MIN .00 AC-FT 4470

e Estimated

MILK RIVER BASIN

06154410 LITTLE PEOPLES CREEK NEAR HAYS, MT

LOCATION.--Lat 47°57'58", long 108°39'36", in SE1/4SE1/4NW1/4 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^2.

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. Datum of gage is 3,769.72 ft above National Geodetic Vertical Datum of 1929. August 1972 to June 24, 1976, gage at former site at datum 10.00 ft higher. Prior to Apr. 22, 1987, gage located 330 ft downstream.

REMARKS.--Estimated daily discharges: Dec. 26 to Jan. 15. Water-discharge records fair except those for estimated daily discharges, which are poor. No known regulation or diversion upstream from station.

AVERAGE DISCHARGE.--19 years (water years 1973-91), 4.66 ft^3/s, 3,380 acre-ft/yr; median of yearly mean discharges, 4.03 ft^3/s, 2,920 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 576 ft^3/s, May 25, 1974, gage height, 4.57 ft, from floodmark, at site and datum then in use, from rating curve extended above 44 ft^3/s, on basis of slope-area measurement of peak flow; minimum, 0.92 ft^3/s, Mar. 21, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 50 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 12	0800	*55	*1.65	Only peak greater than base discharge this year.			

Minimum daily discharge, 1.6 ft^3/s, on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.2	2.0	1.8	e1.7	1.8	1.6	1.8	4.5	4.1	30	3.8	2.5
2	2.2	2.0	1.8	e1.6	1.8	1.6	1.9	4.7	4.1	25	3.8	2.5
3	2.2	2.0	1.8	e1.6	1.8	1.6	1.8	4.7	4.3	21	3.6	2.5
4	2.2	2.0	1.8	e1.6	1.8	1.6	1.8	4.7	4.0	18	3.6	2.5
5	2.2	2.0	1.8	e1.6	1.8	1.8	1.8	4.7	4.1	15	3.6	2.5
6	2.2	1.8	1.9	e1.6	1.8	1.8	1.8	4.7	18	14	3.6	2.5
7	2.2	1.9	2.0	e1.6	1.8	1.7	1.9	4.7	39	13	3.6	2.5
8	2.2	2.0	2.0	e1.6	1.8	1.7	2.0	9.6	40	11	3.6	2.5
9	2.2	2.0	2.0	e1.6	1.8	1.7	2.0	15	27	10	3.6	2.4
10	2.2	2.0	2.0	e1.6	1.8	1.7	2.0	14	18	9.6	3.6	2.4
11	2.2	2.0	1.9	e1.6	1.8	1.7	2.2	13	15	8.9	3.6	2.4
12	2.2	2.0	2.0	e1.7	1.8	1.7	2.2	47	13	8.2	3.4	2.4
13	2.2	2.0	2.0	e1.7	2.0	1.7	2.2	34	11	7.6	3.2	2.5
14	2.2	2.0	2.0	e1.8	2.0	1.7	2.2	21	11	7.3	3.2	2.6
15	2.1	2.0	1.9	e1.8	1.9	1.9	2.1	15	9.7	6.9	3.2	2.6
16	2.1	2.0	1.8	1.8	2.0	1.8	2.1	12	8.8	6.4	3.0	2.4
17	2.1	2.0	1.8	1.8	2.0	1.8	2.1	11	8.3	6.2	3.0	2.4
18	2.1	2.0	1.8	1.8	2.0	1.8	2.1	10	7.9	5.7	3.0	2.4
19	2.1	2.0	2.0	1.9	1.8	1.8	2.1	8.9	7.5	5.3	3.0	2.5
20	2.1	2.0	1.6	1.9	1.6	1.9	2.2	8.1	7.5	5.3	3.0	2.6
21	2.1	1.8	1.6	1.8	1.7	1.9	2.2	7.3	12	5.2	3.0	2.7
22	2.1	1.8	1.6	1.8	1.7	1.8	2.2	6.4	39	4.8	2.8	2.7
23	2.1	1.8	1.6	1.8	1.6	1.8	2.2	6.3	31	4.7	2.7	2.6
24	2.1	1.8	1.6	1.8	1.6	1.8	2.3	6.2	28	4.7	2.7	2.5
25	2.0	1.8	1.6	1.8	1.6	1.8	2.9	5.8	33	4.6	2.7	2.5
26	2.0	1.8	e1.6	1.8	1.6	1.8	4.7	5.6	32	4.4	2.7	2.5
27	2.0	1.8	e1.6	1.8	1.6	1.8	4.4	5.0	28	4.3	2.8	2.5
28	2.0	1.8	e1.6	1.8	1.6	1.8	4.4	5.0	26	4.1	2.6	2.6
29	2.0	1.8	e1.6	1.9	---	1.8	4.4	4.7	23	3.9	2.5	2.5
30	2.0	1.8	e1.6	1.8	---	1.8	4.4	4.7	36	3.8	2.5	2.5
31	2.0	---	e1.7	1.8	---	1.8	---	4.4	---	3.8	2.5	---
TOTAL	65.8	57.7	55.4	53.8	49.9	54.5	74.4	312.7	550.3	282.7	97.5	75.2
MEAN	2.12	1.92	1.79	1.74	1.78	1.76	2.48	10.1	18.3	9.12	3.15	2.51
MAX	2.2	2.0	2.0	1.9	2.0	1.9	4.7	47	40	30	3.8	2.7
MIN	2.0	1.8	1.6	1.6	1.6	1.6	1.8	4.4	4.0	3.8	2.5	2.4
AC-FT	131	114	110	107	99	108	148	620	1090	561	193	149

CAL YR 1990 TOTAL 1485.7 MEAN 4.07 MAX 30 MIN 1.3 AC-FT 2950
WTR YR 1991 TOTAL 1729.9 MEAN 4.74 MAX 47 MIN 1.6 AC-FT 3430

e Estimated

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1977 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRESSURE (MM OF HG) (00025)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)
OCT										
11...	1145	2.1	100	2	447	5.0	6.0	--	--	--
DEC										
04...	1425	1.9	--	--	470	7.5	6.0	--	--	--
JAN										
16...	1340	1.8	--	--	455	-1.5	5.0	--	--	--
FEB										
19...	1230	1.8	100	2	438	7.0	6.0	665	10.4	96
APR										
02...	1140	1.8	--	--	446	16.0	10.0	--	--	--
MAY										
21...	1300	6.7	100	2	362	24.0	11.5	666	9.6	101
JUN										
07...	1350	46	--	--	300	--	12.5	--	--	--
10...	1445	17	--	--	338	26.0	13.0	--	--	--
20...	1505	7.6	--	--	388	16.0	9.5	--	--	--
AUG										
05...	1500	3.6	40	1	446	32.0	13.0	670	9.0	97

DATE	TIME	PH (STANDARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)
OCT										
11...	1145	--	230	59	21	2.8	0.1	1.5	227	25
FEB										
19...	1230	8.5	250	61	23	3.0	0.1	1.5	212	35
MAY										
21...	1300	8.1	200	53	16	4.0	0.1	1.7	182	34
AUG										
05...	1500	8.2	240	63	19	3.4	0.1	1.8	188	27

DATE	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	PHOSPHORUS TOTAL (MG/L AS P) (00665)
OCT										
11...	2.8	0.1	11	259	0.35	1.47	<0.01	<0.10	<0.01	<0.01
FEB										
19...	2.7	0.3	9.7	263	0.36	1.28	<0.01	<0.10	<0.01	<0.01
MAY										
21...	2.5	0.3	11	232	0.32	4.19	0.01	<0.05	<0.01	<0.01
AUG										
05...	0.30	0.3	12	240	0.33	2.33	<0.01	<0.05	<0.01	0.03

DATE	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	ARSENIC TOTAL (UG/L AS AS) (01002)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BORON, DISSOLVED (UG/L AS B) (01020)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	IRON, DISSOLVED (UG/L AS FE) (01046)
OCT									
11...	0.01	--	--	20	--	--	--	--	<3
FEB									
19...	<0.01	1	<10	30	<1	<1	<1	<10	10
MAY									
21...	<0.01	1	<10	20	<1	<1	9	80	9
AUG									
05...	<0.01	2	<10	30	<1	<1	2	<10	6

MILK RIVER BASIN

06154410 LITTLE PEOPLES CREEK NEAR HAYS, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG) (71900)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	SELE-NIUM, TOTAL (UG/L AS SE) (01147)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT									
11...	--	--	--	--	--	--	--	--	--
FEB									
19...	1	<10	<0.1	1	<1	<10	11	0.05	68
MAY									
21...	3	<10	<0.1	2	<1	<10	5	0.09	80
AUG									
05...	3	<10	<0.1	--	<1	<10	23	0.22	90

06154430 LODGE POLE CREEK AT LODGE POLE, MT

LOCATION.--Lat 48°01'52", long 108°31'55", in SE1/4SE1/4SW1/4 sec. 5, T.26 N., R.25 E., Blaine County, Hydrologic Unit 10050009, Fort Belknap Indian Reservation, 10 ft upstream of culvert in county road just south of Lodge Pole and 8 mi northeast of Hays.

DRAINAGE AREA.--19.5 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1987 to current year. Miscellaneous measurements made at this site 1972, 1978, and 1982-85 water years.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 3,420 ft above National Geodetic Vertical datum of 1929, from topographic map.

REMARKS.--No estimated daily discharges this year. Water-discharge records good. No known diversion for irrigation upstream of station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 390 ft^3/s, Sept. 25, 1986, gage height, 6.84 ft, from floodmark, by computation of peak flow through culvert.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 82 ft^3/s, May 12, 1991, gage height, 2.81 ft; minimum, 0.01 ft^3/s, Jan. 13, 1989, gage height, 1.03 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 82 ft^3/s, May 12, gage height, 2.81 ft; minimum, 0.39 ft^3/s, on several days, gage height, 1.24 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.5	2.3	1.5	1.3	.96	.66	.58	.45	3.0	33	5.0	2.2
2	1.6	2.2	1.4	1.3	1.0	.70	.55	.41	3.1	27	5.0	2.2
3	1.6	2.2	1.4	1.3	1.0	.64	.50	.45	3.3	23	4.7	2.2
4	1.6	2.2	1.5	1.3	1.0	.66	.50	.45	3.1	20	4.4	2.2
5	1.6	2.2	1.5	1.3	.98	.62	.50	.45	3.3	18	4.1	2.2
6	1.6	2.2	1.5	1.3	.94	.68	.48	.47	48	16	3.9	2.1
7	1.7	2.2	1.4	1.3	.96	.69	.48	.42	64	14	3.8	2.0
8	1.7	2.1	1.4	1.3	.94	.68	.48	.41	47	14	3.5	2.1
9	1.7	2.0	1.4	1.4	.94	.68	.45	2.7	33	12	3.4	2.1
10	1.9	2.0	1.3	1.4	.93	.73	.50	6.5	24	12	3.2	2.2
11	1.9	1.9	1.3	1.3	.88	.69	.82	5.6	19	11	3.1	2.2
12	1.9	1.9	1.4	1.2	.90	.66	.55	65	14	10	3.2	2.2
13	2.0	1.9	1.4	1.1	.87	.66	.51	44	11	9.2	3.3	2.1
14	2.0	1.9	1.3	1.0	.83	.66	.51	29	11	8.8	3.3	2.4
15	2.1	1.8	1.4	.97	.84	.59	.51	20	9.2	8.7	3.4	2.2
16	2.1	1.8	1.3	.95	.83	.59	.48	15	8.1	8.4	3.2	2.2
17	2.1	1.8	1.3	.94	.81	.61	.54	11	7.4	8.6	3.0	2.2
18	2.1	1.8	1.2	1.0	.76	.58	.55	8.6	6.4	8.6	2.8	2.2
19	2.1	1.7	1.2	.96	.81	.51	.48	6.7	6.3	8.5	2.7	2.2
20	2.1	1.7	1.2	.94	.80	.51	.46	5.5	6.8	8.4	2.6	2.0
21	2.1	1.7	1.2	.94	.77	.51	.43	4.9	7.2	8.3	2.5	2.3
22	2.2	1.7	1.2	.94	.75	.51	.43	4.0	31	7.8	2.4	2.1
23	2.2	1.7	1.3	.94	.75	.51	.42	3.4	27	7.9	2.5	2.0
24	2.3	1.7	1.2	.94	.76	.51	.42	3.0	32	7.5	2.4	1.8
25	2.4	1.7	1.2	.94	.76	.51	.41	3.2	45	7.1	2.4	1.8
26	2.4	1.6	1.3	.94	.74	.54	.42	3.0	40	6.9	2.3	1.8
27	2.4	1.6	1.3	.94	.66	.66	.39	2.9	32	6.3	2.5	1.8
28	2.4	1.7	1.3	.94	.66	.66	.43	3.4	29	5.9	2.5	1.7
29	2.4	1.7	1.3	.94	---	.61	.45	3.3	24	5.7	2.3	1.7
30	2.4	1.6	1.3	.98	---	.58	.46	3.3	36	5.4	2.3	1.9
31	2.4	---	1.3	.92	---	.58	---	3.1	---	5.1	2.3	---
TOTAL	62.5	56.5	41.2	33.92	23.83	18.98	14.69	260.61	634.2	353.1	98.0	62.3
MEAN	2.02	1.88	1.33	1.09	.85	.61	.49	8.41	21.1	11.4	3.16	2.08
MAX	2.4	2.3	1.5	1.4	1.0	.73	.82	65	64	33	5.0	2.4
MIN	1.5	1.6	1.2	.92	.66	.51	.39	.41	3.0	5.1	2.3	1.7
AC-FT	124	112	82	67	47	38	29	517	1260	700	194	124

CAL YR 1990 TOTAL 1546.51 MEAN 4.24 MAX 49 MIN .55 AC-FT 3070
WTR YR 1991 TOTAL 1659.83 MEAN 4.55 MAX 65 MIN .39 AC-FT 3290

MILK RIVER BASIN

06154430 LODGE POLE CREEK AT LODGE POLE, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1982-84, 1988 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
OCT										
11...	1010	1.8	--	--	540	2.5	6.0	--	--	--
DEC										
05...	0845	1.4	--	--	627	-1.0	3.0	--	--	--
JAN										
16...	1500	0.95	--	--	508	-2.0	4.0	--	--	--
FEB										
19...	1400	0.83	60	1	505	7.0	7.0	672	10.1	95
APR										
02...	0955	0.58	0	0	522	16.0	7.0	680	9.2	85
MAY										
13...	1340	41	--	--	210	16.0	10.0	--	--	--
JUN										
07...	1230	68	--	--	229	21.5	12.0	--	--	--
10...	1545	22	0	0	334	27.0	14.0	679	9.4	103
13...	0925	12	--	--	388	12.5	11.0	--	--	--
20...	1605	6.9	--	--	443	16.0	10.5	--	--	--
27...	1420	31	--	--	335	21.0	13.0	--	--	--
AUG										
05...	1300	4.0	0	0	522	31.0	15.0	678	8.6	96
SEP										
17...	1000	2.3	--	--	549	3.0	9.0	--	--	--

DATE	TIME	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
FEB										
19...	1400	7.8	280	80	20	--	--	1.8	258	40
APR										
02...	0955	7.7	280	80	20	7.4	0.2	2.0	262	39
JUN										
10...	1545	7.9	180	52	11	4.4	0.1	1.7	162	16
AUG										
05...	1300	8.0	270	80	18	7.3	0.2	2.0	287	32

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)
FEB										
19...	0.70	0.2	11	--	--	--	<0.01	<0.10	<0.01	--
APR										
02...	3.7	0.2	11	320	0.44	0.50	0.01	<0.05	<0.01	--
JUN										
10...	1.4	0.2	13	197	0.27	11.7	<0.01	<0.05	0.01	0.19
AUG										
05...	0.40	0.2	13	325	0.44	3.51	<0.01	<0.05	<0.01	--

MILK RIVER BASIN

06154430 LODGE POLE CREEK AT LODGE POLE, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	ARSENIC TOTAL (UG/L AS AS) (01002)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	IRON, DIS-SOLVED (UG/L AS FE) (01046)
FEB										
19...	0.02	<0.01	<1	<10	30	<1	<1	<1	210	27
APR										
02...	<0.01	<0.01	<1	<10	30	<1	<1	2	240	40
JUN										
10...	0.02	<0.01	<1	<10	20	<1	<1	4	320	25
AUG										
05...	0.01	<0.01	<1	<10	40	<1	<1	3	210	14

DATE	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG) (71900)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	SELE-NIUM, TOTAL (UG/L AS SE) (01147)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
FEB									
19...	<1	60	<0.1	1	<1	<10	88	0.20	22
APR									
02...	1	80	<0.1	<1	<1	<10	34	0.05	31
JUN									
10...	3	20	<0.1	5	<1	10	18	1.1	85
AUG									
05...	--	50	<0.1	--	<1	10	71	0.77	75

MILK RIVER BASIN

06154490 WILLOW COULEE NEAR DODSON, MT

LOCATION.--Lat 48°19'31", long 108°24'52", in SW1/4NE1/4SE1/4 sec.25, T.30 N., R.25 E., Blaine County, Hydrologic Unit 10050009, just below culvert on county road 1.1 mi upstream of mouth and 9.5 mi southwest of Dodson.

DRAINAGE AREA.--5.16 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 2,450 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: June 25 to July 6. Records good except those for estimated daily discharges, which are poor. No known diversion for irrigation upstream of station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--8 years, 0.66 ft^3/s, 478 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,310 ft^3/s, Sept. 25, 1986, gage height, 7.84 ft, from floodmark by computation of peak flow through culvert and over road; no flow periods most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 206 ft^3/s, June 30; gage height, 3.34 ft; no flow most days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	e12	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	e1.5	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.40	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.20	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.10	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.02	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	e.10	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	e.40	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	e.20	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	e.08	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.00	.00	e.50	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	e35	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.28	14.25	0.00	0.00
MEAN	.000	.000	.000	.000	.000	.000	.000	.000	1.21	.46	.000	.000
MAX	.00	.00	.00	.00	.00	.00	.00	.00	35	12	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.00	.00	.00	.00	.00	.00	.00	.00	72	28	.00	.00

CAL YR 1990 TOTAL 67.20 MEAN .18 MAX 6.0 MIN .00 AC-FT 133
WTR YR 1991 TOTAL 50.53 MEAN .14 MAX 35 MIN .00 AC-FT 100

e Estimated

06154510 KUHR COULEE TRIBUTARY NEAR DODSON, MT

LOCATION.--Lat 48°23'17", long 108°23'17", in SW1/4NW1/4SW1/4 sec. 20, T.30 N., R.26 E., Phillips County, at culvert in county road 0.5 mi upstream of Kuhr Coulee and 8.5 mi southwest of Dodson.

DRAINAGE AREA.--1.25 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,430 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--No estimated daily discharges this year. Records poor. No known diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--8 years, 0.15 ft^3/s, 109 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 436 ft^3/s, Sept. 25, 1986, gage height, 15.82 ft, from floodmark, based on rating curve developed on basis of culvert computation of peak flow; no flow most days each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 16 ft^3/s, June 30, gage height, 1.38 ft; no flow most days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.66	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	3.0	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.68	0.00	0.00
MEAN	.000	.000	.000	.000	.000	.000	.000	.000	.10	.022	.000	.000
MAX	.00	.00	.00	.00	.00	.00	.00	.00	3.0	.66	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.00	.00	.00	.00	.00	.00	.00	.00	6.0	1.3	.00	.00

CAL YR 1990 TOTAL 19.10 MEAN .052 MAX 6.9 MIN .00 AC-FT 38
WTR YR 1991 TOTAL 3.68 MEAN .010 MAX 3.0 MIN .00 AC-FT 7.3

MILK RIVER BASIN

06154550 PEOPLES CREEK BELOW KUHR COULEE, NEAR DODSON, MT

LOCATION.--Lat 48°21'49", long 108°21'16", in NW1/4NW1/4NE1/4 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 of Kuhr Coulee, 5.5 mi southwest of Dodson, and at river mile 7.8.

DRAINAGE AREA.--675 mi^2.

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 September 1989. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 2,309.18 ft above National Geodetic Vertical Datum of 1929 (levels by Bureau of Indian Affairs). Prior to June 1951, nonrecording gage at site 0.5 mi upstream at different datum. June 1, 1951 to Sept. 30, 1988, water-stage recorder at sites 2.5 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Oct. 1 to Mar. 27. Water-discharge records fair except those for estimated daily discharges, which are poor. Diversions for irrigation of about 3,300 acres upstream from station.

AVERAGE DISCHARGE.--32 years (1952-73, 1982-91), 31.4 ft^3/s, 22,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,590 ft^3/s, Sept. 25, 1986, gage height, 15.91 ft., from floodmark; maximum gage height, 17.05 ft, Mar. 29, 1952, backwater from ice, from floodmark in gage house, at different site and datum; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
July 1	0430	*1,000	*10.84	No other peak greater than base discharge.			

No flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.00	e2.5	e1.5	e.00	e.00	e5.0	7.7	6.1	18	452	6.3	.23
2	e.00	e2.5	e1.5	e.00	e.00	e5.0	7.7	5.5	17	134	6.4	.20
3	e.00	e2.5	e1.5	e.00	e.00	e7.0	7.3	14	17	111	5.8	.21
4	e.00	e2.5	e1.5	e.00	e.00	e8.0	6.8	17	16	91	5.2	.11
5	e.00	e2.5	e1.5	e.00	e.00	e9.0	6.5	16	18	75	5.1	.11
6	e.00	e2.5	e1.5	e.00	e.00	e10	5.9	16	23	60	5.1	.09
7	e.00	e2.5	e1.5	e.00	e.00	e10	5.3	15	28	51	5.5	.09
8	e.00	e2.5	e1.5	e.00	e.00	e11	5.1	16	70	45	6.0	.09
9	e.00	e2.5	e1.5	e.00	e.00	e12	4.8	19	116	41	5.4	.08
10	e.00	e2.5	e1.5	e.00	e.00	e11	4.9	21	104	39	4.5	.08
11	e.00	e2.5	e1.5	e.00	e.00	e10	5.8	24	85	37	4.0	.08
12	e.00	e2.5	e1.0	e.00	e.00	e10	6.3	39	71	35	3.6	.09
13	e.00	e2.5	e.80	e.00	e.00	e10	9.1	51	62	33	3.0	.07
14	e.00	e2.5	e.80	e.00	e.00	e9.0	16	78	57	31	2.9	.11
15	e.00	e2.5	e.90	e.00	e.00	e9.0	15	82	52	28	2.6	.08
16	e.10	e2.5	e.80	e.00	e.10	e9.0	11	79	46	26	2.8	.07
17	e.20	e2.0	e.60	e.00	e1.0	e9.0	9.3	66	43	22	2.5	.06
18	e.30	e2.0	e.30	e.00	e3.0	e9.0	8.5	54	39	21	3.2	.04
19	e.40	e2.0	e.10	e.00	e4.0	e9.0	8.1	44	36	19	2.8	.04
20	e.40	e2.0	e.00	e.00	e5.0	e10	4.3	38	34	19	2.1	.06
21	e.50	e2.0	e.00	e.00	e5.0	e10	1.6	31	32	19	2.4	.19
22	e.70	e2.0	e.00	e.00	e4.5	e10	1.7	25	38	16	2.6	.30
23	e1.0	e2.0	e.00	e.00	e4.0	e9.0	1.3	24	49	15	2.3	.43
24	e1.5	e2.0	e.00	e.00	e4.0	e9.0	1.2	21	57	14	2.3	.54
25	e1.5	e2.0	e.00	e.00	e4.5	e9.0	1.1	20	85	13	1.8	.63
26	e2.0	e1.5	e.00	e.00	e5.0	e8.0	1.0	18	124	13	1.3	.71
27	e2.0	e1.5	e.00	e.00	e6.0	e8.0	1.0	17	122	12	.84	.79
28	e2.0	e1.5	e.00	e.00	e5.0	8.2	5.1	17	114	10	1.2	.86
29	e2.0	e1.5	e.00	e.00	---	9.2	8.6	17	115	8.8	1.3	.89
30	e2.5	e1.5	e.00	e.00	---	9.4	7.3	17	144	7.8	.44	.99
31	e2.5	---	e.00	e.00	---	8.1	---	19	---	6.8	.34	---
TOTAL	19.60	65.5	21.80	0.00	51.10	279.9	185.3	926.6	1832	1505.4	101.62	8.32
MEAN	.63	2.18	.70	.000	1.82	9.03	6.18	29.9	61.1	48.6	3.28	.28
MAX	2.5	2.5	1.5	.00	6.0	12	16	82	144	452	6.4	.99
MIN	.00	1.5	.00	.00	.00	5.0	1.0	5.5	16	6.8	.34	.04
AC-FT	39	130	43	.00	101	555	368	1840	3630	2990	202	17

CAL YR 1990 TOTAL 4526.97 MEAN 12.4 MAX 87 MIN .00 AC-FT 8980
WTR YR 1991 TOTAL 4997.14 MEAN 13.7 MAX 452 MIN .00 AC-FT 9910

e Estimated

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1989 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, IN CUBIC FEET PER SECOND (00060)	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)
NOV								
29...	1455	--	1.6	--	--	1640	7.0	0.0
MAR								
05...	1415	E9.0	--	80	1	1310	-3.5	0.0
28...	1440	--	8.6	--	--	1120	7.0	4.0
APR								
30...	1510	--	7.3	--	--	1250	6.0	7.0
MAY								
13...	1125	--	47	100	2	978	16.0	14.0
JUN								
07...	1645	--	25	--	--	726	--	--
11...	0800	--	90	50	1	680	20.0	19.0
21...	0820	--	32	--	--	670	14.5	16.0
27...	1020	--	124	--	--	582	19.0	17.0
JUL								
01...	1055	--	469	--	--	600	14.0	18.0
AUG								
05...	1720	--	5.5	20	1	980	32.0	24.0
SEP								
17...	0815	--	0.05	--	--	760	2.0	11.5

DATE	TIME	PH LAB (STANDARD UNITS) (00403)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)
MAR											
05...	1415	8.1	370	74	44	160	4	6.4	321	410	13
MAY											
13...	1125	8.3	350	76	39	77	2	9.4	231	310	8.2
JUN											
11...	0800	8.3	270	64	26	50	1	8.0	230	160	5.3
AUG											
05...	1720	8.3	250	42	36	120	3	7.1	217	290	11

DATE	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)
MAR											
05...	0.4	5.0	906	1.23	E22.0	<0.01	<0.05	0.02	<0.01	300	19
MAY											
13...	0.6	9.6	669	0.91	84.8	<0.01	<0.05	0.01	<0.01	230	23
JUN											
11...	0.4	15	467	0.64	113	0.02	<0.05	0.03	<0.01	190	44
AUG											
05...	0.6	1.9	639	0.87	9.49	<0.01	<0.05	<0.01	<0.01	320	13

DATE	TIME	ARSENIC DISSOLVED (UG/L AS AS) (01000)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)
MAY								
13...	1125	2	<1	1	<1	13	<0.1	<1

MILK RIVER BASIN

06155030 MILK RIVER NEAR DODSON, MT

LOCATION.--Lat 48°24'11", long 108°17'35", in NE1/4SE1/4NW1/4 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^2.

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,250 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 24 to Mar. 22. Records good except those for estimated daily discharges, which are poor. Numerous diversions for irrigation upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--9 years, 169 ft^3/s, 122,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,200 ft^3/s, Sept. 26, 1986, gage height, 29.79 ft; no flow at times some years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,940 ft^3/s, June 30, gage height, 18.45 ft; minimum daily, 3.0 ft^3/s, Oct. 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.5	5.3	e50	e40	e70	e70	59	291	60	2600	76	65
2	5.6	62	e50	e35	e80	e80	49	263	89	2060	72	65
3	3.8	112	e45	e35	e90	e90	12	108	104	1870	70	65
4	3.7	112	e50	e35	e90	e95	12	57	70	1730	75	64
5	3.2	111	e55	e35	e85	e95	13	44	55	1610	92	64
6	3.0	108	e55	e35	e90	e90	12	39	53	1500	139	62
7	3.4	108	e60	e35	e80	e90	12	37	63	1390	182	63
8	3.7	108	e65	e40	e80	e90	12	35	113	1290	228	62
9	3.9	107	e70	e40	e80	e95	12	33	254	975	267	61
10	4.0	105	e75	e40	e75	e95	12	30	370	450	219	61
11	3.5	105	e70	e40	e70	e95	12	29	418	346	128	46
12	3.8	104	e60	e45	e70	e90	12	28	425	460	94	13
13	3.5	104	e55	e50	e75	e90	12	33	383	361	79	14
14	3.6	106	e55	e50	e70	e90	11	39	311	277	73	21
15	3.8	106	e60	e45	e65	e90	10	73	231	218	71	33
16	4.3	107	e55	e45	e70	e95	11	109	174	164	72	43
17	4.9	107	e50	e45	e75	e95	12	97	159	132	79	46
18	5.5	106	e45	e50	e75	e100	13	82	120	100	85	50
19	5.6	104	e45	e50	e75	e110	14	82	110	83	90	62
20	5.6	103	e40	e45	e80	e120	19	91	107	76	96	53
21	5.6	102	e35	e45	e80	e130	26	80	111	77	95	41
22	6.0	101	e30	e50	e75	e140	30	67	164	78	92	33
23	6.1	94	e35	e50	e70	140	34	62	232	80	87	25
24	6.7	e90	e40	e50	e70	121	38	59	358	86	80	20
25	6.8	e80	e40	e45	e75	83	47	53	451	84	72	17
26	6.3	e60	e35	e45	e75	31	56	43	639	81	68	16
27	7.1	e55	e40	e45	e80	37	98	38	752	79	67	16
28	7.4	e55	e40	e40	e75	39	183	40	830	76	65	15
29	6.8	e55	e35	e40	---	39	225	40	961	75	65	14
30	6.5	e50	e40	e45	---	37	249	42	2010	76	65	14
31	5.9	---	e45	e55	---	42	---	50	---	76	65	---
TOTAL	157.1	2732.3	1525	1345	2145	2704	1317	2174	10177	18560	3108	1224
MEAN	5.07	91.1	49.2	43.4	76.6	87.2	43.9	70.1	339	599	100	40.8
MAX	7.5	112	75	55	90	140	249	291	2010	2600	267	65
MIN	3.0	5.3	30	35	65	31	10	28	53	75	65	13
AC-FT	312	5420	3020	2670	4250	5360	2610	4310	20190	36810	6160	2430

CAL YR 1990 TOTAL 59332.4 MEAN 163 MAX 1200 MIN 3.0 AC-FT 117700
WTR YR 1991 TOTAL 47168.4 MEAN 129 MAX 2600 MIN 3.0 AC-FT 93560

e Estimated

06156500 BELANGER CREEK DIVERSION CANAL NEAR VIDORA, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°29'39", long 109°21'54", in NW1/4 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, from Cypress Lake elevation.

REMARKS.--Estimated daily discharges: Mar. 1 to Apr. 1. Records poor. Canal diverts water from right bank of Belanger Creek in SW1/4 sec.30, T.6, R.25 W., third meridian, for storage in Cypress Lake.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 598 ft^3/s, May 7, 1975; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.00	e.60	.67	.00	15	7.6	.00	.00		
2			e.00	30	.85	.00	13	13	.00	.00		
3			e.00	68	.64	.00	11	9.5	.00	.00		
4			e.00	43	1.2	.00	11	7.4	.00	.00		
5			e.00	32	.71	.00	12	6.8	.00	.00		
6			e.00	6.6	1.3	.00	11	6.6	.00	.00		
7			e.00	.21	41	.00	10	6.5	.00	.00		
8			e.00	1.7	64	.00	14	5.8	.00	.00		
9			e.00	.95	55	.00	15	5.3	.00	.00		
10			e.00	1.1	20	.00	14	4.8	.00	.00		
11			e.00	4.1	4.2	.00	16	4.2	.00	.00		
12			e.00	3.1	15	.00	12	4.7	.00	.00		
13			e.00	2.8	37	.00	16	33	.00	.00		
14			e.00	3.6	5.3	.00	17	57	.00	.00		
15			e.00	4.1	.14	.00	13	27	.00	.00		
16			e.00	.04	.00	.00	9.4	29	.00	.00		
17			e.00	.00	.00	.00	8.7	12	.00	.00		
18			e.00	.00	.00	.00	8.2	8.2	.00	.00		
19			e.00	.00	.00	.00	8.1	6.6	.00	.00		
20			e.00	.00	.00	.00	8.0	5.8	.00	.00		
21			e.18	.00	.00	.00	7.6	3.6	.00	.00		
22			e2.2	.00	.00	.00	7.3	.07	.00	.00		
23			e.78	.53	.00	.00	7.2	.00	.00	.00		
24			e.14	1.3	.00	.00	7.2	.00	.00	.00		
25			e.00	1.1	.11	.00	7.8	.00	.00	.00		
26			e.00	1.1	.11	.00	6.6	.00	.00	.00		
27			e.00	1.5	.00	5.7	7.0	.00	.00	.00		
28			e.00	.95	1.8	13	7.9	.00	.00	.00		
29			e.00	2.2	20	18	7.6	.00	.00	.00		
30			e.00	2.0	.53	16	6.0	.00	.00	.00		
31			e.00	---	.00	---	6.4	.00	---	.00		
TOTAL			3.30	212.58	269.56	52.70	321.0	264.47	0.00	0.00		
MEAN			.11	7.09	8.70	1.76	10.4	8.53	.000	.000		
MAX			2.2	68	64	18	17	57	.00	.00		
MIN			.00	.00	.00	.00	6.0	.00	.00	.00		
AC-FT			6.5	422	535	105	637	525	.00	.00		

e Estimated

06157500 CYPRESS LAKE EAST OUTFLOW CANAL NEAR VIDORA, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°29'12", long 109°21'08", in SE1/4 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, from topographic map. Prior to Sept. 26, 1946, at datum 2.24 ft higher and Sept. 26, 1946, to May 18, 1950, at datum 1.54 ft higher.

REMARKS.--Estimated daily discharges: Mar. 1 to Apr. 11, and Oct. 26-31. Records fair. Canal diverts water from Cypress Lake for irrigation in Frenchman River basin in Saskatchewan.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 202 ft^3/s, Apr. 19, 1952; no flow at times most seasons.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.00	e3.0	.92	9.6	.64	.39	.21	.32		
2			e.00	e5.5	.85	4.9	.49	.53	.21	.32		
3			e.00	e5.6	4.4	3.8	.57	.42	.21	.32		
4			e.00	e6.8	2.2	5.3	.53	.39	.18	.32		
5			e.00	e.78	1.8	7.0	.57	.35	.18	.32		
6			e.00	e.60	1.8	6.3	.60	.32	.18	.35		
7			e.00	e.85	4.6	7.5	.71	.32	.21	.35		
8			e.00	e.85	15	7.7	.81	.28	.21	.35		
9			e.00	e.46	35	7.3	.60	.28	.21	.32		
10			e.00	e.32	42	6.6	.74	.25	.21	.32		
11			e.00	e.53	42	5.4	4.4	.25	.25	.28		
12			e.00	2.0	45	3.9	1.0	.25	.25	.28		
13			e.00	2.3	49	1.9	.64	.35	.25	.32		
14			e.00	1.0	48	7.5	.39	.92	.28	.28		
15			e.04	1.0	44	15	.39	.60	.28	.32		
16			e.07	1.1	39	14	.42	.39	.32	.35		
17			e.25	1.1	27	13	.42	.39	.35	.14		
18			e.67	1.0	17	12	.42	.42	.35	.11		
19			e.99	1.0	10	11	.39	.39	.32	.14		
20			e1.6	1.0	2.1	10	.39	.42	.28	.25		
21			e1.1	1.1	3.1	11	.42	.46	.28	.28		
22			e.42	1.1	1.6	12	.42	.46	.32	.28		
23			e3.3	1.2	1.1	12	.46	.46	.32	.25		
24			e3.4	1.1	1.3	11	.46	.42	.28	.21		
25			e2.3	.99	6.4	11	.35	.42	.28	.25		
26			e.78	.92	10	11	.28	.39	.28	e.18		
27			e.11	1.0	9.8	7.2	.28	.35	.25	e.07		
28			e.07	1.1	7.8	.78	.32	.32	.25	e.04		
29			e.07	.95	12	.71	.28	.32	.28	e.04		
30			e.07	1.0	14	.67	.35	.28	.32	e.04		
31			e.11	---	12	---	.42	.21	---	e.04		
TOTAL			15.35	47.25	510.77	237.06	19.16	12.00	7.80	7.44		
MEAN			.50	1.57	16.5	7.90	.62	.39	.26	.24		
MAX			3.4	6.8	49	15	4.4	.92	.35	.35		
MIN			.00	.32	.85	.67	.28	.21	.18	.04		
AC-FT			30	94	1010	470	38	24	15	15		

e Estimated

MILK RIVER BASIN

06158500 EASTEND CANAL AT EASTEND, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°30'21", long 108°50'54", in NW1/4 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. Datum of gage is 2,998.58 ft above mean sea level (Geodetic Survey of Canada datum). Prior to June 1973, at sites within 1 mi, at different datums.

REMARKS.--No estimated daily discharges this year. Records good. Canal diverts water from Eastend Reservoir in NW1/4 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.

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, 86 ft^3/s, June 4, 1986; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	.00	.00	82	.00	.00		
2			.00	.00	.00	.00	.00	79	.00	.00		
3			.00	.00	.00	.00	.00	73	.00	.00		
4			.00	.00	.00	.00	.00	70	.00	.00		
5			.00	.00	.00	.00	.00	67	.00	.00		
6			.00	.00	37	.00	.00	64	.00	.00		
7			.00	.00	65	.00	.00	58	.00	.00		
8			.00	.00	70	.00	.00	56	.00	.00		
9			.00	.00	76	.00	.00	50	.00	.00		
10			.00	.00	81	.00	.00	46	.00	.00		
11			.00	.00	79	.00	.00	49	.00	.00		
12			.00	.00	80	.00	.00	50	.00	.00		
13			.00	.00	79	.00	.00	40	.00	.00		
14			.00	.00	81	.00	.00	20	.00	.00		
15			.00	.00	79	.00	.00	5.1	.00	.00		
16			.00	.00	70	.00	.00	.00	.00	.00		
17			.00	.00	64	.00	.00	.00	.00	.00		
18			.00	.00	64	.00	.00	.00	.00	.00		
19			.00	.00	64	.00	.00	.00	.00	.00		
20			.00	.00	63	.00	.00	.00	.00	.00		
21			.00	.00	59	.00	.00	.00	.00	.00		
22			.00	.00	57	.00	.00	.00	.00	.00		
23			.00	.00	58	.00	.00	.00	.00	.00		
24			.00	.00	59	.00	.00	.00	.00	.00		
25			.00	.00	49	.00	.00	.00	.00	.00		
26			.00	.00	40	.00	.00	.00	.00	.00		
27			.00	.00	25	.00	.00	.00	.00	.00		
28			.00	.00	9.2	.00	.00	.00	.00	.00		
29			.00	.00	.00	.00	47	.00	.00	.00		
30			.00	.00	.00	.00	79	.00	.00	.00		
31			.00	---	.00	---	85	.00	---	.00		
TOTAL			0.00	0.00	1408.20	0.00	211.00	809.10	0.00	0.00		
MEAN			.000	.000	45.4	.000	6.81	26.1	.000	.000		
MAX			.00	.00	81	.00	85	82	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.00	.00	2790	.00	419	1600	.00	.00		

MILK RIVER BASIN

06159500 FRENCHMAN RIVER BELOW EASTEND RESERVOIR, NEAR EASTEND, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°30'54", long 108°50'16", in SE1/4 sec.36, T.6, R.22 W., third meridian, Hydrologic Unit 10050013, on left bank 0.8 mi west of Eastend, 1.7 mi downstream from Eastend Reservoir, and at river mile 298.8.

DRAINAGE AREA.--619 mi^2.

PERIOD OF RECORD.--April 1909 to October 1916, March 1918 to May 1931, September 1935, March to July 1936, and April 1939 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309. Published as "at East End" 1909-16. Records prior to April 1939, not equivalent owing to diversion in Eastend Canal since 1937.

REVISED RECORDS.--WSP 1729: 1919, 1941 (monthly figures only). W 1983: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,960 ft, from topographic map. Prior to July 1941, non-recording gages at several sites within 1.5 mi of present site at various datums.

REMARKS.--Estimated daily discharges: Mar. 1-30, Oct. 27-31. Records good above 70 ft^3/s and fair below, except those for estimated daily discharges, which are poor. Natural flow of stream affected by storage reservoirs, diversions for irrigation, and return flow from irrigated areas. Water may be diverted into or from Battle Creek basin through Cypress Lake.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,500 ft^3/s, Apr. 16, 1952, gage height, 19.10 ft, from flood-mark in gage house; no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 484 ft^3/s, May 29, gage height, 4.64 ft; minimum daily, 0.99 ft^3/s, July 30,31.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e14	100	57	122	40	1.1	7.8	38		
2			e3.9	176	61	86	14	1.3	8.9	38		-
3			e20	322	63	22	14	1.2	9.4	38		
4			e76	399	63	183	14	1.1	9.6	38		
5			e15	399	63	168	14	1.4	8.5	38		
6			e8.4	300	38	119	15	3.1	8.7	37		
7			e9.7	259	18	99	15	2.9	8.8	37		
8			e38	203	40	105	21	3.3	9.6	37		
9			e20	107	76	104	26	3.0	10	35		
10			e11	78	184	87	26	3.3	10	40		
11			e12	79	137	78	33	3.3	10	49		
12			e13	70	134	63	41	3.0	10	46		
13			e16	61	321	43	41	3.4	10	42		
14			e18	61	364	24	41	3.6	11	37		
15			e23	39	279	22	31	3.0	11	34		
16			e27	18	193	37	18	3.4	9.9	25		
17			e26	18	111	59	14	2.8	9.3	16		
18			e30	18	106	57	13	3.0	9.5	15		
19			e64	17	96	46	14	3.5	9.6	15		
20			e65	17	66	39	14	3.3	9.9	16		
21			e43	30	36	38	12	3.7	11	17		
22			e13	40	22	48	10	4.7	10	16		
23			e18	18	14	66	7.4	3.8	7.4	17		
24			e20	17	14	118	5.5	3.8	5.4	19		
25			e26	17	174	141	5.3	3.7	21	18		
26			e50	30	163	125	4.3	3.9	27	16		
27			e67	39	163	71	1.3	3.9	41	e12		
28			e78	42	219	44	1.2	4.0	40	e14		
29			e84	49	367	41	1.1	4.3	40	e14		
30			e120	49	381	24	.99	5.9	40	e14		
31			109	---	193	---	.99	7.7	---	e14		
TOTAL			1138.0	3072	4216	2279	509.08	103.4	434.3	842		
MEAN			36.7	102	136	76.0	16.4	3.34	14.5	27.2		
MAX			120	399	381	183	41	7.7	41	49		
MIN			3.9	17	14	22	.99	1.1	5.4	12		
AC-FT			2260	6090	8360	4520	1010	205	861	1670		

e Estimated

MILK RIVER BASIN

06161300 HUFF LAKE PUMPING CANAL NEAR VAL MARIE, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°22'20", long 107°53'05", in NW1/4 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.--No estimated daily discharges this year. Records good. Canal diverts water from Huff Lake in NW1/4 sec.7, T.5, R.14 W., third meridan, 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^3/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 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	25	.00	.00	.00	.00		
2			.00	.00	.00	25	.00	.00	.00	.00		
3			.00	.00	.00	25	.00	.00	.00	.00		
4			.00	.00	.00	24	.00	.00	.00	.00		
5			.00	.00	.00	25	.00	1.9	.00	.00		
6			.00	.00	.00	20	.00	22	.00	.00		
7			.00	.00	.00	6.1	.00	24	.00	3.0		
8			.00	.00	.00	.00	.00	25	.00	.00		
9			.00	.00	.00	.00	.00	25	.00	.00		
10			.00	.00	.00	.00	.00	25	.00	.00		
11			.00	.00	.00	.00	.00	25	.00	.00		
12			.00	.00	.00	.00	.00	24	.00	.00		
13			.00	.00	.00	.00	.00	26	.00	.00		
14			.00	.00	.00	11	.00	26	.00	.00		
15			.00	.00	.00	13	.00	26	.00	.00		
16			.00	.00	.00	13	.00	26	.00	.00		
17			.00	.00	.00	7.9	.00	25	.00	.00		
18			.00	.00	.00	3.3	.00	26	.00	.00		
19			.00	.00	.00	.00	.00	26	.00	.00		
20			.00	.00	2.2	.00	.00	26	.00	.00		
21			.00	.00	15	.00	.00	25	.00	.00		
22			.00	.00	25	.00	.00	24	.00	.00		
23			.00	.00	25	.00	.00	20	.00	.00		
24			.00	.00	25	.00	.00	7.8	.00	.00		
25			.00	.00	24	.00	.00	.00	.00	.00		
26			.00	.00	25	.00	.00	2.4	.00	.00		
27			.00	.00	25	.00	.00	.00	.00	.00		
28			.00	.00	25	.00	.00	.00	.00	.00		
29			.00	.00	25	.00	.00	.00	.00	.00		
30			.00	.00	24	.00	.00	.00	.00	.00		
31			.00	---	25	---	.00	.00	---	.00		
TOTAL			0.00	0.00	265.20	198.30	0.00	458.10	0.00	3.00		
MEAN			.000	.000	8.55	6.61	.000	14.8	.000	.097		
MAX			.00	.00	25	25	.00	26	.00	3.0		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.00	.00	526	393	.00	909	.00	6.0		

MILK RIVER BASIN

06161500 HUFF LAKE GRAVITY CANAL NEAR VAL MARIE, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°22'10", long 107°53'06", in SW1/4 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 Marie West 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. Datum of gage is 2,662.88 ft above mean sea level (Geodetic Survey of Canada datum). Prior to Sept. 27, 1949, at site 0.5 mi downstream at different datum.

REMARKS.--No estimated daily discharges this year. Records fair. Canal diverts water from Huff Lake in SW1/4 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, 55 ft^3/s, July 14, 1972; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	52	.00	.00	.00	.00		
2			.00	.00	.00	47	.00	.00	.00	.00		
3			.00	.00	.00	38	.00	.00	.00	.00		
4			.00	.00	.00	34	.00	.00	.00	.00		
5			.00	.00	.00	29	.00	9.1	.00	.00		
6			.00	.00	.00	29	.00	28	.00	.00		
7			.00	.00	.00	22	.00	31	.00	.00		
8			.00	.00	.00	17	.00	34	.00	.00		
9			.00	.00	.00	15	.00	36	.00	.00		
10			.00	.00	.00	.00	.00	39	.00	.00		
11			.00	.00	.00	.00	.00	41	.00	.00		
12			.00	.00	.00	.00	.00	42	.00	.00		
13			.00	.00	.00	.00	.00	36	.00	.00		
14			.00	.00	.00	.00	.00	23	.00	.00		
15			.00	.00	.00	.00	.00	24	.00	.00		
16			.00	.00	.00	.00	.00	25	.00	.00		
17			.00	.00	.00	.00	.00	25	.00	.00		
18			.00	.00	.00	.00	.00	24	.00	.00		
19			.00	.00	.00	.00	.00	23	.00	.00		
20			.00	.00	.81	.00	.00	23	.00	.00		
21			.00	.00	28	.00	.00	23	.00	.00		
22			.00	.00	34	.00	.00	24	.00	.00		
23			.00	.00	33	.00	.00	24	.00	.00		
24			.00	.00	37	.00	.00	22	.00	.00		
25			.00	.00	43	.00	.00	20	.00	.00		
26			.00	.00	43	.00	.00	19	.00	.00		
27			.00	.00	43	.00	.00	17	.00	.00		
28			.00	.00	43	.00	.00	18	.00	.00		
29			.00	.00	47	.00	.00	16	.00	.00		
30			.00	.00	47	.00	.00	12	.00	.00		
31			.00	---	50	---	.00	.00	---	.00		
TOTAL			0.00	0.00	448.81	283.00	0.00	658.10	0.00	0.00		
MEAN			.000	.000	14.5	9.43	.000	21.2	.000	.000		
MAX			.00	.00	50	52	.00	42	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.00	.00	890	561	.00	1310	.00	.00		

MILK RIVER BASIN

06162500 NEWTON LAKE MAIN CANAL NEAR VAL MARIE, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°18'18", long 107°48'05", in NE1/4 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. Datum of gage is 2,622.03 ft above mean sea level (Geodetic Surveys of Canada datum). Prior to May 21, 1963, at several sites within 2 mi of present site at different datums.

REMARKS.--No estimated daily discharges this year. Records fair. Canal diverts water from Newton Lake in SE1/4 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, 122 ft^3/s, May 26, 27, 1976; no flow at times each season.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	93	.00	87	.00	.00		
2			.00	.00	.00	93	.00	87	.00	.00		
3			.00	.00	.00	92	.00	87	.00	.00		
4			.00	.00	.00	94	.00	87	.00	.00		
5			.00	.00	.00	89	.00	96	.00	.00		
6			.00	.00	.00	90	.00	98	.00	.00		
7			.00	.00	.00	91	.00	96	.00	.00		
8			.00	.00	.00	87	.00	92	.00	.00		
9			.00	.00	.00	76	.00	87	.00	.00		
10			.00	.00	.00	75	.00	86	.00	.00		
11			.00	.00	.00	73	.00	87	.00	.00		
12			.00	.00	.00	60	.00	87	.00	.00		
13			.00	.00	.00	57	.00	85	.00	.00		
14			.00	.00	.00	47	.00	85	.00	.00		
15			.00	.00	.00	28	.00	78	.00	.00		
16			.00	.00	.00	8.4	.00	65	.00	.00		
17			.00	.00	.00	5.4	.00	53	.00	.00		
18			.00	.00	.00	.00	.00	37	.00	.00		
19			.00	.00	.00	.00	.00	30	.00	.00		
20			.00	.00	.00	.00	.00	26	.00	.00		
21			.00	.00	.00	.00	.00	23	.00	.00		
22			.00	.00	.00	.00	.00	18	.00	.00		
23			.00	.00	55	.00	.00	17	.00	.00		
24			.00	.00	87	.00	.00	18	.00	.00		
25			.00	.00	97	.00	.00	11	.00	.00		
26			.00	.00	95	.00	.00	.00	.00	.00		
27			.00	.00	93	.00	.00	.00	.00	.00		
28			.00	.00	91	.00	.00	.00	.00	.00		
29			.00	.00	93	.00	.00	.00	.00	.00		
30			.00	.00	93	.00	.00	.00	.00	.00		
31			.00	---	91	---	75	.00	---	.00		
TOTAL			0.00	0.00	795.00	1158.80	75.00	1623.00	0.00	0.00		
MEAN			.000	.000	25.6	38.6	2.42	52.4	.000	.000		
MAX			.00	.00	97	94	75	98	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.00	.00	1580	2300	149	3220	.00	.00		

MILK RIVER BASIN

06163050 FRENCHMAN RIVER BELOW NEWTON LAKE, NEAR VAL MARIE, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°18'07", long 107°48'20", in NE1/4 sec.15, T.4, R.14 W., third meridian, Hydrologic Unit 10050013, on left bank about 200 ft downstream from spillway for Newton Lake, about 5.4 mi northwest of Val Marie, and at river mile 156.1.

DRAINAGE AREA.--1,349 mi^2, of which 210 mi^2 probably is noncontributing.

PERIOD OF RECORD.--May 1976 to current season. Seasonal records only. Published as Frenchman River below Val Marie Reservoir, near Val Marie, Saskatchewan, May 1976 to October 1979. June to October 1939, July to October 1965, and May 1966 to current season in reports of Department of the Environment, Canada.

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,606.11 ft above mean sea level (Geodetic Survey of Canada datum).

REMARKS.--Estimated daily discharges: Mar. 1 to Apr. 8, Oct. 27-31. Records fair except those below 10 ft^3/s, which are poor. Natural flow of stream affected by storage reservoirs, diversions for irrigation, and return flow from irrigated areas. Water may be diverted into or from Battle Creek basin through Cypress Lake.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,500 ft^3/s, July 1, 1991, gage height, 13.21 ft; no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 2,500 ft^3/s, July 1, gage height, 13.21 ft; no flow, on many days.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.57	e.07	.14	189	1820	12	10	4.2		
2			e.60	e.07	.21	196	523	12	10	4.2		
3			e.64	e.07	.32	200	420	12	10	4.3		
4			e.64	e.07	.18	202	97	11	10	4.1		
5			e.67	e.07	.11	205	.00	11	8.4	3.6		
6			e.67	e.07	.14	206	22	7.6	5.4	3.5		
7			e.71	e.07	.11	209	53	.00	5.3	3.5		
8			e.71	e.04	.07	214	61	.00	5.0	3.5		
9			e.71	.00	.11	216	60	.00	4.8	3.5		
10			e.71	.00	.11	214	60	.00	4.7	3.5		
11			e.74	.00	.07	214	138	.00	4.6	3.5		
12			e.74	.18	.32	214	189	.00	4.6	3.7		
13			e.78	.28	.18	212	220	.04	4.4	3.8		
14			e.81	.07	.07	209	164	.00	4.4	3.8		
15			e.85	.07	.04	208	127	.14	4.5	3.8		
16			e.88	.07	.04	206	69	.42	4.5	3.7		
17			e.92	.07	.04	204	44	.39	4.4	3.9		
18			e.39	.07	149	201	39	.25	4.3	3.7		
19			e.07	.04	180	173	26	.07	3.8	3.5		
20			e.07	.07	207	19	21	.07	3.8	3.4		
21			e.07	.04	202	17	21	.04	3.8	3.3		
22			e.07	.00	201	118	21	.04	3.8	3.2		
23			e.07	.04	198	176	20	.04	3.6	2.5		
24			e.07	.00	194	185	14	.04	3.4	2.4		
25			e.07	.00	191	203	12	3.7	3.5	2.9		
26			e.04	.00	188	201	12	11	4.0	3.0		
27			e.04	.04	183	123	15	11	4.3	e3.2		
28			e.04	.07	180	136	14	11	4.2	e3.8		
29			e.04	.14	179	653	13	11	4.3	e4.0		
30			e.04	.14	180	1960	13	11	4.2	e4.0		
31			e.07	---	183	---	12	10	---	e4.2		
TOTAL			13.50	1.92	2617.26	7683	4320.00	135.84	156.0	111.2		
MEAN			.44	.064	84.4	256	139	4.38	5.20	3.59		
MAX			.92	.28	207	1960	1820	12	10	4.3		
MIN			.04	.00	.04	17	.00	.00	3.4	2.4		
AC-FT			27	3.8	5190	15240	8570	269	309	221		

e Estimated

MILK RIVER BASIN

06164000 FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°00'00", long 107°18'06", in SE1/4 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^2, of which 343 mi^2 probably is noncontributing.

PERIOD OF RECORD.--April 1917 to current season (seasonal records only for most seasons).

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, from topographic map. Prior to June 23, 1937, water-stage recorder at site 0.5 mi upstream at different datum. June 23, 1937, to October 1952, water-stage recorder at site 100 ft downstream at present datum.

REMARKS.--Estimated daily discharges: Mar. 20 to Apr. 4, Oct. 28-31. Records good except those for estimated daily discharges, which are poor. 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. 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 discharge, 22,700 ft^3/s, Apr. 15, 1952, gage height, 19.90 ft, from floodmark, from rating curve extended above 2,300 ft^3/s on basis of slope-area measurement of peak flow; no flow at times most seasons.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 2,820 ft^3/s, June 30, gage height, 13.27 ft; minimum daily, 0.81 ft^3/s, Oct. 5,6.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			4.1	e28	25	180	1390	16	7.8	.95		
2			2.9	e28	20	175	2010	16	6.9	.99		
3			2.6	e25	16	173	1890	17	6.5	.95		
4			4.4	e21	14	197	2360	25	6.5	.88		
5			3.8	16	13	201	2090	40	5.9	.81		
6			2.6	13	10	198	1650	38	5.8	.81		
7			1.6	6.1	8.2	229	1020	44	6.1	.85		
8			1.6	8.2	6.3	239	271	53	6.0	1.2		
9			3.6	8.3	5.9	230	189	55	5.9	1.3		
10			16	5.1	4.5	208	168	49	6.1	1.4		
11			37	4.1	3.4	202	152	40	6.0	1.6		
12			57	3.7	41	197	158	36	5.3	1.7		
13			135	3.0	134	195	168	28	4.2	1.9		
14			114	2.9	77	199	225	25	3.2	1.6		
15			119	3.0	34	194	243	26	2.6	1.8		
16			155	2.3	20	195	209	43	2.2	1.3		
17			136	1.9	13	190	144	46	1.9	1.2		
18			150	1.7	9.2	182	108	50	1.6	1.1		
19			176	1.8	5.4	174	76	41	1.4	.99		
20			e22	1.8	31	170	65	31	1.3	1.0		
21			e247	1.9	118	158	54	23	1.2	1.0		
22			e212	2.1	144	84	42	19	1.7	.95		
23			e177	2.2	144	74	36	18	1.6	1.1		
24			e141	2.2	149	270	34	13	1.8	4.6		
25			e106	2.5	153	374	32	9.1	1.9	4.6		
26			e71	3.4	168	413	31	6.3	1.8	4.0		
27			e35	6.2	171	473	28	6.1	1.7	4.0		
28			e18	12	177	509	22	8.9	1.3	e7.8		
29			e19	27	190	682	20	9.5	1.1	e9.5		
30			e21	26	185	1590	18	9.6	.99	e7.4		
31			e25	---	179	---	16	9.2	---	e6.4		
TOTAL			2216.2	270.4	2268.9	8555	14919	850.7	108.29	75.68		
MEAN			71.5	9.01	73.2	285	481	27.4	3.61	2.44		
MAX			247	28	190	1590	2360	55	7.8	9.5		
MIN			1.6	1.7	3.4	74	16	6.1	.99	.81		
AC-FT			4400	536	4500	16970	29590	1690	215	150		

e Estimated

MILK RIVER BASIN

RESERVOIRS IN FRENCHMAN RIVER BASIN IN SASKATCHEWAN

(International gaging stations)

06157000 CYPRESS LAKE.--Lat 49°27'30", long 109°30'25", in SE1/4 sec.12, T.6, R.27 W., third meridian, Hydrologic Unit 10050013, on south shore, and 12 mi north of Consul. DRAINAGE AREA, 107 mi². 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. Datum 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 February 1970; 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. 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, 12,700 acre-ft, Oct. 30, 1990, elevation, 3,184.33 ft.

EXTREMES FOR CURRENT SEASON: Maximum contents, 17,000 acre-ft, July 13,16, elevation, 3,185.34 ft; minimum observed, 13,400 acre-ft, Mar. 7, elevation, 3,184.48 ft.

06159000 EASTEND RESERVOIR.--Lat 49°30'26", long 108°51'08", in NW1/4 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 mi². 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. Datum 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 revised capacity table effective Jan. 1, 1983. 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. 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 various times.

EXTREMES FOR CURRENT SEASON: Maximum contents, 2,390 acre-ft, May 12, elevation, 3,013.72 ft; minimum, 73 acre-ft, Oct. 27, elevation, 3,003.44 ft.

06162000 HUFF LAKE.--Lat 49°22'16", long 107°53'07", in SW1/4 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 mi². 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. Datum 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 gatewell. REMARKS, Reservoir is formed by earthfill dam with concrete control works completed in 1939. The following capacity figures are from revised capacity table effective Jan. 1, 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. 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, 4,360 acre-ft, May 20, 1967, elevation, 2,677.83 ft; no contents Feb. 28, Mar. 31, 1950, Oct. 22-31, 1984, Mar. 1-7 and Aug. 6 to Sept. 14, 1985.

EXTREMES FOR CURRENT SEASON: Maximum contents, 4,520 acre-ft, June 30, elevation, 2,677.92 ft; minimum, 90 acre-ft, Feb. 11, elevation, 2,664.79 ft.

06163000 NEWTON LAKE.--Lat 49°18'12", long 107°48'20", in NE1/4 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 mi². PERIOD OF RECORD, February 1937 to current season (seasonal records only). February 1937 to October 1979, published as Val Marie Reservoir. Water-stage recorder. Datum 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 revised capacity table effective Jan. 1, 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. 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, 11,700 acre-ft, June 30, elevation, 2,636.57 ft; no contents for many days.

MILK RIVER BASIN

RESERVOIRS IN FRENCHMAN RIVER BASIN IN SASKATCHEWAN--Continued

Monthend contents, in acre-feet, October 1990 to October 1991

Date	Cypress Lake	Eastend Reservoir	Huff Lake	Newton Lake
Oct. 31	12,700	74	726	0
Nov. 30	-	-	-	-
Dec. 31	-	-	-	-
Jan. 31	-	-	-	-
Feb. 28	13,400	76	379	0
Mar. 31	14,000	1,050	3,510	1,480
Apr. 30	14,600	2,190	3,510	8,250
May 31	14,300	1,930	3,940	7,550
June 30	15,600	2,010	3,270	11,200
July 31	16,200	1,690	3,490	9,510
Aug. 31	15,900	554	692	6,600
Sept. 30	14,600	490	800	5,890
Oct. 31	14,000	77	2,080	5,430

MILK RIVER BASIN

06164510 MILK RIVER AT JUNEBERG BRIDGE, NEAR SACO, MT

LOCATION.--Lat 48°30'32", long 107°13'02", in NE1/4NE1/4 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^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1977 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,130 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 21 to Dec. 1, Dec. 20 to Mar. 24. 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 (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.

AVERAGE DISCHARGE.--14 years (water years 1978-91), 413 ft^3/s, 299,200 acre-ft/yr; median of yearly mean discharges, 233 ft^3/s, 168,800 acre-ft per year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,400 ft^3/s, Apr. 3, 1978, gage height, 24.20 ft; maximum gage height, 26.70 ft, Mar. 4, 1986, backwater from ice jam; minimum daily discharge, 2.1 ft^3/s, Aug. 20, 1984.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,490 ft^3/s, July 1, gage height, 19.09 ft; minimum daily, 42 ft^3/s, Apr. 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	126	58	e115	e110	e120	e140	81	143	178	7290	208	241
2	126	58	115	e110	e130	e130	80	214	177	6690	222	232
3	128	59	115	e110	e140	e140	74	256	192	5410	254	229
4	131	60	118	e100	e140	e150	67	316	202	4530	253	241
5	128	60	117	e100	e140	e150	76	318	239	3940	247	249
6	116	58	115	e100	e140	e140	81	266	335	3970	248	231
7	105	134	117	e100	e140	e140	65	210	391	3900	291	221
8	101	149	117	e100	e140	e140	52	176	437	3770	389	230
9	98	139	117	e100	e130	e140	45	145	475	3580	360	221
10	95	137	117	e100	e130	e140	43	125	500	2720	411	219
11	94	139	117	e100	e130	e140	42	132	477	1590	433	235
12	96	137	118	e100	e140	e130	43	143	640	1250	432	250
13	93	134	120	e110	e140	e140	45	140	761	911	393	238
14	98	134	118	e110	e130	e150	49	193	772	805	331	199
15	112	137	117	e100	e110	e150	51	236	707	810	383	156
16	112	137	117	e100	e120	e150	55	262	656	745	380	147
17	108	135	120	e110	e120	e150	54	244	580	697	422	171
18	112	132	117	e120	e130	e150	50	202	560	656	329	203
19	104	128	114	e110	e150	e150	48	221	509	544	302	215
20	78	129	e90	e110	e170	e150	46	218	460	441	301	211
21	66	e120	e85	e110	e170	e160	45	199	420	364	325	212
22	64	e110	e80	e120	e160	e200	43	181	403	318	320	239
23	59	e120	e80	e110	e160	e300	44	167	438	289	296	250
24	57	e100	e85	e110	e150	e350	46	166	434	275	279	226
25	56	e70	e95	e110	e150	313	45	192	468	247	270	227
26	55	e100	e100	e110	e160	300	47	206	993	229	268	226
27	59	e120	e110	e110	e150	247	53	187	1520	237	265	223
28	60	e120	e100	e110	e150	213	61	209	1260	242	258	191
29	61	e120	e95	e100	---	140	68	240	1730	246	253	168
30	59	e120	e100	e110	---	99	81	227	4200	243	256	156
31	58	---	e110	e110	---	84	---	221	---	223	250	---
TOTAL	2815	3354	3351	3310	3940	5276	1680	6355	21114	57162	9629	6457
MEAN	90.8	112	108	107	141	170	56.0	205	704	1844	311	215
MAX	131	149	120	120	170	350	81	318	4200	7290	433	250
MIN	55	58	80	100	110	84	42	125	177	223	208	147
AC-FT	5580	6650	6650	6570	7810	10460	3330	12610	41880	113400	19100	12810

CAL YR 1990 TOTAL 93829 MEAN 257 MAX 1300 MIN 55 AC-FT 186100
WTR YR 1991 TOTAL 124443 MEAN 341 MAX 7290 MIN 42 AC-FT 246800

e Estimated

06164510 MILK RIVER AT JUNEBERG BRIDGE, NEAR SACO, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1978 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1977 to current year.
WATER TEMPERATURE: October 1977 to September 1979.

REMARKS.--Unpublished records of once-daily water temperature are available in files of District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 2,220 microsiemens, Jan. 7, 8, 1978; minimum daily, 263 microsiemens, Mar. 17, 1982.
WATER TEMPERATURE (water years 1978-79): Maximum daily, 26.5°C, July 20, 22, Aug. 2, 1979; 0.0°C on many days during winter.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum daily, 1,660 microsiemens, Feb. 3; minimum daily, 446 microsiemens, July 3.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)
OCT									
11...	1040	94	80	3	--	6.0	8.0	8.3	270
DEC									
06...	1015	114	85	1	1330	-1.0	0.0	8.2	420
JAN									
24...	0955	111	100	2	--	-12.0	0.0	7.7	400
FEB									
22...	1000	155	75	3	1050	-2.0	0.0	8.0	290
MAR									
25...	1030	312	--	--	810	1.5	0.5	--	--
MAY									
16...	0945	280	0	0	--	15.0	16.5	8.1	180
JUN									
17...	1015	576	25	1	638	17.5	19.0	8.3	190
JUL									
01...	1400	7460	--	--	440	22.0	18.0	--	--
10...	1230	2740	50	1	500	24.0	22.0	7.8	140
AUG									
15...	1415	413	--	--	689	21.5	23.5	--	--
SEP									
20...	0950	201	0	0	780	10.5	12.0	8.3	220

DATE	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)
OCT									
11...	60	28	110	3	4.4	251	260	14	<0.1
DEC									
06...	92	47	200	4	5.2	359	480	42	0.3
JAN									
24...	89	44	200	4	5.3	373	440	35	0.2
FEB									
22...	65	31	140	4	4.0	270	310	28	0.3
MAR									
25...	--	--	--	--	--	--	--	--	--
MAY									
16...	40	19	81	3	5.8	167	210	9.5	0.3
JUN									
17...	43	20	70	2	5.6	192	140	7.6	0.3
JUL									
01...	--	--	--	--	--	--	--	--	--
10...	33	15	50	2	6.7	152	110	6.8	0.2
AUG									
15...	--	--	--	--	--	--	--	--	--
SEP									
20...	50	23	84	2	4.2	225	200	11	0.2

MILK RIVER BASIN

06164510 MILK RIVER AT JUNEBERG BRIDGE, NEAR SACO, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)
OCT									
11...	5.3	632	0.86	160	--	<0.010	<0.100	0.050	<0.010
DEC									
06...	4.4	1090	1.48	334	--	<0.010	<0.100	0.110	<0.010
JAN									
24...	8.0	1050	1.42	314	--	<0.010	0.300	0.320	0.010
FEB									
22...	4.7	746	1.02	312	--	<0.010	0.300	0.110	<0.010
MAR									
25...	--	--	--	--	--	--	--	--	--
MAY									
16...	3.7	470	0.64	355	0.110	0.010	0.120	0.110	<0.010
JUN									
17...	6.8	408	0.56	635	--	<0.010	<0.050	0.030	<0.010
JUL									
01...	--	--	--	--	--	--	--	--	--
10...	10	323	0.44	2390	0.078	0.020	0.098	0.050	0.010
AUG									
15...	--	--	--	--	--	--	--	--	--
SEP									
20...	5.5	513	0.70	278	--	<0.010	<0.050	0.010	<0.010

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG.C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	823	1250	1370	1490	1570	1000	1040	1250	739	478	879	760
2	823	1250	1390	1500	1260	1000	1100	1520	770	480	877	763
3	842	1250	1490	1410	1660	1010	1160	1520	768	446	881	770
4	843	1190	1440	1310	1320	987	1100	1530	767	448	841	772
5	842	1160	1450	1430	1320	989	1100	1530	737	486	842	775
6	847	1150	1390	1400	1320	990	1040	804	739	512	863	817
7	848	1120	1360	1410	1560	991	1110	801	740	479	808	816
8	917	1060	1460	1400	1320	987	1120	728	753	470	808	817
9	913	1070	1500	1390	1260	990	1190	732	755	511	805	818
10	914	1180	1450	1390	1260	990	1090	727	722	544	902	802
11	942	1170	1470	1380	1140	992	1150	729	721	562	723	793
12	949	1200	1270	1410	1150	974	1040	760	641	574	723	795
13	965	1190	1270	1380	1150	997	1160	760	644	600	805	776
14	973	1250	1290	1380	1160	975	1210	735	644	602	728	776
15	957	1170	1310	1370	1160	970	1210	726	771	668	---	777
16	949	1180	1320	1370	1150	972	1150	728	772	669	763	825
17	944	1300	1430	1460	1150	990	1190	762	---	672	763	825
18	979	1570	1390	1420	1140	880	1210	762	760	697	763	825
19	977	1560	1390	1460	1140	958	1150	763	654	712	830	826
20	988	1040	1410	1460	1140	884	1200	808	652	800	829	824
21	993	1100	1470	1470	1150	943	1220	807	649	800	752	824
22	986	1100	1440	1450	---	888	1200	804	649	702	746	805
23	963	1100	1430	1590	1150	889	1200	772	650	861	745	806
24	1090	1100	1440	1590	1140	843	1200	808	663	861	746	840
25	1090	1100	1430	1600	1150	832	1200	807	645	860	776	817
26	1090	1130	1440	1600	1140	844	1200	808	633	859	780	823
27	1090	1390	1440	1600	1150	891	1200	805	714	859	777	888
28	1070	1300	1460	1610	1150	1040	1200	801	578	845	751	888
29	1060	1300	1480	1630	---	1040	1200	798	575	841	744	842
30	1150	1440	1480	1620	---	1040	1260	767	481	910	743	890
31	1160	---	1480	1540	---	1040	---	771	---	912	746	---
MEAN	967	1210	1410	1470	1240	962	1160	885	689	668	791	813

WTR YR 1991 MEAN 1020 MAX 1660 MIN 446

06164590 BEAVER CREEK NEAR ZORTMAN, MT

LOCATION.--Lat 47°56'19", long 108°23'26", in NE1/4SE1/4NE1/4 sec.8, T.25 N., R.26 E., Phillips County, Hydrologic Unit 10050014, on right bank, at Baker Creek School, 3.3 mi southeast of Blaine-Phillips County line, 4.7 mi east of Fort Belknap Indian Reservation boundary, and 6 mi northeast of Zortman.

DRAINAGE AREA.--10.1 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,320 ft above National Geodetic Vertical Datum of 1929, from topographic map.

AVERAGE DISCHARGE.--8 years (water years 1984-91), 1.17 ft^3/s, 848 acre-ft/yr.

REMARKS.--Estimated daily discharges: Nov. 25 to Mar. 9, May 12. Records fair 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.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 233 ft^3/s, June 29, 1991, gage height, 2.80 ft, from floodmark from culvert computation and flow-over-road measurement of peak flow; maximum gage height, 3.38 ft, Dec. 31, 1983, backwater from ice; no flow many days, 1985, 1988-89, 1991.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 233 ft^3/s, June 29, gage height, 2.80 ft, from floodmark from culvert computation and flow-over-road measurement of peak flow; no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.5	1.8	e.50	e.00	e.70	e.35	.50	.59	.65	4.3	3.4	3.4
2	1.6	1.5	e.40	e.00	e.80	e.30	.62	.52	.53	3.6	3.4	2.8
3	1.5	1.5	e.35	e.00	e.80	e.40	.56	.55	.58	3.5	3.6	2.7
4	1.4	1.6	e.30	e.00	e.70	e.45	.65	.62	.68	3.8	3.5	2.7
5	1.3	1.6	e.35	e.00	e.70	e.50	.67	.63	.69	3.3	3.5	2.7
6	1.2	1.6	e.35	e.00	e.60	e.50	.58	.59	8.3	3.4	3.5	2.7
7	1.2	1.7	e.35	e.00	e.60	e.60	.53	.61	2.6	3.5	3.6	2.5
8	1.2	1.4	e.35	e.00	e.60	e.70	.54	.51	1.2	3.7	3.6	2.3
9	1.3	1.4	e.30	e.00	e.60	e.70	.51	.63	.94	4.2	3.5	2.1
10	1.2	1.4	e.30	e.00	e.60	.75	.56	.55	.84	4.0	3.7	2.1
11	1.4	1.0	e.30	e.10	e.60	.66	.96	.64	.90	4.2	3.6	2.2
12	1.4	1.4	e.30	e.30	e.60	.52	.84	e.80	.84	4.9	3.9	2.2
13	1.5	1.2	e.20	e.50	e.50	.55	.66	.90	.73	5.1	3.8	2.2
14	1.6	1.2	e.20	e.70	e.50	.52	.68	.80	.76	5.2	3.7	2.2
15	1.6	1.2	e.20	e.70	e.50	.51	.69	.76	.83	5.2	3.9	2.3
16	1.5	1.3	e.20	e.60	e.50	.50	.55	.83	.90	5.0	4.2	2.3
17	1.5	1.4	e.20	e.60	e.60	.53	.63	.77	.92	4.4	4.0	2.1
18	1.5	1.3	e.10	e.70	e.60	.52	.92	.72	1.0	4.3	3.7	2.0
19	1.5	1.3	e.05	e.70	e.60	.53	.80	.67	1.1	4.2	4.2	1.9
20	1.4	1.4	e.00	e.60	e.60	.62	.78	.58	1.2	4.4	4.2	2.2
21	1.4	1.3	e.00	e.60	e.60	.58	.70	.52	1.3	4.1	3.4	2.2
22	1.5	1.4	e.00	e.70	e.50	.52	.77	.51	2.5	3.5	3.4	1.8
23	1.4	1.5	e.00	e.70	e.50	.42	.72	.52	1.7	3.5	3.3	1.8
24	1.4	1.5	e.00	e.60	e.50	.43	.80	.50	2.2	3.5	3.3	2.0
25	1.6	e1.2	e.00	e.60	e.50	.47	.73	.55	3.3	3.5	3.2	1.9
26	1.7	e.80	e.00	e.60	e.45	.68	.86	.59	2.1	3.5	3.5	1.7
27	1.6	e.50	e.00	e.70	e.45	.52	.89	.50	1.6	3.5	3.4	2.1
28	1.9	e.50	e.00	e.60	e.40	.48	2.1	.75	1.9	3.4	3.0	2.2
29	1.8	e.60	e.00	e.50	---	.48	.75	.65	19	3.4	3.0	2.1
30	1.9	e.60	e.00	e.50	---	.47	.68	.63	15	3.5	2.9	2.1
31	1.8	---	e.00	e.60	---	.50	---	.64	---	3.4	3.1	---
TOTAL	46.3	38.10	5.30	12.20	16.20	16.26	22.23	19.63	76.79	123.0	110.0	67.5
MEAN	1.49	1.27	.17	.39	.58	.52	.74	.63	2.56	3.97	3.55	2.25
MAX	1.9	1.8	.50	.70	.80	.75	2.1	.90	19	5.2	4.2	3.4
MIN	1.2	.50	.00	.00	.40	.30	.50	.50	.53	3.3	2.9	1.7
AC-FT	92	76	11	24	32	32	44	39	152	244	218	134

CAL YR 1990 TOTAL 424.62 MEAN 1.16 MAX 4.9 MIN .00 AC-FT 842
WTR YR 1991 TOTAL 553.51 MEAN 1.52 MAX 19 MIN .00 AC-FT 1100

e Estimated

MILK RIVER BASIN

06164615 LITTLE WARM CREEK AT RESERVATION BOUNDARY, NEAR ZORTMAN, MT

LOCATION.--Lat 47°59'04", long 108°21'15", in SE1/4SW1/4SW1/4 sec. 27, T.26 N., R.26 E., Phillips County, Hydrologic Unit 10050014, 0.2 mi upstream from Fort Belknap Indian Reservation boundary, 2.5 mi northwest of U.S. Highway 191, at 15 mi northeast of Zortman.

DRAINAGE AREA.--6.31 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 3,070 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Oct. 1-3, Dec. 19-24, Jan. 11-13, 26, 27, July 1-16. Records fair except those for estimated daily discharges, which are poor. Diversions for irrigation upstream from station can, at times, dry up stream. Severval observations of water temperature and specific conductance were made this year.

AVERAGE DISCHARGE.--8 years, 2.87 ft^3/s, 2,080 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,250 ft^3/s, June 29, 1991, gage height, 7.55 ft; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,250 ft^3/s, June 29, gage height, 7.55 ft; minimum daily, 2.3 ft^3/s, Oct. 5, Dec. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e2.5	2.8	2.6	2.6	2.9	2.7	2.5	3.1	2.6	e6.0	3.9	3.5
2	e2.5	2.7	2.6	2.6	2.7	2.8	2.6	3.0	2.7	e5.0	3.8	3.3
3	e2.5	2.7	2.5	2.6	2.8	3.1	2.5	3.6	2.7	e5.0	3.8	3.3
4	e2.5	2.7	2.9	2.6	2.6	3.2	2.6	3.9	2.7	e5.0	3.6	3.5
5	2.3	2.9	2.8	2.7	2.6	2.8	2.7	3.7	2.5	e5.0	3.6	3.5
6	2.6	2.7	2.8	2.7	2.6	2.7	2.5	3.2	7.0	e5.0	3.6	3.6
7	2.6	2.7	2.7	2.7	2.6	2.8	2.8	3.2	11	e5.0	3.8	3.7
8	2.7	2.8	2.8	2.8	2.6	2.8	2.8	3.1	3.1	e5.0	3.6	3.5
9	2.8	2.8	2.9	2.7	2.6	2.8	2.8	3.5	2.7	e4.5	3.6	3.5
10	2.9	2.8	2.9	2.8	2.6	2.8	3.1	3.0	2.7	e4.5	3.6	3.4
11	2.7	2.8	2.9	e2.7	2.7	2.7	4.5	3.3	2.7	e4.5	3.6	3.5
12	2.5	2.8	2.8	e2.7	2.8	2.6	3.2	18	2.8	e4.5	3.6	3.4
13	2.6	2.9	2.8	e2.7	3.0	2.7	3.1	3.3	2.7	e4.5	3.6	3.5
14	2.6	2.8	2.8	2.7	2.5	2.6	3.0	3.0	2.9	e4.5	3.7	3.6
15	2.6	2.8	2.8	2.5	2.7	2.6	2.9	3.0	2.7	e4.5	3.7	3.4
16	2.6	2.8	2.8	2.4	2.7	2.6	2.8	3.0	2.7	e4.5	3.7	3.3
17	2.7	2.9	2.8	2.6	2.8	2.6	3.2	2.9	2.7	4.3	3.6	3.1
18	2.6	2.7	2.8	3.2	2.6	2.6	3.6	3.0	2.8	4.1	3.6	3.0
19	2.7	2.8	e2.6	2.8	2.8	2.7	3.0	3.1	2.8	4.1	3.5	3.1
20	2.7	2.9	e2.6	2.7	3.1	2.6	2.7	3.0	3.0	4.1	3.6	3.2
21	2.6	2.7	e2.6	2.7	3.0	2.5	2.7	2.9	3.2	4.0	3.5	3.6
22	2.7	2.8	e2.7	2.6	3.0	2.6	2.8	2.9	5.8	4.0	3.5	3.2
23	2.7	2.9	e2.8	2.6	3.0	2.6	2.9	2.9	4.6	4.0	3.6	3.1
24	2.7	2.5	e2.8	2.6	2.8	2.5	3.0	2.9	18	3.9	3.6	3.1
25	2.8	2.4	2.8	2.6	2.7	2.5	3.1	2.9	6.6	3.9	3.6	3.1
26	2.8	2.4	2.7	e2.5	2.8	2.5	3.1	2.9	4.0	4.1	3.5	3.2
27	2.6	2.6	2.7	e2.5	3.0	2.5	3.0	2.8	3.3	4.0	3.6	3.1
28	2.7	2.7	2.3	2.6	2.8	2.5	3.7	3.3	4.7	3.9	3.7	3.2
29	2.9	2.8	2.7	2.8	---	2.5	3.6	3.0	54	3.9	3.4	3.3
30	2.9	2.7	2.9	2.9	---	2.5	3.3	2.8	38	3.9	3.4	3.1
31	3.0	---	3.0	2.7	---	2.5	---	2.6	---	3.9	3.4	---
TOTAL	82.6	82.3	85.2	82.9	77.4	82.5	90.1	110.8	209.7	137.1	111.9	99.9
MEAN	2.66	2.74	2.75	2.67	2.76	2.66	3.00	3.57	6.99	4.42	3.61	3.33
MAX	3.0	2.9	3.0	3.2	3.1	3.2	4.5	18	54	6.0	3.9	3.7
MIN	2.3	2.4	2.3	2.4	2.5	2.5	2.5	2.6	2.5	3.9	3.4	3.0
AC-FT	164	163	169	164	154	164	179	220	416	272	222	198

CAL YR 1990 TOTAL 1024.4 MEAN 2.81 MAX 12 MIN 1.0 AC-FT 2030
WTR YR 1991 TOTAL 1252.4 MEAN 3.43 MAX 54 MIN 2.3 AC-FT 2480

e Estimated

06164623 LITTLE WARM CREEK TRIBUTARY NEAR LODGE POLE, MT

LOCATION.--Lat 47°59'43", long 108°19'09", in SW1/4SE1/4NW1/4 sec. 24, T.26 N., R.26 E., Phillips County, Hydrologic Unit 10050014, at culvert on county road 0.3 mi northeast of Little Warm Creek, 1.3 mi east of Fort Belknap Indian Reservation boundary, 2.3 mi northeast of State Highway 191, and 10 mi southeast of Lodge Pole.

DRAINAGE AREA.--2.42 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

REVISED RECORDS.--WDR MT-86-1: 1983-85(M).

GAGE.--Water-stage recorder. Elevation of gage is 2,910 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: June 24-27, June 29 to July 14. Records fair except those for estimated daily discharges, which are poor. No known diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--8 years, 0.18 ft^3/s, 133 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,270 ft^3/s, June 29, 1991, gage height, 5.80 ft, from floodmarks, on basis of culvert computations and flow-over-road measurement of peak flow; no flow most days.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,270 ft^3/s, June 29, gage height, 5.80 ft, from floodmarks, on basis of culvert computation and from over-road measurement of peak flow; no flow most days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.05	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.16	.00	e.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.62	.00	e.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.16	.00	e.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	4.1	e.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.08	e.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.13	.00	e.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.02	.00	e.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.02	.77	.00	e.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	8.6	.00	e.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.06	.00	e.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.03	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.18	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	4.6	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	1.5	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	e15	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	e7.0	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	e.05	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	e.02	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.24	.00	6.5	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.01	.00	e10	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	e20	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.49	10.52	68.85	0.05	0.00	0.00
MEAN	.000	.000	.000	.000	.000	.000	.016	.34	2.29	.002	.000	.000
MAX	.00	.00	.00	.00	.00	.00	.24	8.6	20	.05	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.00	.00	.00	.00	.00	.00	1.0	21	137	.1	.00	.00

CAL YR 1990 TOTAL 16.16 MEAN .044 MAX 6.2 MIN .00 AC-FT 32
WTR YR 1991 TOTAL 79.91 MEAN .22 MAX 20 MIN .00 AC-FT 159

e Estimated

06166000 BEAVER CREEK BELOW GUSTON COULEE, NEAR SACO, MT

LOCATION.--Lat 48°21'25", long 107°34'48", in SE1/4SW1/4NW1/4 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 river mile 61.1.

DRAINAGE AREA.--1,208 mi^2.

PERIOD OF RECORD.--April 1981 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 2,215 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Oct. 17-31, Mar. 1-17. Records fair except those for estimated daily discharges, which are poor. Some regulation by numerous small reservoirs on tributary streams. Diversions for irrigation upstream from gage. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 23,500 ft^3/s, Sept. 26, 1986, gage height, 14.68 ft, from slope-area determination of peak flow; no flow at times each year.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 642 ft^3/s, July 5, gage height, 7.09 ft; no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.48					e.00	.41	3.1	.58	415	1.6	.40
2	.45					e.00	.43	1.1	.54	535	.72	.34
3	.44					e.00	.42	.87	.52	555	.26	.26
4	.43					e.00	.40	.81	.62	582	.75	.25
5	.48					e.00	.39	1.0	.73	623	1.8	.22
6	.78					e.00	.36	1.3	.92	612	2.3	.20
7	1.0					e.00	.32	1.1	1.2	428	3.5	.23
8	1.2					e.00	.30	.82	1.0	198	3.7	.31
9	1.0					e.00	.28	.96	2.7	87	2.1	.31
10	1.5					e.00	.28	.89	8.1	44	.81	.27
11	2.2					e.00	.29	.86	101	25	.74	.25
12	1.6					e.00	.27	1.4	93	11	.70	.28
13	1.2					e.00	.25	.95	54	4.7	.56	.46
14	1.0					e.00	.23	1.0	29	6.7	.51	.70
15	.81					e.00	.23	1.0	17	3.7	.43	3.3
16	.79					e.00	.22	.70	7.7	1.4	.40	3.2
17	e.75					e.00	.22	.59	6.5	.88	.35	.24
18	e.70					.00	.22	.71	9.5	.25	.30	.00
19	e.60					.00	.20	1.3	5.5	.36	.27	.00
20	e.50					.00	.19	2.2	1.6	.01	.25	.00
21	e.50					.00	.20	1.1	1.2	.00	.23	.00
22	e.50					.00	.17	.82	1.2	.00	.19	.40
23	e.50					.00	.15	.85	2.2	.00	.12	1.5
24	e.50					.00	.13	.11	2.7	.08	.09	2.2
25	e.50					.00	.41	.00	3.6	.80	.07	4.5
26	e.50					.00	1.3	.00	174	3.2	.06	4.7
27	e.50					.04	.94	.00	237	4.3	.65	3.0
28	e.50					.16	1.2	.04	196	2.2	1.4	2.8
29	e.50					.26	6.6	.47	225	1.6	.88	5.0
30	e.50					.34	4.6	.89	293	2.5	.54	3.4
31	e.50					.39	---	.71	---	2.7	.46	---
TOTAL	23.41					1.19	21.61	27.65	1477.61	4150.38	26.74	38.72
MEAN	.76					.038	.72	.89	49.3	134	.86	1.29
MAX	2.2					.39	6.6	3.1	293	623	3.7	5.0
MIN	.43					.00	.13	.00	.52	.00	.06	.00
AC-FT	46					2.4	43	55	2930	8230	53	77

e Estimated

MILK RIVER BASIN

06169500 ROCK CREEK BELOW HORSE CREEK, NEAR INTERNATIONAL BOUNDARY

(Hydrologic bench-mark station)

LOCATION.--Lat 48°58'10", long 106°50'20", in NE1/4NW1/4 sec.15, T.37 N., R.37 E., Valley County, Hydrologic Unit 10050015, on right bank 2 mi south of international boundary, 3 mi downstream from Horse Creek, 21 mi northwest of Opheim, MT, and at river mile 82.0.

DRAINAGE AREA.--328 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1916 to October 1926, September 1956 to current year (seasonal records only prior to October 1978). Monthly discharge only for some periods, published in WSP 1309. Published as Rock Creek near Barnard, Mt. 1916-17. Prior to September 1956, records were collected at both Horse Creek (1914-56) and Rock Creek above Horse Creek (1914-56). Summations are equivalent to records at this site.

REVISED RECORDS.--WSP 1509: 1925(M), WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,530 ft above National Geodetic Vertical Datum of 1929, from topographic map. March 1916 to October 1926, nonrecording gages at several sites within 500 ft upstream at different datum.

REMARKS.--Estimated daily discharges: Nov. 6-10, 24-30, Dec. 1-4, Dec. 17 to Mar. 31. Water-discharge records good except those for estimate daily discharges and those below 1.0 ft^3/s, which are poor. Several small diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--13 years (1979-91), 14.7 ft^3/s, 10,650 acre-ft/yr; median of yearly mean discharges, 10.6 ft^3/s, 7,680 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,420 ft^3/s, Apr. 7, 1969, gage height, 12.03 ft; maximum gage height, 13.40 ft, Mar. 29, 1978, backwater from ice; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 15, 1952, reached a stage of 12.6 ft, from floodmarks, discharge, 5,110 ft^3/s, by slope-area measurement of peak flow.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 250 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 20	--	a450	---	June 29	0430	*1,260	*7.54
June 25	1330	818	6.56				

a--Estimated, backwater from ice.
No flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.03	e.55	e.00	e.00	e6.0	71	34	1.9	385	.50	.02
2	.00	.02	e.50	e.00	e.00	e5.0	60	18	1.7	237	.54	.02
3	.00	.03	e.45	e.00	e.00	e4.0	48	12	1.6	207	.50	.02
4	.00	.04	e.50	e.00	e.00	e3.0	37	11	2.6	141	.44	.02
5	.00	.06	.56	e.00	e.00	e2.0	25	10	39	71	.41	.02
6	.00	e.06	.63	e.00	e.00	e4.0	19	11	48	56	.49	.03
7	.00	e.10	.69	e.00	e.00	e3.0	13	11	57	36	.76	.03
8	.00	e.20	.68	e.00	e.00	e3.0	11	9.4	52	24	.85	.06
9	.00	e.30	.67	e.00	e.00	e4.0	9.8	8.2	29	16	3.5	.04
10	.00	e.40	.73	e.00	e.00	e6.0	8.7	7.6	13	12	2.0	.05
11	.00	.45	.81	e.00	e.00	e8.0	7.7	8.1	9.3	17	.74	.04
12	.00	.51	.92	e.00	e.00	e7.0	6.7	7.5	7.1	34	.45	.06
13	.00	.68	.93	e.00	e.00	e10	6.1	7.4	5.3	14	.30	.05
14	.00	.83	.84	e.00	e.00	e70	5.6	7.8	4.0	9.6	.25	.03
15	.00	.73	.66	e.00	e.00	e120	5.1	7.7	3.3	7.3	.22	.03
16	.01	.94	.55	e.00	e.00	e200	4.9	7.9	2.7	5.5	.18	.04
17	.01	1.1	e.40	e.00	e.00	e210	4.8	7.2	2.0	4.7	.17	.04
18	.01	.87	e.35	e.00	e.00	e220	4.9	6.3	1.7	4.3	.11	.04
19	.01	.75	e.30	e.00	e.00	e350	4.9	5.6	1.3	3.6	.08	.06
20	.01	.83	e.25	e.00	e.10	e360	5.0	5.1	1.2	3.3	.07	.05
21	.01	.93	e.20	e.00	e3.0	e300	4.6	8.7	.96	2.8	.06	.13
22	.01	.92	e.15	e.00	e2.5	e190	4.5	8.5	4.1	2.2	.05	.11
23	.01	.84	e.15	e.00	e2.0	e120	4.2	5.2	50	1.8	.04	.13
24	.01	e.70	e.15	e.00	e1.5	e90	4.1	3.9	33	1.4	.03	.15
25	.01	e.60	e.10	e.00	e1.0	e60	3.9	3.4	446	1.0	.03	.14
26	.01	e.50	e.05	e.00	e1.0	e40	4.0	3.0	283	.93	.03	.14
27	.00	e.40	e.10	e.00	e5.0	e20	5.4	2.9	103	.90	.02	.11
28	.01	e.45	e.05	e.00	e8.0	e10	12	2.9	147	.80	.03	.14
29	.01	e.50	e.00	e.00	---	e7.0	54	2.5	884	.66	.03	.33
30	.01	e.55	e.00	e.00	---	e10	55	2.3	820	.58	.03	.41
31	.03	---	e.00	e.00	---	e50	---	2.1	---	.53	.02	---
TOTAL	0.17	15.32	12.92	0.00	24.10	2492.0	509.9	248.2	3054.76	1301.90	12.93	2.54
MEAN	.005	.51	.42	.000	.86	80.4	17.0	8.01	102	42.0	.42	.085
MAX	.03	1.1	.93	.00	8.0	360	71	34	884	385	3.5	.41
MIN	.00	.02	.00	.00	.00	2.0	3.9	2.1	.96	.53	.02	.02
AC-FT	.3	30	26	.00	48	4940	1010	492	6060	2580	26	5.0

CAL YR 1990 TOTAL 3260.89 MEAN 8.93 MAX 651 MIN .00 AC-FT 6470
WTR YR 1991 TOTAL 7674.74 MEAN 21.0 MAX 884 MIN .00 AC-FT 15220

e Estimated

06169500 ROCK CREEK BELOW HORSE CREEK, NEAR INTERNATIONAL BOUNDARY--Continued
(Hydrologic bench-mark station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1964-65, 1977 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
DEC												
12...	1030	0.96	100	3	--	-3.0	0.0	702	7.6	--	K24	K11
MAR												
28...	1050	11	--	--	382	0.5	0.5	--	--	--	--	--
APR												
04...	1015	40	--	--	500	14.0	8.0	--	--	--	--	--
22...	1400	4.8	0	0	980	15.0	11.0	693	5.2	52	K5	K2
MAY												
13...	1045	7.3	--	--	885	13.5	13.0	--	--	--	--	--
JUN												
10...	1100	12	--	--	527	23.0	21.0	--	--	--	--	--
26...	1220	278	--	--	270	21.0	17.0	--	--	--	--	--
JUL												
23...	1145	2.0	25	1	865	18.0	21.5	708	8.0	98	220	K49
SEP												
17...	1150	0.04	90	3	1450	6.0	8.0	709	10.2	93	K34	K9

DATE	TIME	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)
DEC											
12...	1030	907	0	725	8.1	10	270	41	40	360	10
APR											
22...	1400	554	0	444	8.4	20	200	37	27	150	5
JUL											
23...	1145	451	0	361	8.1	25	200	42	24	120	4
SEP											
17...	1150	605	0	484	8.6	27	200	28	32	280	9

DATE	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)
DEC											
12...	11	745	330	8.8	1.8	9.7	1180	1250	1.60	3.06	0.01
APR											
22...	7.6	386	130	5.6	0.4	11	617	642	0.84	8.00	0.03
JUL											
23...	8.4	389	110	6.9	0.3	14	570	548	0.78	3.08	<0.01
SEP											
17...	10	527	300	7.2	0.6	5.6	927	962	1.26	0.10	0.03

DATE	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N) (00607)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)
DEC											
12...	<0.01	<0.10	<0.10	0.05	0.04	--	0.05	0.01	0.01	<0.01	40
APR											
22...	<0.01	<0.05	<0.05	0.05	0.02	--	0.06	0.03	0.05	<0.01	40
JUL											
23...	<0.01	<0.05	<0.05	<0.01	0.03	0.57	0.10	0.04	0.03	0.01	10
SEP											
17...	<0.01	<0.05	<0.05	0.03	0.01	--	0.12	0.02	0.04	<0.01	<10

06169500 ROCK CREEK BELOW HORSE CREEK, NEAR INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)
DEC											
12...	2	90	<0.5	<1	1	<3	3	26	<1	250	35
APR											
22...	9	79	<0.5	<1	6	<3	3	60	1	99	12
JUL											
23...	7	110	<0.5	<1	<1	<3	5	17	<1	79	6
SEP											
17...	3	85	<0.5	<1	<1	<3	2	16	<1	170	<1

DATE	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
DEC											
12...	<0.1	<10	3	<1	<1.0	470	<6	<3	92	0.24	89
APR											
22...	0.1	10	<1	<1	<1.0	350	<6	<3	75	0.97	92
JUL											
23...	<0.1	<10	7	<1	<1.0	370	<6	4	90	0.49	91
SEP											
17...	<0.1	<10	4	<1	<1.0	360	<6	3	74	0.01	97

WATER QUALITY DATA, WATER YEARS OCTOBER 1989 TO SEPTEMBER 1991

DATE	TIME	ALPHA, COUNT, 2 SIGMA WAT DIS AS NAT U (UG/L) (75986)	ALPHA COUNT, 2 SIGMA WAT DIS AS TH-230 (PCI/L) (75987)	ALPHA, 2 SIGMA SED SUS TOT DRY AS TH-230 (PCI/L) (76004)	GROSS ALPHA, DIS-SOLVED (UG/L AS U-NAT) (80030)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT) (80040)	BETA, 2 SIGMA WATER, DISS, AS SR90 /Y90 (PCI/L (75988)	BETA, 2 SIGMA WATER, DISS, AS CS-137 (PCI/L) (75989)	BETA, 2 SIGMA SED, SUSP, TOT DRY SR90Y90 (PCI/L) (76005)
APR 1990									
05...	1030	1.7	1.0	2.8	1.5	4.9	1.6	2.1	1.1
JUL 1991									
23...	1145	1.8	<0.60	1.0	<0.6	<0.6	2.2	3.0	0.80
SEP									
17...	1150	6.7	4.7	1.1	6.5	1.2	2.6	3.5	0.80

DATE	GROSS BETA, DIS-SOLVED (PCI/L AS CS-137) (03515)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137) (03516)	GROSS BETA, DIS-SOLVED (PCI/L AS SR/YT-90) (80050)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/YT-90) (80060)	RA-226 2 SIGMA WATER, DISS, (PCI/L) (76001)	RADIUM 226, DIS-SOLVED, RADON METHOD (PCI/L) (09511)	URANIUM NATURAL 2 SIGMA WATER, DISS, (UG/L) (75990)	URANIUM NATURAL DIS-SOLVED (UG/L AS U) (22703)
APR 1990								
05...	12	4.1	8.6	3.1	0.020	0.13	--	0.99
JUL 1991								
23...	14	3.6	11	3.4	0.020	0.12	<1.0	2.2
SEP								
17...	15	2.6	11	2.4	0.030	0.13	<1.0	3.9

MILK RIVER BASIN

06172310 MILK RIVER AT TAMPICO, MT

LOCATION.--Lat 48°18'29", long 106°49'19", in SW1/4SW1/4SW1/4 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^2.

PERIOD OF RECORD.--October 1973 to September 1977, May 1987 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,110 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 22 to Mar. 22, May 29 to June 16, 27, 28. 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 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.

AVERAGE DISCHARGE.--8 years (1974-77, 1988-91), 426 ft^3/s, 308,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,210 ft^3/s, May 26, 1974, gage height, 23.65 ft; maximum gage height, 25.40 ft, July 4, 1991; no flow at times.

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^3/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,240 ft^3/s, July 4, gage height, 25.40 ft; minimum daily, 3.5 ft^3/s, Oct. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	313	e120	e80	e130	e95	33	305	e120	5690	98	80
2	18	229	e110	e80	e130	e90	33	278	e230	6670	95	75
3	19	169	e110	e80	e130	e95	24	293	e340	7110	102	71
4	20	136	e130	e80	e130	e100	15	308	e390	7200	107	78
5	22	133	e130	e80	e130	e110	15	343	e570	6950	112	86
6	31	98	e130	e80	e120	e110	15	399	e680	6690	114	90
7	27	107	e130	e80	e120	e110	13	363	e740	6230	155	84
8	24	145	e130	e90	e120	e110	13	315	e630	6090	207	72
9	23	197	e130	e90	e110	e110	12	269	e500	5470	270	66
10	25	208	e130	e90	e100	e110	12	184	e460	4710	251	60
11	26	193	e120	e90	e100	e120	11	118	e650	4120	288	56
12	23	178	e110	e100	e100	e130	12	109	e450	2340	295	50
13	33	177	e100	e100	e110	e140	13	141	e450	1700	281	48
14	65	190	e95	e95	e100	e170	13	161	e560	1100	236	46
15	86	185	e90	e100	e95	e210	13	190	e590	907	187	122
16	110	176	e85	e100	e100	e270	13	203	e530	613	224	236
17	131	175	e80	e110	e110	e300	15	166	841	687	239	377
18	151	174	e75	e100	e120	e350	16	134	693	660	261	461
19	285	166	e75	e100	e130	e400	19	127	444	598	226	426
20	209	165	e75	e100	e130	e450	19	173	398	454	169	387
21	167	168	e75	e100	e130	e500	20	185	354	362	145	361
22	245	e110	e70	e100	e120	e500	23	156	312	319	165	345
23	341	e150	e65	e100	e110	625	26	119	681	254	159	437
24	458	e100	e70	e100	e120	652	28	82	501	178	147	723
25	314	e70	e75	e90	e130	546	33	58	552	132	138	503
26	47	e80	e75	e85	e130	401	31	76	581	117	128	390
27	8.0	e50	e75	e85	e120	216	32	86	e1500	111	124	365
28	3.5	e100	e75	e80	e100	146	35	88	e2650	115	120	353
29	26	e130	e75	e85	---	49	33	e100	3040	135	101	293
30	214	e120	e75	e100	---	69	127	e100	4080	136	89	253
31	252	---	e75	e110	---	39	---	e100	---	122	85	---
TOTAL	3419.5	4592	2960	2860	3275	7323	717	5729	24517	77970	5318	6994
MEAN	110	153	95.5	92.3	117	236	23.9	185	817	2515	172	233
MAX	458	313	130	110	130	652	127	399	4080	7200	295	723
MIN	3.5	50	65	80	95	39	11	58	120	111	85	46
AC-FT	6780	9110	5870	5670	6500	14530	1420	11360	48630	154700	10550	13870

CAL YR 1990 TOTAL 76831.5 MEAN 210 MAX 1500 MIN 3.5 AC-FT 152400
WTR YR 1991 TOTAL 145674.5 MEAN 399 MAX 7200 MIN 3.5 AC-FT 288900

e Estimated

MILK RIVER BASIN

06174500 MILK RIVER AT NASHUA, MT
(National stream quality accounting network station)

LOCATION.--Lat 48°07'47", long 106°21'50", in NE1/4NE1/4 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 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1939 to current year.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,027.75 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Nov. 24 to Mar. 25. 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 Saskatchewan. Diversions for irrigation of about 140,000 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--52 years (water years 1939-91), 669 ft^3/s, 484,700 acre-ft/yr; median of yearly mean discharges, 557 ft^3/s, 403,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 45,300 ft^3/s, Apr. 18, 1952, gage height, 31.38 ft; no flow July 14, 15, July 17 to Aug. 1, Aug. 15 to Sept. 6, 1984, and May 16-19, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,170 ft^3/s, July 8, gage height, 15.99 ft; minimum daily, 35 ft^3/s, Oct. 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	74	61	e150	e85	e110	e130	79	239	228	3010	214	92
2	75	217	e140	e85	e140	e100	78	240	221	3760	184	85
3	73	281	e150	e90	e160	e110	65	406	218	4590	152	90
4	76	265	e160	e95	e150	e120	81	449	317	5200	136	83
5	77	216	e150	e95	e150	e110	171	445	422	5640	148	70
6	82	172	e140	e95	e150	e120	155	436	532	5920	158	64
7	78	144	e150	e95	e150	e130	145	464	589	6070	163	75
8	67	158	e160	e90	e150	e140	133	522	762	6150	167	82
9	49	141	e150	e90	e140	e170	125	517	880	6080	212	80
10	43	135	e140	e95	e130	e160	113	482	931	5900	254	73
11	37	178	e140	e100	e140	e140	110	458	825	5560	256	76
12	56	210	e140	e120	e130	e120	115	399	704	5140	239	76
13	99	212	e140	e140	e120	e130	116	334	660	4410	252	84
14	65	199	e140	e140	e110	e140	115	313	642	3330	249	90
15	43	191	e130	e130	e120	e150	115	491	657	2320	246	95
16	36	192	e120	e120	e130	e160	112	532	759	1540	238	116
17	56	194	e110	e130	e130	e200	122	492	786	1070	208	185
18	90	192	e100	e140	e140	e250	107	437	753	830	220	253
19	116	183	e95	e130	e150	e300	95	414	727	829	238	321
20	134	184	e90	e120	e150	e350	89	397	698	903	259	381
21	208	178	e85	e130	e150	e400	95	380	628	778	251	372
22	236	192	e80	e130	e140	e450	98	372	570	639	211	321
23	192	174	e80	e120	e150	e450	95	378	554	528	172	271
24	198	e150	e85	e110	e140	e500	76	311	581	462	168	220
25	271	e130	e85	e110	e130	e550	68	257	760	418	173	241
26	356	e140	e85	e120	e130	559	77	238	797	351	181	374
27	334	e150	e85	e110	e140	495	104	232	729	286	160	334
28	188	e160	e90	e100	e140	395	124	273	820	239	128	244
29	87	e170	e90	e95	---	280	122	263	1380	200	119	215
30	49	e160	e90	e90	---	192	204	218	2200	204	117	201
31	35	---	e90	e95	---	122	---	216	---	217	109	---
TOTAL	3580	5329	3640	3395	3870	7623	3304	11605	21330	82574	5982	5264
MEAN	115	178	117	110	138	246	110	374	711	2664	193	175
MAX	356	281	160	140	160	559	204	532	2200	6150	259	381
MIN	35	61	80	85	110	100	65	216	218	200	109	64
AC-FT	7100	10570	7220	6730	7680	15120	6550	23020	42310	163800	11870	10440

CAL YR 1990 TOTAL 95562 MEAN 262 MAX 1700 MIN 35 AC-FT 189500
WTR YR 1991 TOTAL 157496 MEAN 431 MAX 6150 MIN 35 AC-FT 312400

e Estimated

MILK RIVER BASIN

06174500 MILK RIVER AT NASHUA, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950-53, 1959 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: January 1974 to September 1981.
WATER TEMPERATURE: January 1974 to September 1979.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1974-81): Maximum daily, 2,540 microsiemens, Dec. 12, 1977; minimum daily, 246 microsiemens, Apr. 14, 1974.
WATER TEMPERATURE (water years 1974-79): Maximum, 27.0°C, July 20, 21, 1974; minimum, 0.0°C on many days during winter.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT												
10...	1030	44	0	0	--	11.0	9.5	705	6.1	--	K5	K9
DEC												
05...	1045	146	100	--	--	0.5	0.0	713	10.9	--	K31	K5
JAN												
25...	1115	109	--	--	1050	-13.0	0.0	--	--	--	--	--
FEB												
21...	0830	146	75	1	--	2.0	0.0	714	14.1	--	K5	64
MAR												
26...	1040	574	--	--	635	-4.0	0.5	--	--	--	--	--
APR												
23...	0730	98	0	0	1000	10.0	12.0	715	8.6	85	K8	K2
JUN												
12...	1055	691	--	--	745	21.0	23.0	--	--	--	--	--
JUL												
25...	1130	415	0	0	776	25.0	24.0	714	7.5	96	140	190
SEP												
18...	1100	257	0	0	1100	10.0	11.5	724	10.3	100	210	72

DATE	TIME	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)
OCT												
10...	1030	322	0	255	8.4	10	300	67	32	150	4	5.6
DEC												
05...	1045	450	0	354	8.0	4.5	420	92	46	210	4	6.2
FEB												
21...	0830	410	0	329	7.6	3.0	410	92	44	210	5	5.5
APR												
23...	0730	281	0	223	8.4	16	260	58	27	140	4	5.8
JUL												
25...	1130	248	0	197	7.8	200	210	48	21	85	3	7.7
SEP												
18...	1100	326	0	259	8.1	3.8	300	67	31	130	3	7.0

06174500 MILK RIVER AT NASHUA, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUORIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
OCT												
10...	267	310	27	0.2	5.3	714	756	0.97	84.8	<0.01	<0.01	<0.10
DEC												
05...	350	510	28	0.3	7.5	1110	1120	1.51	438	0.01	0.01	<0.10
FEB												
21...	353	500	46	0.3	6.9	1090	1110	1.48	430	<0.01	<0.01	0.52
APR												
23...	221	340	28	0.4	2.0	698	739	0.95	185	0.02	<0.01	<0.05
JUL												
25...	201	190	10	0.3	8.9	489	494	0.67	548	0.02	<0.01	<0.05
SEP												
18...	276	310	24	0.4	6.6	686	737	0.93	476	0.01	<0.01	<0.05

DATE	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITROGEN, ORGANIC DIS-SOLVED (MG/L AS N) (00607)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOSPHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	SEDIMENT, SUS-PENDED (MG/L) (80154)	SEDIMENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT											
10...	<0.10	<0.01	<0.01	--	<0.01	<0.01	0.02	<0.01	45	5.3	92
DEC											
05...	<0.10	0.05	0.04	--	0.06	0.01	0.03	0.02	74	29	75
FEB											
21...	0.48	0.03	0.03	--	0.04	<0.01	<0.01	<0.01	122	48	72
APR											
23...	<0.05	0.02	--	--	0.09	0.02	0.01	<0.01	53	14	93
JUL											
25...	<0.05	0.03	0.02	0.78	0.19	0.03	0.03	0.01	445	499	99
SEP											
18...	<0.05	0.02	<0.01	--	0.10	0.03	0.04	0.02	46	32	90

DATE	TIME	ALUMINUM, DIS-SOLVED (UG/L AS AL) (01106)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BERYLLIUM, DIS-SOLVED (UG/L AS BE) (01010)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHROMIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)
OCT											
10...	1030	10	2	64	<0.5	<1	1	<3	2	7	<1
FEB											
21...	0830	30	<1	60	<0.5	1	<1	<3	2	8	<1
JUL											
25...	1130	30	4	71	<0.5	<1	<1	<3	5	28	<1
SEP											
18...	1100	<10	2	64	<0.5	<1	<1	<3	2	10	<1

DATE	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGANESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELENIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRONTIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANADIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
OCT										
10...	64	21	0.1	<10	2	<1	<1	620	<6	4
FEB										
21...	87	180	<0.1	<10	3	<1	<1	850	<6	3
JUL										
25...	60	1	<0.1	<10	5	<1	<1	430	<6	4
SEP										
18...	69	8	<0.1	<10	4	<1	<1	590	<6	9

MILK RIVER BASIN

06175000 PORCUPINE CREEK AT NASHUA, MT

LOCATION.--Lat 48°08'09", long 106°20'52", in SW1/4NE1/4SE1/4 sec.31, T.28 N., R.42 E., Valley County, Hydrologic Unit 10050016, on right bank, 30 ft downstream from U.S. Highway 2 bridge, 0.1 mi downstream from Fort Peck Indian Reservation boundary, 0.3 mi east of Nashua, and at river mile 3.9.

DRAINAGE AREA.--725 mi^2.

PERIOD OF RECORD.--July 1908 to September 1924 (no winter records 1912-13, 15-16, 22-24), October 1981 to current year. Flows are equivalent if overflow channel just upstream from the present location is gaged.

GAGE.--Water-stage recorder. Elevation of gage is 2,060 ft above National Geodetic Vertical Datum of 1929, from topographic map. July 12, 1908, to Sept. 30, 1924, nonrecording gage 0.5 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Nov. 29 to Mar. 28. Water-discharge records poor. Diversions for irrigation of about 430 acres upstream from station.

AVERAGE DISCHARGE.--18 years (1909-11, 1913-14, 1916-21, 1982-91), 20.0 ft^3/s, 14,490 acre-ft/yr; median of yearly mean discharges, 12.3 ft^3/s, 8,910 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,600 ft^3/s, Apr. 13, 1982, gage height, 15.95 ft; maximum gage height, 18.0 ft, Apr. 11, 1916, from floodmark, at previous site and datum; no flow each year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 24, 1939, computed as 35,000 ft^3/s by U.S. Indian Service (now U.S. Bureau of Indian Affairs), caused by failure of Middle Fork dam.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 419 ft^3/s, June 29; gage height, 6.04 ft; no flow most days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	e.00	e.00	e.00	e.00	.63	19	.11	160	.11	.00
2	.00	.00	e.00	e.00	e.00	e.00	1.3	19	.00	117	.00	.00
3	.00	.00	e.00	e.00	e.00	e.00	7.0	22	.00	84	.00	.00
4	.00	.00	e.00	e.00	e.00	e.00	8.6	22	.00	54	.00	.00
5	.00	.00	e.00	e.00	e.00	e.00	8.2	18	.20	166	.00	.00
6	.00	.00	e.00	e.00	e.00	e.00	6.4	16	27	87	.00	.00
7	.00	.00	e.00	e.00	e.00	e.00	4.1	16	80	116	.00	.00
8	.00	.00	e.00	e.00	e.00	e.00	3.9	15	81	146	.00	.00
9	.00	.00	e.00	e.00	e.00	e.00	3.0	15	67	97	.00	.00
10	.00	.00	e.00	e.00	e.00	e.00	.93	13	54	48	.00	.00
11	.00	.00	e.00	e.00	e.00	e.00	.00	11	37	32	.00	.00
12	.00	.00	e.00	e.00	e.00	e.00	.00	11	26	25	.00	.00
13	.00	.00	e.00	e.00	e.00	e.00	.00	13	19	20	.00	.00
14	.00	.00	e.00	e.00	e.00	e.00	.00	11	16	18	.00	.00
15	.00	.00	e.00	e.00	e.00	e.00	.00	10	14	16	.00	.00
16	.00	.00	e.00	e.00	e.00	e.00	.00	8.0	11	14	.00	.00
17	.00	.00	e.00	e.00	e.00	e.00	.00	6.4	9.0	13	.00	.00
18	.00	.00	e.00	e.00	e.00	e.00	.00	4.2	6.6	11	.00	.00
19	.00	.00	e.00	e.00	e.00	e.00	.00	1.7	6.2	10	.00	.00
20	.00	.00	e.00	e.00	e.00	e.00	.00	.20	5.1	8.4	.00	.00
21	.00	.00	e.00	e.00	e.00	e.00	.00	.00	5.7	6.4	.00	.00
22	.00	.00	e.00	e.00	e.00	e.50	.00	.30	8.8	4.4	.00	.00
23	.00	.00	e.00	e.00	e.00	e1.0	.00	1.2	12	3.1	.00	.00
24	.00	.00	e.00	e.00	e.00	e5.0	.00	2.6	15	2.8	.00	.00
25	.00	.00	e.00	e.00	e.00	e20	.00	2.2	18	2.4	.00	.00
26	.00	.00	e.00	e.00	e.00	e15	.00	1.3	20	2.0	.00	.00
27	.00	.00	e.00	e.00	e.00	e12	.00	1.2	22	1.7	.00	.00
28	.00	.00	e.00	e.00	e.00	e8.0	.21	1.4	27	1.2	.00	.00
29	.00	e.00	e.00	e.00	---	4.2	24	1.3	140	1.2	.00	.00
30	.00	e.00	e.00	e.00	---	2.4	22	.95	131	1.2	.00	.00
31	.00	---	e.00	e.00	---	2.1	---	.54	---	.53	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	70.20	90.27	264.49	858.71	1269.33	0.11	0.00
MEAN	.000	.000	.000	.000	.000	2.26	3.01	8.53	28.6	40.9	.004	.000
MAX	.00	.00	.00	.00	.00	20	24	22	140	166	.11	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.53	.00	.00
AC-FT	.00	.00	.00	.00	.00	139	179	525	1700	2520	.2	.00

CAL YR 1990 TOTAL 29.88 MEAN .082 MAX 10 MIN .00 AC-FT 59
WTR YR 1991 TOTAL 2553.11 MEAN 6.99 MAX 166 MIN .00 AC-FT 5060

e Estimated

WOLF CREEK BASIN

06176500 WOLF CREEK NEAR WOLF POINT, MT

LOCATION.--Lat 48°05'47", long 105°40'41", in NE1/4SE1/4NW1/4 sec.17, T.27 N., R.47 E., Roosevelt County, Hydrologic Unit 10060001, on right bank 0.5 mi north of U.S. Highway 2, 1.5 mi west of Wolf Point, and at river mile 2.3.

DRAINAGE AREA.--251 mi^2.

PERIOD OF RECORD.--August 1908 to July 1914 (no winter records 1909, 1913-14), March 1950 to September 1953, water years 1954, 1956-1973 (annual maximums), October 1981 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,000 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to July 31, 1914, nonrecording gage at site 0.8 mi upstream at different datum. Aug. 1, 1914, to Sept. 30, 1953, water-stage recorder at same site and datum. May 1955 to September 1973, crest-stage gage at same site and datum.

REMARKS.--Estimated daily discharges: Oct. 20 to Nov. 28 and Feb. 18 to Apr. 2. Records poor. Minor diversion for irrigation upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--16 years (1910-12, 1951-53, 1982-91), 7.28 ft^3/s, 5,270 acre-ft/yr; median of yearly mean discharge, 5.19 ft^3/s, 3,760 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,780 ft^3/s, Apr. 4 or 5, 1954, gage height, 12.9 ft, on basis of contracted-opening measurement of peak flow; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of 1938 reached a stage of about 12 ft, at previous site and datum, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,830 ft^3/s, June 30, gage height, 8.62 ft; no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	e.00	.00	.00	.00	e.00	e.00	3.1	.09	233	.03	.00
2	.00	e.00	.00	.00	.00	e.00	e.00	2.4	.07	80	.03	.00
3	.00	e.00	.00	.00	.00	e.00	.00	2.5	.04	48	.03	.00
4	.00	e.00	.00	.00	.00	e.00	.00	3.3	.02	31	.02	.00
5	.00	e.00	.00	.00	.00	e.00	.00	2.8	.04	24	.02	.00
6	.00	e.00	.00	.00	.00	e.00	.00	2.5	2.1	49	.01	.00
7	.00	e.00	.00	.00	.00	e.00	.00	2.0	1.3	54	.01	.00
8	.00	e.00	.00	.00	.00	e.00	.00	2.1	5.0	34	.01	.00
9	.00	e.00	.00	.00	.00	e.00	.00	1.8	3.0	23	.00	.00
10	.00	e.00	.00	.00	.00	e.00	.00	1.5	2.0	17	.00	.00
11	.00	e.00	.00	.00	.00	e.00	.00	1.2	1.3	14	.00	.00
12	.00	e.00	.00	.00	.00	e.00	.00	2.4	.78	11	.00	.00
13	.00	e.00	.00	.00	.00	e.00	.00	12	.70	8.9	.00	.00
14	.00	e.00	.00	.00	.00	e.00	.00	12	.90	7.0	.00	.00
15	.00	e.00	.00	.00	.00	e.00	.00	6.5	1.7	5.7	.01	.00
16	.00	e.00	.00	.00	.00	e.00	.00	4.3	1.4	4.6	.01	.00
17	.00	e.00	.00	.00	.00	e.00	.00	3.6	.92	4.0	.00	.00
18	.00	e.00	.00	.00	e.00	e.00	.00	2.7	.54	3.2	.00	.00
19	.00	e.00	.00	.00	e.00	e.00	.00	2.3	.30	3.3	.00	.00
20	e.00	e.00	.00	.00	e.00	e.00	.00	2.1	.27	3.1	.00	.00
21	e.00	e.00	.00	.00	e.00	e.00	.00	2.0	.27	2.2	.00	.00
22	e.00	e.00	.00	.00	e.00	e.00	.00	1.5	.39	1.5	.00	.00
23	e.00	e.00	.00	.00	e.00	e.00	.00	.90	1.0	1.1	.00	.00
24	e.00	e.00	.00	.00	e.00	e.00	.00	.93	1.4	.81	.00	.00
25	e.00	e.00	.00	.00	e.00	e.00	.00	1.0	1.9	.59	.00	.00
26	e.00	e.00	.00	.00	e.00	e.00	.00	1.2	3.0	.45	.00	.00
27	e.00	e.00	.00	.00	e.00	e.00	.00	1.6	2.4	.32	.00	.00
28	e.00	e.00	.00	.00	e.00	e.00	.00	.59	3.7	.22	.00	.00
29	e.00	.00	.00	.00	---	e.00	.16	.26	5.6	.13	.00	.00
30	e.00	.00	.00	.00	---	e.00	2.9	.16	624	.07	.00	.00
31	e.00	---	.00	.00	---	e.00	---	.12	---	.04	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	3.06	83.36	666.13	665.23	0.18	0.00
MEAN	.000	.000	.000	.000	.000	.000	.10	2.69	22.2	21.5	.006	.000
MAX	.00	.00	.00	.00	.00	.00	2.9	12	624	233	.03	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.12	.02	.04	.00	.00
AC-FT	.00	.00	.00	.00	.00	.00	6.1	165	1320	1320	.4	.00

CAL YR 1990 TOTAL 6.50 MEAN .018 MAX .40 MIN .00 AC-FT 13
WTR YR 1991 TOTAL 1417.96 MEAN 3.88 MAX 624 MIN .00 AC-FT 2810

e Estimated

MISSOURI RIVER MAIN STEM

06177000 MISSOURI RIVER NEAR WOLF POINT, MT

LOCATION.--Lat 48°04'00", long 105°31'55", in SW1/4NW1/4 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^2.

PERIOD OF RECORD.--September 1928 to current year.

REVISED RECORDS.--WSP 1146: 1931. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,958.57 ft above National Geodetic Vertical Datum of 1929. Prior to Apr. 13, 1930, nonrecording gages at Wolf Point ferry landing 5.5 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Dec. 2 to Mar. 5. 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.

AVERAGE DISCHARGE.--11 years (1928-39, prior to Fort Peck Lake reaching operational level), 7,219 ft^3/s, 5,230,000 acre-ft/yr; 48 years (1943-91, after operational level was reached), 10,400 ft^3/s, 7,535,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 66,800 ft^3/s, Mar. 25, 1939, gage height, 14.4 ft, ice present, from rating curve extended above 39,000 ft^3/s; maximum gage height, 15.64 ft, Mar. 27, 1960, backwater from ice; minimum daily discharge, 320 ft^3/s, Dec. 10, 1941.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 14, 1908, reached a stage of about 20 ft, present site and datum.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 11,900 ft^3/s, July 1, gage height, 3.94 ft; maximum gage height, 7.39 ft, Mar. 3, backwater from ice; minimum discharge, 3,060 ft^3/s, Apr. 18, gage height, 0.42 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8050	8210	4980	e8100	e8000	e8000	8310	7990	7930	11600	7820	7830
2	8090	8170	e6000	e8100	e8000	e8200	8230	8000	7920	11500	7720	7870
3	8070	8110	e8200	e8100	e8000	e8500	8210	8090	7920	11200	7600	7860
4	8020	8280	e8200	e8100	e8000	e8500	8130	8230	8010	11000	7500	7770
5	8070	8400	e8300	e8300	e8100	e8600	8070	8390	8070	10900	7530	7920
6	8070	6800	e8300	e8300	e8100	8660	8110	8370	8310	10500	7540	6350
7	8010	5230	e8200	e8300	e8100	8550	8130	8330	8210	9960	7600	4770
8	8060	5060	e8200	e8300	e8100	8560	6200	8340	8610	9680	7650	4560
9	8070	4960	e8200	e8300	e8100	8450	3920	8450	9020	9970	7790	4530
10	8070	5040	e8200	e8300	e8100	8460	3510	8540	8810	10900	7810	4410
11	8050	7270	e7800	e8300	e8100	8480	3360	8500	8720	11100	7810	4530
12	8040	8290	e7800	e8400	e8100	8440	3320	8540	8640	10300	7800	6960
13	8050	8410	e7800	e8300	e8100	8410	3310	8680	8600	9240	7890	8000
14	8040	8460	e7500	e8200	e8000	8370	3270	8490	8590	8550	7840	8060
15	8070	8440	e7100	e8000	e8000	8420	3190	8210	8710	8220	7810	8070
16	8150	8380	e7700	e8000	e8000	8450	3140	8240	8550	7560	7840	7820
17	8190	8220	e7500	e8000	e8000	8450	3100	8380	8550	7910	7820	7760
18	8170	8360	e7300	e8000	e8000	8480	3750	8310	8710	8520	7800	7690
19	8200	8320	e7300	e8000	e8000	8480	7230	8370	8750	8950	7790	7810
20	8190	8340	e7400	e8000	e8000	8440	7850	8400	8880	8730	7710	7920
21	8180	8360	e7400	e8000	e8000	8600	7880	8200	9010	8850	7660	7940
22	8260	8300	e7300	e8000	e8000	8640	7870	8150	8900	8880	7820	7910
23	8320	8300	e7400	e8000	e8000	8640	7870	8170	9120	8620	7780	8100
24	8330	8320	e7400	e8000	e8000	8680	7890	8320	8890	8440	7680	8150
25	8300	8300	e7400	e8000	e8000	8700	7880	8420	8920	8260	7680	8130
26	8380	8330	e7500	e8000	e7900	8700	7990	8380	9190	8150	7680	7960
27	8450	6980	e7600	e8000	e7900	8860	8160	8120	9050	8210	7710	8310
28	8460	5790	e7600	e7900	e7900	8670	8440	8090	8990	8200	7960	8330
29	8480	5840	e7600	e7800	---	8600	8320	7970	9600	8150	7860	8230
30	8330	5070	e7800	e7900	---	8540	8050	7980	10400	8130	7740	8140
31	8230	---	e8000	e8000	---	8400	---	7910	---	8040	7860	---
TOTAL	253450	224340	234980	251000	224600	263930	192690	256560	261580	288220	240100	219690
MEAN	8176	7478	7580	8097	8021	8514	6423	8276	8719	9297	7745	7323
MAX	8480	8460	8300	8400	8100	8860	8440	8680	10400	11600	7960	8330
MIN	8010	4960	4980	7800	7900	8000	3100	7910	7920	7560	7500	4410
AC-FT	502700	445000	466100	497900	445500	523500	382200	508900	518800	571700	476200	435800

CAL YR 1990 TOTAL 3060330 MEAN 8384 MAX 13500 MIN 4960 AC-FT 6070000
WTR YR 1991 TOTAL 2911140 MEAN 7976 MAX 11600 MIN 3100 AC-FT 5774000

e Estimated

REDWATER RIVER BASIN

06177500 REDWATER RIVER AT CIRCLE, MT

LOCATION.--Lat 47°24'51", long 105°34'30", in SW1/4SW1/4 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^2.

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. Datum of gage is 2,394.32 ft National Geodetic Vertical Datum of 1929 (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 datum. June 1, 1941, to Mar. 22, 1943, nonrecording gage at site 200 ft upstream at datum 2.8 ft lower. Feb. 26, 1948, to May 7, 1950, nonrecording gage at site 200 ft upstream at present datum.

REMARKS.--Estimated daily discharges: Nov. 27 to Mar. 12. 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.

AVERAGE DISCHARGE.--53 years (1931-32, 1935-36, 1937-71, 1975-91), 12.5 ft^3/s, 9,160 acre-ft/yr; median of yearly mean discharges, 7.90 ft^3/s, 5,720 acre-ft per year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,960 ft^3/s, June 29, 1986, gage height, 12.85 ft, from floodmarks, rating curve extended above 3,500 ft^3/s; no flow at time most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 80 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 25	2030	185	7.18	July 1	2130	*251	*7.75

No flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.03	e.04	e.00	e.00	e.02	.23	1.7	.58	175	.24	.05
2	.00	.03	e.03	e.00	e.02	e.03	.15	1.4	.52	136	.28	.05
3	.00	.03	e.02	e.00	e.02	e.05	.15	1.2	.62	55	.26	.05
4	.00	.03	e.02	e.00	e.02	e.10	.17	1.8	.81	30	.22	.05
5	.00	.03	e.02	e.00	e.04	e.08	.15	1.5	.83	23	.24	.06
6	.00	.03	e.02	e.00	e.04	e.10	.13	1.4	.83	18	.21	.06
7	.00	.03	e.02	e.00	e.06	e.10	.14	1.3	.78	15	.17	.06
8	.00	.04	e.02	e.00	e.06	e.15	.20	1.5	.71	13	.19	.17
9	.00	.04	e.02	e.00	e.04	e.15	.19	1.0	.60	11	.35	.11
10	.00	.04	e.02	e.00	e.04	e.15	.16	.89	.48	9.5	.20	.11
11	.00	.04	e.02	e.00	e.04	e.18	.21	.74	.35	8.0	.13	.16
12	.00	.04	e.02	e.00	e.04	e.20	.35	1.5	.26	6.8	.11	.14
13	.00	.04	e.02	e.00	e.04	.20	.59	1.2	.22	5.7	.10	.13
14	.00	.04	e.02	e.00	e.04	.19	.71	.96	.21	4.5	.12	.12
15	.00	.04	e.02	e.00	e.02	.16	.69	.91	.17	3.8	.13	.24
16	.00	.04	e.02	e.00	e.03	.14	.63	.95	.19	3.4	.16	.22
17	.00	.04	e.02	e.00	e.03	.13	.64	.79	.19	2.6	.14	.17
18	.01	.04	e.02	e.00	e.03	.15	.76	.66	.15	2.1	.12	.13
19	.02	.04	e.02	e.00	e.03	.14	.74	.61	.16	1.7	.10	.14
20	.02	.05	e.02	e.00	e.04	.17	.72	.67	.44	1.5	.08	.13
21	.03	.05	e.01	e.00	e.03	.19	.63	.62	.53	1.3	.06	.17
22	.03	.05	e.00	e.00	e.03	.14	.56	.50	.65	1.0	.06	.20
23	.03	.05	e.00	e.00	e.03	.15	.49	.85	.71	.85	.06	.19
24	.03	.05	e.00	e.00	e.02	.20	.53	.84	8.2	.79	.05	.17
25	.03	.05	e.00	e.00	e.02	.22	.39	.87	77	.69	.06	.16
26	.03	.05	e.00	e.00	e.02	.30	.68	1.3	155	.57	.06	.15
27	.03	e.04	e.00	e.00	e.02	.32	1.2	1.3	85	.54	.08	.15
28	.03	e.04	e.00	e.00	e.02	.33	1.9	1.2	45	.48	.06	.15
29	.03	e.05	e.00	e.00	---	.47	2.1	.95	30	.38	.06	.16
30	.03	e.05	e.00	e.00	---	.39	1.9	.90	83	.31	.05	.15
31	.04	---	e.00	e.00	---	.33	---	.75	---	.26	.05	---
TOTAL	0.39	1.22	0.44	0.00	0.87	5.63	18.09	32.76	494.19	532.77	4.20	4.00
MEAN	.013	.041	.014	.000	.031	.18	.60	1.06	16.5	17.2	.14	.13
MAX	.04	.05	.04	.00	.06	.47	2.1	1.8	155	175	.35	.24
MIN	.00	.03	.00	.00	.00	.02	.13	.50	.15	.26	.05	.05
AC-FT	.8	2.4	.9	.00	1.7	11	36	65	980	1060	8.3	7.9

CAL YR 1990 TOTAL 339.65 MEAN .93 MAX 10 MIN .00 AC-FT 674
WTR YR 1991 TOTAL 1094.56 MEAN 3.00 MAX 175 MIN .00 AC-FT 2170

e Estimated

POPLAR RIVER BASIN

06178000 POPLAR RIVER AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 48°59'25", long 10°41'46", in NE1/4NE1/4SE1/4 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^2.

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 above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Mar. 1-29, Oct. 26-31. Water-discharge records good except those for March and those below 1.0 ft^3/s, which are poor. 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^3/s, Apr. 6, 1954, gage height, 10.25 ft, from flood-mark, from rating curve extended above 2,500 ft^3/s on basis of slope-area measurement of peak flow; no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 68 ft^3/s, July 2, gage height, 3.10 ft, but may have been higher during the estimated period; minimum daily, 0.04 ft^3/s, Sept. 14,15.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.10	21	16	2.4	25	.71	.10	.13		
2			e.15	20	12	2.2	54	1.2	.22	.14		
3			e.20	20	11	2.0	28	1.2	.22	.14		
4			e.30	18	11	1.8	26	1.0	.33	.17		
5			e.25	17	13	2.1	20	.96	.59	.19		
6			e.20	15	12	2.6	16	.95	.10	.74		
7			e.15	14	12	4.2	12	.86	.11	.88		
8			e.15	13	11	4.6	9.7	.73	.13	.97		
9			e.30	12	10	4.1	7.9	.75	.10	.97		
10			e.50	11	9.3	3.8	7.2	.62	.12	1.0		
11			e1.0	10	8.6	3.4	7.3	.50	.14	1.1		
12			e2.0	10	10	3.0	5.8	.30	.11	1.0		
13			e5.0	9.6	16	2.4	4.9	.20	.05	.93		
14			e10	9.5	17	2.1	4.2	.19	.04	.88		
15			e20	9.7	15	2.0	4.0	.21	.04	.97		
16			e30	9.4	12	1.6	3.3	.17	.07	1.1		
17			e40	9.0	9.8	1.3	2.7	.15	.07	1.3		
18			e50	9.1	7.8	.85	3.0	.16	.05	1.1		
19			e55	9.0	6.5	.74	2.7	.18	.05	1.2		
20			e45	8.8	5.8	.67	2.0	.17	.07	1.3		
21			e38	8.3	5.2	.56	1.8	.17	.25	1.4		
22			e30	7.9	4.7	.70	1.4	.17	.28	1.6		
23			e25	7.7	4.1	.99	1.0	.15	.40	1.6		
24			e20	7.3	3.7	1.8	.81	.17	.36	1.6		
25			e16	7.0	3.5	1.5	.66	.16	.25	1.6		
26			e12	8.7	3.6	1.9	.56	.15	.17	e1.6		
27			e7.0	14	3.3	3.4	.92	.12	.13	e1.4		
28			e9.0	26	3.1	5.7	.86	.11	.13	e1.2		
29			e12	29	2.9	12	.85	.09	.12	e1.1		
30			15	22	2.8	19	2.1	.09	.13	e1.0		
31			18	---	2.5	---	.87	.07	---	e1.0		
TOTAL			462.30	393.0	265.2	95.41	257.53	12.66	4.93	31.31		
MEAN			14.9	13.1	8.55	3.18	8.31	.41	.16	1.01		
MAX			55	29	17	19	54	1.2	.59	1.6		
MIN			.10	7.0	2.5	.56	.56	.07	.04	.13		
AC-FT			917	780	526	189	511	25	9.8	62		

e Estimated

PERIOD OF RECORD.--Water years 1964, 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
OCT										
16...	1230	0.05	99	3	1500	6.0	4.0	695	8.1	68
31...	1045	1.8	--	--	1280	9.5	5.0	--	--	--
DEC										
10...	1000	E1.5	90	3	1150	1.0	0.0	700	10.5	79
MAR										
01...	1110	0.08	--	3	1360	-10.0	0.0	--	--	--
11...	1005	1.0	--	--	1420	0.0	0.0	--	--	--
22...	1100	33	--	1	732	5.0	0.0	--	--	--
APR										
05...	1240	16	--	--	1000	21.0	10.0	--	--	--
16...	1230	9.1	100	2	1070	4.0	5.0	702	10.8	92
MAY										
30...	1300	3.1	--	1	1340	20.0	17.5	--	--	--
JUN										
17...	1520	1.5	70	3	1210	17.0	19.0	696	11.9	141
AUG										
06...	1200	0.94	99	3	1310	15.0	18.0	703	6.7	77

DATE	TIME	PH (STAND-ARD UNITS) (00400)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	TUR-BID-ITY (NTU) (00076)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)
OCT										
16...	1230	8.4	27	3.8	340	45	55	270	6	9.3
DEC										
10...	1000	7.9	12	1.0	310	55	43	160	4	7.3
APR										
16...	1230	8.5	30	2.7	290	49	41	140	4	7.2
JUN										
17...	1520	8.4	45	1.5	250	24	46	200	6	7.7
AUG										
06...	1200	8.2	45	1.8	240	27	42	220	6	9.9

DATE	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
OCT										
16...	593	300	12	0.3	5.7	1050	1.43	0.14	<0.01	<0.10
DEC										
10...	487	190	11	0.2	13	773	1.05	E3.13	0.01	<0.10
APR										
16...	464	150	7.9	0.3	5.9	680	0.93	16.7	<0.01	<0.05
JUN										
17...	513	170	9.4	0.5	0.50	767	1.04	3.11	<0.01	<0.05
AUG										
06...	531	190	11	0.6	1.9	822	1.12	2.09	<0.01	<0.05

POPLAR RIVER BASIN

06178000 POPLAR RIVER AT INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
16...	0.02	0.98	0.04	<0.01	--	1700	7	70	0.01	96
DEC										
10...	0.05	0.25	0.02	0.02	--	1100	29	36	E0.15	89
APR										
16...	<0.01	--	0.03	<0.01	8.3	800	33	--	--	--
JUN										
17...	0.01	0.69	0.03	<0.01	--	1300	22	63	0.26	95
AUG										
06...	0.02	0.78	0.06	0.03	11	1500	42	38	0.10	96

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)
APR									
16...	1230	10	1	1	<10	<0.5	<1	<1	<1
AUG									
06...	1200	<10	--	2	--	<0.5	--	<1	--

DATE	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)
APR								
16...	<1	6	1	280	3	<1	20	9
AUG								
06...	<1	--	2	--	--	<1	--	24

DATE	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	MERCURY DISSOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
APR								
16...	<0.10	<0.1	1	1	<1	<1	<10	7
AUG								
06...	--	<0.1	--	2	--	<1	--	4

POPLAR RIVER BASIN

06178500 EAST POPLAR RIVER AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 48°59'58", long 105°24'32", in SW1/4SW1/4 sec.3, T.1, R.26 W., second meridian, in Saskatchewan, Hydrologic Unit 10060003, on left bank 10 ft north of international boundary, 400 ft southwest of Canadian East Poplar Port of Entry, 14 mi north of Scobey, MT, and at river mile 21.9.

DRAINAGE AREA.--541 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1931 to current year (seasonal records only in most seasons prior to October 1974). Prior to March 1962, published as East Fork Poplar River at international boundary.

REVISED RECORDS.--WSP 1389: 1932, 1939, 1942-43, 1947. W 1983: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 2,410.92 ft National Geodetic Vertical Datum of 1929 (International Boundary Survey datum). Prior to Oct. 5, 1953, water-stage recorder at site 80 ft upstream at same datum.

REMARKS.--Estimated daily discharges: Oct. 9, 10, Nov. 23, 24, Jan. 9, 10, 26-30, Mar. 1-3, Aug. 10, 11, 13-15, 18-24, Sept. 7-14, 17. Water-discharge records good. Since September 1975 flow regulated by Morrison Dam at Cookson Reservoir 3.1 mile upstream.

AVERAGE DISCHARGE.--15 years (1977-91), 7.37 ft^3/s, 5,340 acre-ft/yr; median of yearly mean discharges, 3.6 ft^3/s, 2,600 acre-ft/yr.

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 discharge, 4,020 ft^3/s, Apr. 23, 1975, gage height, 12.01 ft; maximum gage height, 12.8 ft, Mar. 25, 1943, from floodmark, backwater from ice; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 74 ft^3/s, June 30, gage height, 6.40 ft; minimum daily, 0.88 ft^3/s, Dec. 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.6	1.9	1.9	.93	1.6	e1.6	2.4	4.2	3.6	9.4	1.6	1.6
2	1.7	1.9	1.8	1.0	1.7	e1.5	2.4	6.1	2.7	5.2	2.0	1.7
3	1.8	1.8	1.9	1.2	2.0	e1.7	2.4	6.7	2.2	3.9	1.9	1.5
4	1.8	1.8	1.9	1.1	2.1	2.0	2.4	5.0	2.0	3.2	1.8	1.7
5	1.9	1.8	1.8	1.2	2.2	1.9	2.2	4.3	2.9	2.7	1.9	1.6
6	1.8	1.8	1.8	1.1	2.1	1.8	2.2	3.9	2.9	2.1	1.9	1.5
7	1.8	1.8	1.8	1.1	2.1	1.7	2.1	6.8	3.0	1.9	2.1	e1.4
8	1.9	1.8	1.8	1.1	2.1	1.8	2.0	8.3	2.8	2.0	1.8	e1.5
9	e1.9	1.8	1.7	e1.1	2.0	2.0	1.8	8.2	2.6	2.0	1.6	e1.6
10	e1.9	1.8	1.7	e1.2	1.9	2.1	1.9	7.7	2.3	2.0	e1.6	e1.7
11	1.9	1.8	1.8	1.3	1.9	2.1	1.9	7.0	2.1	2.1	e1.7	e1.8
12	1.9	1.9	1.8	1.5	1.9	1.9	1.9	7.4	2.1	2.0	1.7	e1.8
13	2.0	1.9	1.8	1.6	2.0	2.1	1.8	7.8	1.9	1.8	e1.8	e1.8
14	1.9	1.9	1.8	1.7	1.9	2.2	1.9	6.7	1.9	2.1	e1.9	e1.8
15	1.8	1.9	1.7	1.8	1.7	2.3	2.0	6.1	2.0	3.5	e2.0	1.9
16	1.7	1.9	1.7	1.7	1.9	2.4	2.0	5.8	1.9	2.7	2.2	1.9
17	1.7	1.8	1.6	1.6	1.9	2.3	2.0	5.6	1.8	2.2	2.1	e1.9
18	1.8	1.8	1.6	1.7	2.0	2.5	1.9	5.6	1.7	2.2	e1.9	1.8
19	2.1	1.8	1.5	1.8	1.9	2.7	1.9	6.1	1.7	2.0	e1.8	1.7
20	2.0	1.8	1.3	1.9	2.0	2.7	1.9	6.2	1.7	1.9	e1.7	1.7
21	1.9	1.8	1.2	1.4	2.0	2.9	1.9	6.2	1.7	1.9	e1.7	1.9
22	1.9	1.8	1.1	1.7	1.9	2.8	1.6	6.1	1.7	1.8	e1.7	1.9
23	1.9	e1.8	1.2	1.7	1.8	2.6	1.7	6.1	1.9	1.5	e1.7	1.8
24	1.9	e1.8	1.4	1.6	1.8	2.3	1.8	6.0	2.1	1.6	e1.7	2.0
25	2.1	1.8	1.4	1.3	1.8	2.3	1.9	6.4	2.0	1.6	1.7	2.0
26	2.0	1.9	1.2	e1.4	1.8	2.2	2.4	6.3	1.9	1.5	1.6	1.8
27	1.6	1.8	1.2	e1.5	1.9	2.1	2.8	6.1	1.9	1.7	1.5	1.7
28	1.7	1.8	1.3	e1.3	1.8	2.0	3.8	6.4	2.1	1.7	1.6	1.8
29	1.7	1.8	1.1	e1.2	---	2.0	3.2	6.3	2.3	1.6	1.8	1.8
30	1.7	1.9	.98	e1.3	---	2.2	2.9	6.2	38	1.6	1.7	1.5
31	1.8	---	.88	1.4	---	2.4	---	4.9	---	1.5	1.5	---
TOTAL	57.1	54.9	47.66	43.43	53.7	67.1	65.0	192.5	101.4	74.9	55.2	52.1
MEAN	1.84	1.83	1.54	1.40	1.92	2.16	2.17	6.21	3.38	2.42	1.78	1.74
MAX	2.1	1.9	1.9	1.9	2.2	2.9	3.8	8.3	38	9.4	2.2	2.0
MIN	1.6	1.8	.88	.93	1.6	1.5	1.6	3.9	1.7	1.5	1.5	1.4
AC-FT	113	109	95	86	107	133	129	382	201	149	109	103

CAL YR 1990 TOTAL 820.48 MEAN 2.25 MAX 6.9 MIN .72 AC-FT 1630
WTR YR 1991 TOTAL 864.99 MEAN 2.37 MAX 38 MIN .88 AC-FT 1720

e Estimated

06178500 EAST POPLAR RIVER AT INTERNATIONAL BOUNDARY--Continued

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.

REMARKS.--Unpublished records of once-daily water temperature are available in files of District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily observed, 2,020 microsiemens, Dec. 23, 1990; minimum daily observed, 363 microsiemens, July 2, 1991.
WATER TEMPERATURE (water years 1975-83): Maxumum, 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: Maximum daily, 2,020 microsiemens, Dec. 23; minimum daily, 363 microsiemens, July 2.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
OCT										
17...	0900	1.8	85	1	--	-1.0	3.5	712	11.0	89
DEC										
10...	1130	1.8	90	3	--	1.0	1.0	700	7.2	--
FEB										
13...	1000	2.2	100	71	--	-6.0	0.5	698	5.0	--
APR										
05...	1005	2.4	--	--	1020	18.0	7.0	--	--	--
16...	1450	2.0	100	2	1440	7.5	6.0	706	12.3	107
MAY										
30...	1020	6.1	--	--	1770	21.5	16.5	--	--	--
JUN										
18...	1200	1.8	0	0	1470	19.0	16.0	705	6.7	74
AUG										
06...	0900	1.8	100	40	1420	13.0	19.0	704	6.6	78

DATE	TIME	PH (STAND-ARD UNITS) (00400)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	TUR-BID-ITY (NTU) (00076)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)
OCT											
17...	0900	8.2	13	3.0	360	67	47	200	5	7.7	534
DEC											
10...	1130	7.4	2	1.6	380	78	45	190	4	7.4	452
FEB											
13...	1000	7.4	4	2.1	380	76	45	190	4	9.2	548
APR											
16...	1450	8.4	25	4.5	360	68	46	210	5	7.8	532
JUN											
18...	1200	8.0	13	14	360	63	49	210	5	8.7	546
AUG											
06...	0900	8.0	14	5.5	310	46	48	220	5	7.9	489

DATE	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE TOTAL (MG/L AS N) (00620)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
OCT										
17...	220	9.9	0.1	13	887	1.21	4.31	0.08	0.02	0.10
DEC										
10...	290	8.5	0.3	16	908	1.24	4.41	0.09	0.01	0.10
FEB										
13...	280	10	0.4	13	954	1.30	5.67	--	<0.01	0.10
APR										
16...	250	8.4	0.3	9.3	921	1.25	4.97	--	<0.01	<0.05
JUN										
18...	280	8.9	0.4	17	967	1.31	4.70	0.03	0.02	0.05
AUG										
06...	260	11	0.3	3.9	892	1.21	4.34	--	<0.01	<0.05

POPLAR RIVER BASIN

06178500 EAST POPLAR RIVER AT INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
17...	0.28	0.42	0.02	0.01	--	1900	10	34	0.17	97
DEC										
10...	0.87	0.23	0.02	<0.01	--	1900	5	43	0.21	54
FEB										
13...	0.70	0.40	0.01	<0.01	--	1900	30	135	0.80	69
APR										
16...	0.06	0.64	0.03	<0.01	--	2000	14	51	0.28	95
JUN										
18...	0.44	1.1	0.08	<0.01	8.4	2100	10	--	--	--
AUG										
06...	0.06	0.54	0.04	<0.01	6.3	2000	7	65	0.32	88

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)
JUN									
18...	1200	10	8	7	<10	<0.5	<1	<1.0	<1
AUG									
06...	0900	<10	--	3	--	<0.5	--	<1.0	--

DATE	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)
JUN								
18...	<1	2	1	710	2	<1	90	36
AUG								
06...	<1	--	1	--	--	<1	--	25

DATE	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	MERCURY DISSOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
JUN								
18...	<0.10	<0.1	3	2	<1	<1	<10	3
AUG								
06...	--	<0.1	--	2	--	<1	--	<3

POPLAR RIVER BASIN

06178500 EAST POPLAR RIVER AT INTERNATIONAL BOUNDARY--Continued

COMPOSITE OF BIMONTHLY SAMPLES, WATER YEARS OCTOBER 1989 TO SEPTEMBER 1991

COMPOSITE PERIOD	URANIUM NATURAL DIS-SOLVED (UG/L AS U) (22703)
OCT. 1, 1989 TO SEP. 30, 1990	1.3
OCT. 1, 1990 TO SEP. 30, 1991	1.2

SPICIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1390	1420	1460	1690	1490	1370	1290	1510	1800	648	1440	1450
2	1400	1430	1480	1660	1470	1410	1140	1510	1790	363	1440	1440
3	1400	1410	1430	1670	1420	1450	1130	1550	1800	373	1420	1450
4	1400	1430	1370	1690	1380	1430	1140	1740	1750	689	1410	1440
5	1400	1490	1460	1550	1410	1370	1150	1760	1760	691	1400	1420
6	1410	1490	1490	1620	1460	1370	1160	1760	1630	916	1370	1430
7	1400	1490	1490	1600	1450	1370	1160	1730	1640	1040	1360	1430
8	1420	1550	1440	1610	1450	1390	1330	1700	1440	1130	1360	1420
9	1420	1540	1390	1610	1450	1400	1320	1800	1380	1270	1400	1410
10	1430	1570	1390	1610	1450	1390	1320	1780	1340	1270	1400	1420
11	1410	1590	1400	1550	1460	1330	1430	1790	1420	1270	1410	1410
12	1420	1560	1370	1540	1450	1310	1430	1760	1420	1450	1430	1400
13	1420	1570	1330	1540	1450	1310	1420	1750	1420	1450	1430	1390
14	1410	1510	1490	1540	1440	1340	1430	1770	1500	1450	1430	1390
15	1390	1500	1480	1460	1420	1340	1420	1780	1490	1460	1420	1410
16	1410	1510	1460	1460	1550	1240	1450	1780	1500	1460	1420	1410
17	1410	1480	1470	1470	1500	1240	1430	1780	1500	1460	1410	1380
18	1400	1480	1490	1460	1450	1250	1430	1790	1490	1450	1430	1380
19	1430	1490	1650	1470	1420	1170	1440	1780	1490	1450	1420	1380
20	1420	1480	1580	1470	1430	1170	1450	1780	1490	1430	1410	1380
21	1430	1460	1850	1510	1390	1170	1440	1770	1490	1440	1400	1360
22	1430	1540	1940	1540	1370	1130	1440	1760	1490	1360	1420	1410
23	1430	1540	2020	1490	1450	1130	1440	1750	1470	1430	1430	1360
24	1430	1560	1940	1490	1450	1150	1450	1750	1440	1430	1420	1360
25	1440	1550	1670	1490	1450	1150	1470	1740	1440	1430	1420	1400
26	1440	1540	1740	1510	1450	1150	1480	1740	1440	1430	1400	1400
27	1430	1690	1760	1510	1430	1310	1530	1740	1440	1430	1400	1400
28	1440	1690	1750	1510	1420	1310	1530	1750	1390	1450	1410	1400
29	1440	1690	1590	1500	---	1320	1540	1770	1390	1430	1420	1400
30	1450	1640	1760	1560	---	1410	1540	1770	651	1430	1430	1420
31	1450	---	1590	1560	---	1380	---	1770	---	1430	1420	---
MEAN	1420	1530	1570	1550	1440	1300	1380	1740	1490	1240	1410	1410

WATER YEAR 1991 MEAN 1460 MAX 2020 MIN 363

06179000 EAST FORK POPLAR RIVER NEAR SCOBEY, MT

LOCATION.--Lat 48°51'08", long 105°25'15", in NE1/4NW1/4 sec.27, T.36 N., R.48 E., Daniels County, Hydrologic Unit 10060003, at bridge on State Highway 13, 2.5 mi upstream from mouth, and 4 mi north of Scobey.

DRAINAGE AREA.--722 mi².

PERIOD OF RECORD.--Water years 1975 to current year.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: October 1975 to September 1979.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE (water years 1976-79): Maximum, 27.5°C July 15, 1978, July 19, 1979; minimum, 0.0°C on many days during winter.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
OCT										
16...	1430	E1.8	99	3	--	5.0	4.5	698	11.4	--
DEC										
10...	1300	E2.0	90	3	1650	1.0	0.0	700	9.1	68
FEB										
13...	1130	E2.4	100	71	--	-10.0	0.0	700	5.1	--
APR										
16...	1600	E2.0	100	2	1030	7.5	6.0	707	12.2	106
JUN										
18...	0730	E2.0	0	0	1690	10.0	16.0	705	7.0	77
AUG										
06...	0730	E2.0	100	40	1140	8.0	17.0	705	5.3	60

DATE	PH (STAND-ARD UNITS) (00400)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	TUR-BID-ITY (NTU) (00076)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
OCT										
16...	8.9	55	4.0	320	21	65	340	8	12	330
DEC										
10...	8.2	13	3.0	380	47	64	280	6	11	270
FEB										
13...	7.8	14	3.8	550	94	76	390	7	14	520
APR										
16...	8.5	28	2.4	220	35	33	170	5	6.1	190
JUN										
18...	8.6	33	2.8	320	24	62	300	7	18	350
AUG										
06...	8.5	33	5.0	210	21	39	190	6	10	200

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)
OCT										
16...	14	0.2	1.7	1210	1.64	E5.86	<0.01	<0.10	0.03	1.5
DEC										
10...	8.7	0.2	2.3	1100	1.49	E5.92	0.02	<0.10	0.03	0.57
FEB										
13...	19	0.3	23	1700	2.31	E11.0	0.01	<0.10	0.54	0.86
APR										
16...	7.5	0.2	3.1	704	0.96	E3.80	<0.01	<0.05	<0.01	--
JUN										
18...	12	0.4	2.0	1140	1.55	E6.17	<0.01	<0.05	0.02	1.4
AUG										
06...	10	0.2	1.0	737	1.00	E3.98	<0.01	<0.05	0.03	0.87

POPLAR RIVER BASIN

06179000 EAST FORK POPLAR RIVER NEAR SCOBEY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)
OCT										
16...	0.04	<0.01	--	--	--	--	2900	--	--	--
DEC										
10...	0.02	<0.01	--	--	--	--	2400	--	--	--
FEB										
13...	0.03	<0.01	--	--	--	--	3100	--	--	--
APR										
16...	0.03	<0.01	--	--	--	--	1100	--	--	--
JUN										
18...	0.04	<0.01	--	--	--	--	2400	--	--	--
AUG										
06...	0.03	0.02	11	<10	3	<0.5	1600	<1	<1	2

DATE	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
16...	61	--	--	--	--	--	--	22	E0.11	94
DEC										
10...	19	--	--	--	--	--	--	60	E0.32	76
FEB										
13...	60	--	--	--	--	--	--	113	E0.73	38
APR										
16...	44	--	--	--	--	--	--	52	E0.28	77
JUN										
18...	29	--	--	--	--	--	--	10	E0.05	81
AUG										
06...	28	<1	7	<0.1	3	<1	6	--	--	--

06179200 POPLAR RIVER ABOVE WEST FORK, NEAR BREDETTE, MT

LOCATION.--Lat 48°33'05", long 105°21'55", in NW1/4SW1/4SW1/4 sec.4, T.32 N., R.49 E., Roosevelt County, Hydrologic Unit 10060004, on county road bridge, 3.8 mi upstream from mouth, and 4.4 mi northwest of Bredette.

DRAINAGE AREA.--1,745 mi^2.

PERIOD OF RECORD.--Water years 1976-81, 1985 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)
FEB												
21...	1130	E1.0	99	2	2000	3.0	0.0	8.1	350	43	59	380
APR												
24...	1030	15	0	0	1300	19.0	10.0	8.5	240	34	38	230
JUL												
25...	1015	9.0	0	0	--	24.0	21.0	8.5	240	28	42	250
SEP												
23...	1100	4.2	100	62	1760	8.0	9.0	9.0	240	19	46	310

DATE	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
FEB												
21...	9	12	748	450	32	0.6	11	1440	1.96	E3.88	--	<0.01
APR												
24...	6	7.4	509	250	17	0.4	4.8	888	1.21	36.0	0.00	0.07
JUL												
25...	7	10	567	270	16	0.5	13	971	1.32	23.6	--	<0.01
SEP												
23...	9	8.5	567	370	24	0.6	2.2	1120	1.53	12.7	--	<0.01

DATE	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)
FEB												
21...	<0.10	0.02	<0.01	--	1800	--	--	60	--	--	--	--
APR												
24...	0.07	0.02	<0.01	2	1200	<1.0	<1	9	<1	7	<0.1	<1
JUL												
25...	<0.05	<0.01	<0.01	--	1500	--	--	22	--	--	--	--
SEP												
23...	<0.05	0.01	<0.01	--	1700	--	--	17	--	--	--	--

POPLAR RIVER BASIN

06180400 WEST FORK POPLAR RIVER NEAR BREDETTE, MT

LOCATION.--Lat 48°33'01", long 105°25'42", in SW1/4SW1/4 sec.1, T.32 N., R.48 E., Roosevelt County, Hydrologic Unit 10060004, at bridge on State Highway 13, 5.9 mi upstream from mouth, and 6.6 mi northwest of Bredette.

DRAINAGE AREA.--1,010 mi^2.

PERIOD OF RECORD.--Water years 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)
FEB												
21...	1230	E1.0	95	2	1360	3.0	0.0	8.1	98	18	13	260
APR												
24...	0945	17	0	0	1050	18.0	10.0	8.5	120	22	15	220
JUL												
25...	0930	10	0	0	1140	23.0	21.0	8.6	110	18	16	230
SEP												
23...	1000	6.0	100	62	1310	8.0	9.0	8.7	89	14	13	280

DATE	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
FEB												
21...	11	3.8	527	160	12	0.3	11	795	1.08	E2.15	--	<0.01
APR												
24...	9	3.9	481	140	8.5	0.5	6.8	706	0.96	32.4	0.027	0.07
JUL												
25...	10	5.2	528	120	10	0.5	8.1	725	0.99	19.6	--	<0.01
SEP												
23...	13	3.6	557	160	13	0.5	4.9	824	1.12	13.3	--	<0.01

DATE	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)
FEB												
21...	<0.10	0.01	<0.01	--	510	--	--	230	--	--	--	--
APR												
24...	0.10	0.01	<0.01	2	500	<1.0	2	28	<1	8	<0.1	<1
JUL												
25...	<0.05	<0.01	<0.01	--	670	--	--	19	--	--	--	--
SEP												
23...	<0.05	0.02	<0.01	--	690	--	--	78	--	--	--	--

06180600 POPLAR RIVER ABOVE SLIMS COULEE, NEAR POPLAR, MT

LOCATION.--Lat 48°16'08", long 105°05'11", in NW1/4NE1/4NE1/4 sec.16, T.29 N., R.51 E., Roosevelt County, Hydrologic Unit 10060003, 0.4 mi west of Route 251, 1.5 mi above Slims Coulee, 11.5 mi north of U.S. Highway 2, and 12 mi north of Poplar.

PERIOD OF RECORD.--February to September 1991.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	PH LAB (STANDARD UNITS) (00403)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)
FEB												
21...	1000	2.0	100	73	1380	2.0	0.0	8.1	160	23	24	270
APR												
03...	0925	86	--	--	922	14.0	11.0	--	--	--	--	--
24...	1330	36	0	0	1180	18.0	16.0	8.6	160	24	24	240
JUL												
23...	1040	49	--	--	1260	--	20.0	--	--	--	--	--
24...	1230	38	0	0	1280	24.0	22.0	8.6	160	22	26	230
SEP												
12...	0845	7.9	--	--	--	--	--	--	--	--	--	--
23...	1000	13	100	62	1430	8.5	9.5	8.7	150	18	25	280

DATE	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)
FEB												
21...	9	6.0	558	230	14	0.4	9.3	912	1.24	4.93	<0.01	<0.10
APR												
03...	--	--	--	--	9.6	--	--	--	--	--	--	--
24...	8	5.7	495	220	8.8	0.4	6.3	827	1.12	80.4	0.02	<0.05
JUL												
23...	--	--	--	--	9.5	--	--	--	--	--	--	--
24...	8	7.9	521	180	10	0.4	12	802	1.09	82.3	<0.01	<0.05
SEP												
12...	--	--	--	--	17	--	--	--	--	--	--	--
23...	10	6.2	542	220	17	0.5	4.1	897	1.22	31.5	<0.01	<0.05

DATE	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BORON, DISSOLVED (UG/L AS B) (01020)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)
FEB											
21...	0.02	<0.01	--	790	--	--	74	--	--	--	--
APR											
03...	--	--	--	--	--	--	--	--	--	--	--
24...	0.02	<0.01	2	760	<1.0	<1	46	1	6	<0.1	<1
JUL											
23...	--	--	--	--	--	--	--	--	--	--	--
24...	0.01	<0.01	--	1000	--	--	35	--	--	--	--
SEP											
12...	--	--	--	--	--	--	--	--	--	--	--
23...	0.03	<0.01	--	1000	--	--	15	--	--	--	--

POPLAR RIVER BASIN

06181000 POPLAR RIVER NEAR POPLAR, MT
(National stream-quality accounting network station)

LOCATION.--Lat 48°10'15", long 105°10'42", in NE1/4NE1/4 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^2.

WATER-DISCHARGE RECORDS

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.

REVISED RECORDS.--WSP 1176. 1948. WSP 1389: 1911. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,953.16 ft above National Geodetic Vertical Datum of 1929. Prior to May 1, 1911, nonrecording gage at site 4.2 mi upstream at different datum. May 1, 1911, to Oct. 4, 1913, nonrecording gage at site 14 mi upstream at different datum. Oct. 5, 1913, to Oct. 31, 1924, nonrecording gage at site 2.2 mi upstream at different datum. Aug. 10, 1947, to Sept. 30, 1969, water-stage recorder at present site and datum.

REMARKS.--Estimated daily discharges: Nov. 6, 7, Nov. 12 to Mar. 26, July 22 to Sept. 30. 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.

AVERAGE DISCHARGE.--52 years (1908-24, 1947-69, 1975-79, 1982-91), 124 ft^3/s, 89,840 acre-ft/yr; median of yearly mean discharges, 83.9 ft^3/s, 60,780 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,400 ft^3/s, Apr. 6, 1954, gage height, 17.86 ft, from floodmark, from slope-area measurement of peak flow; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 10, 1946, reached a stage of 18.1 ft, from floodmark, discharge, 40,000 ft^3/s, from slope-area measurement of peak flow made at site 20 mi upstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft^3/s, and maximums (*):

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
July 1	0315	*1,550	*7.16	July 7	1815	557	4.84

No flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.88	7.1	e8.5	e.00	e.05	e1.0	102	115	38	1050	e31	e14
2	1.0	7.1	e8.0	e.00	e.05	e1.0	97	121	36	575	e31	e14
3	1.2	7.3	e7.5	e.00	e.10	e.50	94	106	36	407	e33	e14
4	1.4	7.6	e8.0	e.00	e.15	e1.0	92	107	32	385	e31	e13
5	1.7	7.9	e8.5	e.00	e.15	e1.0	90	103	34	359	e34	e13
6	1.9	e6.5	e8.5	e.00	e.15	e.50	85	94	79	345	e43	e13
7	2.0	e6.0	e9.0	e.00	e.20	e.50	82	84	82	390	e102	e13
8	2.3	7.9	e10	e.00	e.25	e1.0	78	78	59	381	e118	e13
9	2.7	8.1	e9.5	e.00	e.20	e4.0	76	75	48	264	e81	e13
10	3.0	9.0	e9.0	e.00	e.15	e6.0	71	74	42	213	e59	e12
11	3.1	9.2	e8.5	e.00	e.15	e5.0	66	70	34	175	e46	e12
12	3.4	e8.5	e8.5	e.00	e.20	e6.0	63	73	30	143	e38	e11
13	3.6	e9.5	e8.0	e.00	e.15	e7.0	61	97	31	115	e34	e11
14	3.6	e10	e7.5	e.05	e.15	e9.0	59	101	33	101	e31	e11
15	4.0	e10	e8.0	e.10	e.20	e10	57	89	38	90	e28	e12
16	4.6	e9.5	e7.0	e.05	e.30	e15	55	83	44	83	e27	e12
17	5.5	e9.5	e6.0	e.05	e.50	e20	53	95	36	80	e26	e11
18	5.4	e9.5	e5.0	e.10	e1.0	e30	53	82	32	89	e25	e11
19	5.7	e9.5	e4.0	e.10	e2.0	e60	49	70	29	102	e28	e10
20	5.4	e9.5	e3.0	e.05	e2.0	e70	46	71	26	69	e30	e11
21	6.1	e9.5	e2.0	e.05	e1.5	e120	45	69	25	61	e28	e13
22	6.3	e9.0	e1.0	e.05	e1.0	e100	43	64	26	e54	e26	e12
23	6.0	e8.0	e.50	e.00	e1.0	e80	40	58	32	e46	e26	e14
24	6.0	e7.0	e.50	e.00	e1.0	e90	39	58	39	e42	e24	e18
25	6.4	e7.0	e.40	e.00	e1.0	e95	38	58	33	e40	e22	e17
26	5.6	e6.5	e.20	e.00	e1.0	e100	42	72	42	e36	e21	e16
27	5.1	e6.0	e.25	e.00	e1.0	106	65	58	37	e36	e20	e15
28	5.4	e6.5	e.20	e.00	e1.0	106	100	51	45	e70	e19	e15
29	5.6	e7.5	e.10	e.00	---	119	113	48	160	e47	e18	e13
30	6.1	e9.0	e.00	e.00	---	101	103	46	604	e39	e19	e12
31	6.7	---	e.00	e.00	---	113	---	39	---	e32	e17	---
TOTAL	127.68	245.2	157.15	0.60	16.60	1378.50	2057	2409	1862	5919	1116	389
MEAN	4.12	8.17	5.07	.019	.59	44.5	68.6	77.7	62.1	191	36.0	13.0
MAX	6.7	10	10	.10	2.0	120	113	121	604	1050	118	18
MIN	.88	6.0	.00	.00	.05	.50	38	39	25	32	17	10
AC-FT	253	486	312	1.2	33	2730	4080	4780	3690	11740	2210	772

CAL YR 1990 TOTAL 6444.04 MEAN 17.7 MAX 120 MIN .00 AC-FT 12780
WTR YR 1991 TOTAL 15677.73 MEAN 43.0 MAX 1050 MIN .00 AC-FT 31100

e Estimated

06181000 POPLAR RIVER NEAR POPLAR, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1975-81, 1986 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT												
17...	0945	5.7	100	72	2300	1.0	4.0	724	11.8	96	K13	88
DEC												
03...	1200	7.6	0	0	2330	-9.0	0.0	724	11.4	83	K2	K25
FEB												
20...	1100	1.7	--	0	1560	4.0	0.0	713	6.6	49	K1	190
APR												
02...	1155	88	--	--	940	--	13.0	--	--	--	--	--
03...	1730	88	--	0	996	18.0	13.0	--	--	--	--	--
24...	1100	38	0	0	1320	15.5	13.5	792	8.0	74	K8	K2
JUN												
12...	1050	29	--	--	1350	22.5	22.0	--	--	--	--	--
JUL												
03...	1015	371	--	--	852	21.5	21.0	--	--	--	--	--
23...	1530	--	--	--	--	--	--	--	--	--	--	--
24...	1100	44	0	0	1390	22.0	22.0	722	7.7	94	K44	130
SEP												
12...	1600	11	--	--	--	--	--	--	--	--	--	--
23...	1130	14	100	51	1850	10.0	10.5	719	10.0	96	170	500

DATE	TIME	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)
OCT												
17...	0945	532	12	447	8.7	14	250	31	42	430	12	8.2
DEC												
03...	1200	805	34	718	8.4	5.7	310	45	47	440	11	7.7
FEB												
20...	1100	--	--	--	8.1	8.4	210	34	31	330	10	8.4
APR												
03...	1730	--	--	--	--	--	--	--	--	--	--	--
24...	1100	586	0	469	8.5	33	180	29	25	240	8	5.7
JUL												
23...	1530	--	--	--	--	--	--	--	--	--	--	--
24...	1100	626	0	499	8.4	90	190	27	29	260	8	9.0
SEP												
12...	1600	--	--	--	--	--	--	--	--	--	--	--
23...	1130	616	0	494	8.6	23	210	27	34	340	10	7.0

DATE	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
OCT												
17...	507	230	300	0.2	2.3	1390	1320	1.89	21.4	<0.01	<0.01	<0.10
DEC												
03...	709	---	180	0.6	7.7	1330	---	1.80	27	<0.01	<0.01	<0.10
FEB												
20...	554	250	92	0.4	9.6	1040	1090	1.41	4.77	<0.01	0.02	<0.10
APR												
03...	--	--	25	--	--	--	--	--	--	--	--	--
24...	461	200	52	0.5	5.4	784	846	1.07	80.4	0.03	<0.01	<0.05
JUL												
23...	--	--	61	--	--	--	--	--	--	--	--	--
24...	498	160	58	0.4	13	842	865	1.15	100	0.03	<0.01	<0.05
SEP												
12...	--	--	160	--	--	--	--	--	--	--	--	--
23...	510	240	170	0.6	4.2	1060	1130	1.44	40.1	0.02	<0.01	<0.05

POPLAR RIVER BASIN

06181000 POPLAR RIVER NEAR POPLAR, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N) (00607)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT											
17...	<0.10	0.02	0.01	--	0.02	<0.01	0.01	<0.01	57	0.88	98
DEC											
03...	<0.10	0.01	0.02	--	<0.01	<0.01	<0.01	<0.01	72	1.5	76
FEB											
20...	<0.10	0.04	0.04	--	0.05	<0.01	<0.01	<0.01	26	0.12	87
APR											
03...	--	--	--	--	--	--	--	--	--	--	--
24...	<0.05	0.04	0.02	--	0.05	0.02	0.02	<0.01	98	10	99
JUL											
23...	--	--	--	--	--	--	--	--	--	--	--
24...	<0.05	0.02	0.03	0.87	0.10	0.03	0.02	<0.01	166	20	98
SEP											
12...	--	--	--	--	--	--	--	--	--	--	--
23...	<0.05	0.02	0.02	--	0.04	<0.01	0.02	<0.01	72	2.7	99

DATE	TIME	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)
OCT											
17...	0945	10	2	57	<0.5	<1	<1	<3	2	9	1
FEB											
20...	1100	60	<1	51	<0.5	1	<1	<3	3	73	1
JUL											
24...	1100	30	7	89	<0.5	1	<1	<3	5	35	<1
SEP											
23...	1130	10	2	63	<0.5	2	<1	<3	<1	19	<1

DATE	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
OCT										
17...	130	11	<0.1	<10	2	<1	<1	610	<6	8
FEB										
20...	95	62	<0.1	<10	2	<1	<1	450	<6	5
JUL										
24...	100	3	<0.1	<10	4	<1	<1	460	<6	12
SEP										
23...	110	8	<0.1	<10	2	<1	<1	470	<6	7

BIG MUDDY CREEK BASIN

06181995 BEAVER CREEK AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 48°59'59", long 105°02'06", in SE1/4 sec.5, T.1, R.23 W., second meridian, in Saskatchewan, Hydrologic Unit 10060006, on left bank 300 ft north of international boundary, 6 mi east of Canadian Big Beaver Port of Entry, 8 mi upstream from mouth, and 9 mi southeast of Big Beaver, Saskatchewan.

DRAINAGE AREA.--149 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1977 to current year (seasonal records after November 1982). April 1949 to October 1952, seasonal records collected 0.8 mi downstream (station number 06182000 Beaver Creek near international boundary). Records probably are equivalent.

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,250 ft, from topographic map. April 1949 to October 1952, nonrecording gage 0.8 mi downstream at different datum.

REMARKS.--Estimated daily discharges: Feb. 1 to Mar. 22 and Oct. 28 to Nov. 30. Water-discharge records fair except those for estimated daily discharges, which are poor.

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 discharge, 4,020 ft^3/s, Apr. 7, 1952, gage height, 13.3 ft, from floodmark, from rating curve extended above 320 ft^3/s, on basis of slope-area measurements of peak flow; no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 745 ft^3/s, June 30, gage height, 6.26 ft; minimum daily, 0.35 ft^3/s, Feb. 1,4.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1		e.35	e.74	1.4	2.3	1.1	176	1.4	.88	.85	e1.2	
2		e.39	e.74	1.2	2.2	1.1	69	2.1	.92	.85	e1.4	
3		e.46	e.74	.74	2.1	1.1	39	1.7	.95	.88	e1.4	
4		e.35	e.78	1.2	2.0	1.2	21	1.4	.95	.92	e1.3	
5		e.74	e.78	1.1	1.8	1.2	13	1.2	.95	.92	e1.4	
6		e.78	e.67	1.1	1.7	1.1	23	.99	.81	.95	e1.2	
7		e.85	e.67	1.1	1.7	.99	22	1.1	.85	.95	e1.3	
8		e1.1	e.67	1.1	1.7	1.1	12	.95	.88	.99	e1.2	
9		e.71	e.74	1.1	1.7	.99	8.3	.95	.81	.95	e1.1	
10		e.53	e.88	1.1	1.5	.95	6.2	.95	.92	.95	e1.1	
11		e.64	e.85	1.1	1.5	.95	5.0	.88	.99	.92	e1.1	
12		e.78	e.78	1.1	4.6	.95	4.2	.85	1.1	1.0	e1.1	
13		e.81	e.78	1.0	14	.99	3.7	.81	1.1	.99	e1.0	
14		e.74	e1.3	.95	8.3	.99	3.4	.85	1.1	1.1	e.99	
15		e.64	e5.2	1.0	2.9	1.0	3.1	.88	1.0	1.1	e.95	
16		e.64	e5.5	1.1	1.7	.95	2.9	.95	.99	1.0	e.95	
17		e.60	e6.9	1.3	1.4	.85	2.6	.88	.92	.81	e.92	
18		e.78	e6.3	1.3	1.2	.88	2.4	.81	.92	.88	e.92	
19		e.78	e5.5	1.3	.99	.88	2.2	.78	.88	.92	e.92	
20		e.81	e4.6	1.3	.95	.85	2.0	.78	.92	.85	e.88	
21		e.92	e4.6	1.5	.85	.88	1.8	.81	.92	.88	e.88	
22		e.85	e2.3	1.7	.81	.92	1.7	.81	.88	.85	e.88	
23		e.78	2.1	1.9	.92	.88	1.6	.81	.92	.88	e.88	
24		e.78	1.8	1.9	.92	.88	1.4	.85	.92	.85	e.85	
25		e.78	1.6	1.9	.95	.88	1.4	.85	.88	.85	e.85	
26		e.78	1.3	1.9	1.1	.81	1.6	.95	.85	.92	e.85	
27		e.74	1.4	2.1	1.1	.78	1.9	.95	.85	.92	e.88	
28		e.74	1.6	2.3	1.2	.88	1.7	.95	.85	e.92	e.88	
29		---	1.6	1.9	1.1	1.1	1.6	.88	.81	e1.1	e.88	
30		---	1.8	2.3	1.2	367	1.4	.92	.85	e1.1	e.99	
31		---	1.7	---	1.2	---	1.3	.88	---	e1.1	---	
TOTAL		19.85	66.92	41.99	67.59	395.13	438.4	30.87	27.57	29.15	31.15	
MEAN		.71	2.16	1.40	2.18	13.2	14.1	1.00	.92	.94	1.04	
MAX		1.1	6.9	2.3	14	367	176	2.1	1.1	1.1	1.4	
MIN		.35	.67	.74	.81	.78	1.3	.78	.81	.81	.85	
AC-FT		39	133	83	134	784	870	61	55	58	62	

e Estimated

06181995 BEAVER CREEK AT INTERNATIONAL BOUNDARY--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1977 to October 1991 (discontinued).

WATER QUALITY DATA, OCTOBER 1990 to OCTOBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	PH (STAND-ARD UNITS) (00400)
OCT 1990											
17...	1115	0.74	0	0	--	0.0	5.0	711	9.8	--	8.0
APR 1991											
17...	1015	1.4	100	2	1520	4.5	6.0	714	12.1	104	8.0
JUN											
17...	1215	0.90	70	3	1610	19.0	18.0	703	9.2	106	7.9
AUG											
05...	1530	1.2	75	1	1530	25.0	20.0	705	9.8	117	8.0
OCT											
15...	1530	1.0	0	0	1750	18.0	11.0	695	12.0	120	8.1

DATE	COLOR (PLAT-INUM-COBALT UNITS) (00080)	TUR-BID-ITY (NTU) (00076)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)
OCT 1990										
17...	26	2.8	230	44	29	320	9	6.9	310	10
APR 1991										
17...	31	6.0	220	46	25	270	8	6.9	340	9.2
JUN										
17...	25	3.1	210	39	27	310	9	7.8	350	8.8
AUG										
05...	15	1.7	220	43	28	280	8	8.3	340	10
OCT										
15...	36	3.0	230	44	29	310	9	6.7	420	13

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
OCT 1990										
17...	<0.1	6.5	1070	1.45	2.13	<0.01	<0.10	0.02	0.48	0.03
APR 1991										
17...	0.2	8.3	965	1.31	3.65	<0.01	<0.05	0.01	0.69	0.05
JUN										
17...	0.3	3.1	1070	1.45	2.59	<0.01	<0.05	<0.01	--	0.04
AUG										
05...	0.2	5.3	1020	1.38	3.29	<0.01	<0.05	<0.01	--	0.02
OCT										
15...	0.4	7.9	1150	1.56	3.10	<0.01	<0.05	0.01	0.29	0.02

DATE	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)
OCT 1990										
17...	<0.01	--	--	--	--	--	1600	--	--	--
APR 1991										
17...	<0.01	7.6	2	1	<10	<0.5	1300	<1	<1	<1
JUN										
17...	<0.01	--	--	--	--	--	1600	--	--	--
AUG										
05...	<0.01	7.0	--	1	--	<0.5	1500	--	<1	--
OCT										
15...	<0.01	--	--	--	--	--	1600	--	--	--

06181995 BEAVER CREEK AT INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, OCTOBER 1990 to OCTOBER 1991

DATE	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)
OCT 1990										
17...	--	--	--	--	39	--	--	--	--	--
APR 1991										
17...	<1	2	1	1100	32	1	<1	130	100	<0.10
JUN										
17...	--	--	--	--	16	--	--	--	--	--
AUG										
05...	<1	--	1	--	16	--	<1	--	17	--
OCT										
15...	--	--	--	--	8	--	--	--	--	--

DATE	MERCURY DISSOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 1990										
17...	--	--	--	--	--	--	--	68	0.14	88
APR 1991										
17...	<0.1	2	1	<1	<1	<10	7	62	0.23	78
JUN										
17...	--	--	--	--	--	--	--	14	0.03	--
AUG										
05...	<0.1	--	2	--	<1	--	5	58	0.19	87
OCT										
15...	--	--	--	--	--	--	--	63	0.17	88

BIG MUDDY CREEK BASIN

06183450 BIG MUDDY CREEK NEAR ANTELOPE, MT

LOCATION.--Lat 48°40'22", long 104°30'42", in SW1/4SW1/4NW1/4 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 mi². Prior to 1981, drainage area published as 1,171 mi².

WATER DISCHARGE RECORDS

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 above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 3 to Apr. 3. Water-discharge records good except those for estimated daily discharges, which are poor. Several known diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--13 years, 29.8 ft³/s, 21,590 acre-ft/yr; median of yearly mean discharges, 16.5 ft³/s, 11,950 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,890 ft³/s, Apr. 14, 1982, gage height, 17.37 ft; no flow on many days during 1984, 1985, 1988, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 595 ft³/s, July 4, gage height, 8.13 ft; no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.22	2.7	e3.0	e.00	e.00	e2.5	e25	28	22	137	6.2	6.3
2	.13	3.7	e2.5	e.00	e.00	e2.0	e35	38	17	277	5.3	6.0
3	.05	e2.0	e2.5	e.00	e.00	e2.0	e30	31	13	308	4.3	5.2
4	.03	e2.0	e3.0	e.00	e.00	e2.5	24	29	14	528	3.9	4.6
5	.02	e1.5	e4.0	e.00	e.00	e2.0	14	26	18	467	4.1	4.9
6	.00	e2.0	e4.0	e.00	e.00	e2.0	8.2	22	60	388	4.9	4.1
7	.00	e2.5	e4.0	e.00	e.00	e2.0	4.9	20	55	201	5.0	3.2
8	.00	e3.0	e4.5	e.00	e.00	e2.5	9.9	19	36	113	6.7	3.1
9	.01	e2.5	e5.0	e.00	e.00	e2.5	4.2	19	52	88	16	2.8
10	.01	e2.5	e4.5	e.00	e.00	e2.5	11	19	50	66	13	3.0
11	.01	e3.0	e4.5	e.00	e.00	e2.0	14	17	43	52	8.6	18
12	.01	e3.0	e4.0	e.00	e.00	e2.5	11	15	35	45	6.6	13
13	.02	e3.5	e3.5	e.00	e.00	e3.0	11	15	28	37	5.3	8.1
14	.02	e4.0	e3.0	e.00	e.00	e3.5	12	20	26	29	4.4	5.6
15	.02	e4.5	e3.0	e.00	e.00	e4.0	12	91	23	24	3.6	4.4
16	.02	e4.5	e2.5	e.00	e.00	e4.5	12	88	21	21	3.9	3.8
17	.02	e4.5	e2.0	e.00	e.50	e5.0	13	70	19	18	3.0	3.7
18	.02	e4.5	e1.5	e.00	e1.0	e6.0	17	60	23	17	2.5	4.7
19	.04	e4.5	e1.0	e.00	e5.0	e7.0	14	45	20	15	2.1	5.3
20	.08	e4.5	e.50	e.00	e9.0	e8.0	11	31	17	13	1.6	4.9
21	.14	e4.0	e.10	e.00	e8.0	e9.0	6.6	23	15	12	1.6	4.7
22	.24	e4.0	e.00	e.00	e7.0	e15	3.4	18	15	10	1.6	4.1
23	1.1	e4.0	e.00	e.00	e6.0	e25	1.9	15	14	8.4	1.3	3.5
24	2.4	e3.5	e.00	e.00	e5.0	e30	9.6	14	13	7.1	.97	3.3
25	2.5	e3.5	e.00	e.00	e4.5	e25	12	13	12	6.6	.82	3.0
26	2.7	e3.0	e.00	e.00	e4.0	e20	10	18	9.9	6.1	.75	3.0
27	2.3	e2.5	e.00	e.00	e3.5	e20	13	60	30	5.6	.81	2.9
28	2.5	e2.5	e.00	e.00	e3.0	e15	21	87	31	5.2	1.0	2.7
29	3.4	e3.0	e.00	e.00	---	e20	24	69	21	5.0	1.6	4.1
30	4.2	e3.0	e.00	e.00	---	e25	21	51	18	5.1	4.0	4.0
31	4.1	---	e.00	e.00	---	e25	---	32	---	5.9	6.7	---
TOTAL	26.31	97.9	62.60	0.00	56.50	297.0	415.7	1103	770.9	2921.0	132.15	150.0
MEAN	.85	3.26	2.02	.000	2.02	9.58	13.9	35.6	25.7	94.2	4.26	5.00
MAX	4.2	4.5	5.0	.00	9.0	30	35	91	60	528	16	18
MIN	.00	1.5	.00	.00	.00	2.0	1.9	13	9.9	5.0	.75	2.7
AC-FT	52	194	124	.00	112	589	825	2190	1530	5790	262	298

CAL YR 1990 TOTAL 2014.49 MEAN 5.52 MAX 98 MIN .00 AC-FT 4000
WTR YR 1991 TOTAL 6033.06 MEAN 16.5 MAX 528 MIN .00 AC-FT 11970

e Estimated

06183450 BIG MUDDY CREEK NEAR ANTELOPE, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1979 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT							
17...	1405	0.02	--	--	2520	2.0	5.5
DEC							
11...	0930	4.3	100	50	--	-2.0	0.0
FEB							
20...	1040	8.5	--	--	3680	4.0	0.5
MAR							
29...	1020	17	--	--	1520	-1.0	0.5
APR							
17...	1310	14	--	--	1680	7.5	7.0
MAY							
14...	1045	16	0	0	2140	17.0	15.5
JUN							
11...	1045	42	--	--	880	22.0	23.0
25...	1200	10	0	0	1500	26.0	25.5
AUG							
05...	1300	4.0	95	3	1730	20.0	20.0
SEP							
24...	1515	3.2	--	--	1390	18.0	12.0

DATE	TIME	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
DEC										
11...	0930	8.1	550	77	86	620	12	13	904	1000
MAY										
14...	1045	8.7	370	47	61	390	9	9.2	578	610
JUN										
25...	1200	8.9	230	27	40	260	7	1.3	452	350
AUG										
05...	1300	8.7	310	36	53	290	7	11	491	440

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)
DEC										
11...	61	0.7	6.5	2410	3.28	28.0	0.02	<0.10	0.71	0.10
MAY										
14...	13	0.2	0.8	1480	2.01	63.9	<0.01	<0.05	0.02	0.05
JUN										
25...	21	0.2	0.3	972	1.32	26.3	<0.01	0.06	0.03	0.01
AUG										
05...	45	0.4	4.4	1180	1.60	12.7	<0.01	<0.05	0.04	0.02

DATE	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)
DEC									
11...	--	1500	--	--	40	--	--	--	--
MAY									
14...	6	1300	<1	<1	<10	<1	10	<0.1	<1
JUN									
25...	--	1100	--	--	18	--	--	--	--
AUG									
05...	--	1000	--	--	31	--	--	--	--

06183700 BIG MUDDY CREEK DIVERSION CANAL NEAR MEDICINE LAKE, MT

LOCATION.--Lat 48°30'34", long 104°32'55", in SE1/4NW1/4SE1/4 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 current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,940 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Oct. 1 to Mar. 24, Aug. 2-5. Records 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.

AVERAGE DISCHARGE.--6 years, 14.6 ft^3/s, 10,580 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 1,300 ft^3/s, Mar. 2, 1986; maximum gage height, 9.97 ft, Mar. 31, 1989, backwater from ice; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 628 ft^3/s, July 5, gage height, 8.37 ft; no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.10	e.25	e.00	e.00	e.00	e.00	14	21	37	56	5.1	.56
2	e.10	e.25	e.00	e.00	e.00	e.00	15	19	27	86	e5.0	.51
3	e.10	e.25	e.00	e.00	e.00	e.00	21	28	20	308	e5.0	.27
4	e.10	e.25	e.00	e.00	e.00	e.00	29	31	16	352	e5.5	.23
5	e.10	e.25	e.10	e.00	e.00	e.00	30	28	15	597	e6.0	.17
6	e.10	e.25	e.10	e.00	e.00	e.00	19	25	15	573	5.3	.14
7	e.10	e.25	e.10	e.00	e.00	e.00	14	22	22	476	4.6	.16
8	e.10	e.25	e.10	e.00	e.00	e.00	9.7	19	56	301	3.9	.58
9	e.10	e.25	e.25	e.00	e.00	e.00	6.8	17	53	185	4.0	.30
10	e.10	e.25	e.25	e.00	e.00	e.00	7.4	17	40	139	4.6	.18
11	e.10	e.50	e.25	e.00	e.00	e.00	6.7	17	45	98	11	.28
12	e.10	e.50	e.25	e.00	e.00	e.00	8.1	16	41	65	13	.26
13	e.10	e.50	e.25	e.00	e.00	e.00	12	15	36	48	10	1.4
14	e.10	e.50	e.25	e.00	e.00	e.00	11	16	31	41	8.6	9.6
15	e.10	e1.0	e.25	e.00	e.00	e.00	11	16	26	37	8.4	9.0
16	e.10	e1.0	e.25	e.00	e.00	e.00	12	69	23	31	7.6	6.4
17	e.10	e1.5	e.50	e.00	e.00	e.00	8.0	115	22	26	6.5	4.3
18	e.10	e1.5	e.50	e.00	e.00	e.00	11	78	20	22	5.8	3.8
19	e.10	e2.0	e.50	e.00	e.00	e.00	14	58	18	20	5.1	3.3
20	e.10	e2.0	e.25	e.00	e.00	e.00	16	44	18	17	4.4	2.7
21	e.10	e2.0	e.25	e.00	e.00	e.00	15	33	18	15	3.8	3.2
22	e.10	e2.0	e.10	e.00	e.00	e.00	12	26	17	13	3.4	4.9
23	e.10	e2.5	e.00	e.00	e.00	e.00	8.4	20	15	11	2.6	5.3
24	e.25	e3.0	e.00	e.00	e.00	e30	5.5	17	15	10	2.3	4.8
25	e.25	e2.5	e.00	e.00	e.00	30	4.0	15	15	8.7	2.0	4.1
26	e.25	e2.0	e.00	e.00	e.00	19	3.9	13	14	7.8	1.8	3.9
27	e.25	e1.5	e.00	e.00	e.00	24	9.6	13	13	7.3	1.7	3.3
28	e.25	e1.0	e.00	e.00	e.00	18	15	19	12	6.9	1.2	2.7
29	e.25	e.50	e.00	e.00	---	13	21	87	16	6.3	.89	2.3
30	e.25	e.25	e.00	e.00	---	11	23	87	61	5.9	.84	1.8
31	e.25	---	e.00	e.00	---	11	---	56	---	5.3	.59	---
TOTAL	4.30	30.75	4.50	0.00	0.00	156.00	393.1	1057	777	3575.2	150.52	80.44
MEAN	.14	1.02	.15	.000	.000	5.03	13.1	34.1	25.9	115	4.86	2.68
MAX	.25	3.0	.50	.00	.00	30	30	115	61	597	13	9.6
MIN	.10	.25	.00	.00	.00	.00	3.9	13	12	5.3	.59	.14
AC-FT	8.5	61	8.9	.00	.00	309	780	2100	1540	7090	299	160

CAL YR 1990 TOTAL 1745.46 MEAN 4.78 MAX 94 MIN .00 AC-FT 3460
WTR YR 1991 TOTAL 6228.81 MEAN 17.1 MAX 597 MIN .00 AC-FT 12350

e Estimated

BIG MUDDY CREEK BASIN

06185110 BIG MUDDY CREEK NEAR MOUTH, NEAR CULBERTSON, MT

LOCATION.--Lat 48°09'52", long 104°37'45", in NE1/4NW1/4SW1/4 sec.21, T.28 N., R.55 E., Roosevelt County, Hydrologic Unit 10060006, Fort Peck Indian Reservation, on right bank 30 ft downstream from U.S. Highway 2 bridge and 5.3 mi northwest of Culbertson.

DRAINAGE AREA.--2,684 mi^2.

PERIOD OF RECORD.--November 1981 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,896.52 ft above National Geodetic Vertical Datum of 1929 (unadjusted).

REMARKS.--Estimated daily discharges: Nov. 16 to Apr. 1, June 24 to Aug. 6. Water-discharge records poor. Flows are subject to extreme regulation by diversions and dams at Medicine Lake National Wildlife Refuge about 40 mi upstream.

AVERAGE DISCHARGE.--10 years (1982-91), 24.4 ft^3/s, 17,680 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,860 ft^3/s, Apr. 16, 1982, gage height, 10.40 ft; no flow on many days.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 23 ft^3/s, May 27, gage height, 2.17 ft, but may have been greater during period of estimated daily discharges; no flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	e.00	e.00	e.00	e.00	e4.5	.49	18	e12	e5.0	4.2
2	.00	.00	e.00	e.00	e.00	e.00	3.5	.75	17	e12	e4.5	5.7
3	.00	.00	e.00	e.00	e.00	e.00	1.2	.85	16	e15	e4.5	4.9
4	.00	.00	e.00	e.00	e.00	e.00	.72	.53	16	e15	e4.5	5.4
5	.00	.00	e.00	e.00	e.00	e.00	.89	.49	17	e14	e4.5	6.7
6	.00	.00	e.00	e.00	e.00	e.00	.71	.53	17	e16	e5.0	6.7
7	.00	.00	e.00	e.00	e.00	e.00	.55	.69	15	e17	5.4	8.4
8	.00	.00	e.00	e.00	e.00	e.00	.70	.72	13	e20	6.1	9.7
9	.00	.00	e.00	e.00	e.00	e.00	.68	.44	13	e16	4.4	11
10	.00	.00	e.00	e.00	e.00	e.00	.75	.42	11	e13	3.6	11
11	.00	.00	e.00	e.00	e.00	e.00	.60	.60	10	e11	4.1	9.7
12	.00	.00	e.00	e.00	e.00	e.00	.28	.93	10	e10	2.3	8.3
13	.00	.00	e.00	e.00	e.00	e.00	.16	5.8	9.2	e9.0	.88	7.6
14	.00	.00	e.00	e.00	e.00	e.00	.03	10	7.9	e8.0	.76	7.0
15	.00	.00	e.00	e.00	e.00	e.00	.00	10	8.2	e9.0	.86	6.9
16	.00	e.00	e.00	e.00	e.00	e.00	.03	7.7	7.5	e12	.79	7.7
17	.00	e.00	e.00	e.00	e.00	e.00	.02	6.7	6.6	e10	1.0	5.7
18	.00	e.00	e.00	e.00	e.00	e.00	.07	6.9	6.0	e10	.92	5.7
19	.00	e.00	e.00	e.00	e.00	e.00	.05	8.7	6.4	e9.0	.91	2.1
20	.00	e.00	e.00	e.00	e.00	e.00	.05	14	5.7	e8.0	.74	.07
21	.00	e.00	e.00	e.00	e.00	e.50	.06	19	5.9	e7.5	.86	.16
22	.00	e.00	e.00	e.00	e.00	e1.0	.13	19	5.9	e7.0	1.0	.38
23	.00	e.00	e.00	e.00	e.00	e1.0	.32	19	6.0	e6.5	1.1	.24
24	.00	e.00	e.00	e.00	e.00	e1.0	.19	20	e6.0	e6.0	.83	.04
25	.00	e.00	e.00	e.00	e.00	e.50	.27	21	e10	e6.0	1.2	.00
26	.00	e.00	e.00	e.00	e.00	e.50	.43	21	e9.0	e8.0	1.6	.00
27	.00	e.00	e.00	e.00	e.00	e1.0	.62	22	e8.0	e7.5	1.8	.00
28	.00	e.00	e.00	e.00	e.00	e2.0	.31	20	e7.0	e7.0	2.6	.00
29	.00	e.00	e.00	e.00	---	e5.0	.53	18	e6.5	e6.5	2.9	.00
30	.00	e.00	e.00	e.00	---	e7.0	.49	17	e9.0	e6.0	3.6	.00
31	.00	---	e.00	e.00	---	e5.5	---	16	---	e5.5	4.2	---
TOTAL	0.00	0.00	0.00	0.00	0.00	25.00	18.84	289.24	303.8	319.5	82.45	135.29
MEAN	.000	.000	.000	.000	.000	.81	.63	9.33	10.1	10.3	2.66	4.51
MAX	.00	.00	.00	.00	.00	7.0	4.5	22	18	20	6.1	11
MIN	.00	.00	.00	.00	.00	.00	.00	.42	5.7	5.5	.74	.00
AC-FT	.00	.00	.00	.00	.00	50	37	574	603	634	164	268

CAL YR 1990 TOTAL 263.29 MEAN .72 MAX 12 MIN .00 AC-FT 522
WTR YR 1991 TOTAL 1174.12 MEAN 3.22 MAX 22 MIN .00 AC-FT 2330

e Estimated

MISSOURI RIVER MAIN STEM

06185500 MISSOURI RIVER NEAR CULBERTSON, MT

LOCATION.--Lat 48°07'30", long 104°28'20", in SE1/4NW1/4 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^2.

PERIOD OF RECORD.--July 1941 to December 1951, April 1958 to current year.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,883.4 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark). July 1 to Nov. 6, 1941, water-stage recorder at site 400 ft upstream at datum 0.11 ft higher. Nov. 7, 1941, to Aug. 17, 1950, water-stage recorder at site 580 ft downstream at present datum. Aug. 18, 1950, to Dec. 31, 1951, nonrecording gage on bridge at present datum. Apr. 1, 1958, to Nov. 1, 1967, water-stage recorder at site 580 ft downstream at present datum.

REMARKS.--Estimated daily discharges: Nov. 26 to Mar. 19. Records good except those for estimated daily discharges, which are poor. 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 stations. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--42 years (1943-51, 1959-91, after operational level at Fort Peck Lake was reached), 10,570 ft^3/s, 7,658,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 78,200 ft^3/s, Mar. 26, 1943, gage height, 14.80 ft, from rating curve extended above 30,000 ft^3/s; maximum gage height observed, 19.66 ft, Apr. 14, 1979, backwater from ice jam; minimum daily discharge, 575 ft^3/s, Nov. 22, 1941.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 16,500 ft^3/s, July 2, gage height, 8.13 ft; maximum gage height, 9.70 ft, Dec. 27, backwater from ice; minimum daily discharge, 3,570 ft^3/s, Apr. 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8430	8690	e5000	e8000	e8000	e8000	8960	8600	7950	14400	7740	8120
2	8380	8620	e5000	e8000	e8000	e8000	8810	8410	7890	16100	7700	8150
3	8340	8600	e4500	e8000	e8000	e8500	8730	8410	8020	13800	7560	8200
4	8330	8590	e6000	e8000	e8000	e8500	8610	8420	8070	12400	7510	8250
5	8370	8600	e8000	e8500	e8000	e8500	8540	8480	8100	11900	7530	8240
6	8310	8750	e8500	e8500	e8000	e9000	8400	8550	8220	11500	7490	8250
7	8350	8250	e8500	e8500	e8000	e8500	8310	8510	8230	11000	7340	8000
8	8410	6000	e8500	e8500	e8000	e8500	8320	8440	8390	10300	7380	6330
9	8460	5120	e8500	e8500	e8000	e8500	7740	8380	8490	9980	7480	5490
10	8480	4900	e8500	e8500	e8000	e8500	5430	8360	8830	9800	7520	5330
11	8430	4730	e8000	e8500	e8000	e8500	4430	8430	8960	10200	7560	5260
12	8430	5580	e8000	e8500	e8000	e8500	4060	8680	8740	10800	7580	5230
13	8430	7790	e8000	e8500	e8000	e8500	3910	8820	8690	10300	7580	5940
14	8460	8680	e7500	e8500	e8000	e8500	3880	8840	8680	9520	7670	7830
15	8450	8870	e7000	e8000	e8000	e8500	3840	8780	8630	8790	7750	8360
16	8450	8910	e8000	e8000	e8000	e8500	3760	8430	8730	8380	7730	8460
17	8440	8890	e7500	e8000	e8000	e9000	3660	8230	8720	7830	7760	8410
18	8580	8840	e7500	e8000	e8000	e9500	3610	8220	8570	7660	7790	8240
19	8620	8830	e7500	e8000	e8000	e9800	3570	8250	8600	7880	7770	8240
20	8500	8880	e7500	e8000	e8000	9670	5040	8260	8840	8540	7790	8250
21	8540	8840	e7500	e8000	e8000	9460	7010	8280	8900	8580	7810	8320
22	8600	8830	e7500	e8000	e8000	9430	7550	8410	8970	8420	7730	8390
23	8630	8840	e7500	e8000	e8000	9520	7740	8180	9060	8490	7850	8390
24	8700	8770	e7500	e8000	e8000	9380	7830	8280	9050	8430	8000	8420
25	8770	8740	e7500	e8000	e8000	9340	7880	8430	9250	8250	7920	8440
26	8730	e7000	e7500	e8000	e8000	9290	8020	8690	9120	8080	7900	8430
27	8670	e8400	e8000	e8000	e8000	9220	8280	8710	9330	8000	7900	8330
28	8730	e7000	e8000	e8000	e8000	9280	8720	8500	10800	7950	7950	8290
29	8800	e5500	e8000	e8000	---	9260	8960	8290	10500	7970	8070	8500
30	8850	e4500	e8000	e8000	---	9130	8850	8110	11000	7850	8220	8470
31	8830	---	e8000	e8000	---	9050	---	7980	---	7790	8150	---
TOTAL	264500	232540	232500	253000	224000	275830	202450	261360	265330	300890	239730	232560
MEAN	8532	7751	7500	8161	8000	8898	6748	8431	8844	9706	7733	7752
MAX	8850	8910	8500	8500	8000	9800	8960	8840	11000	16100	8220	8500
MIN	8310	4500	4500	8000	8000	8000	3570	7980	7890	7660	7340	5230
AC-FT	524600	461200	461200	501800	444300	547100	401600	518400	526300	596800	475500	461300

CAL YR 1990 TOTAL 3078490 MEAN 8434 MAX 14000 MIN 4500 AC-FT 6106000
WTR YR 1991 TOTAL 2984690 MEAN 8177 MAX 16100 MIN 3570 AC-FT 5920000

e Estimated

06186500 YELLOWSTONE RIVER AT YELLOWSTONE LAKE OUTLET, YELLOWSTONE NATIONAL PARK

LOCATION.--Lat 44°34'03", long 110°22'48", Yellowstone National Park, Hydrologic Unit 10070001, on left bank 450 ft downstream from Fishing Bridge, 0.3 mi downstream from outlet of Yellowstone Lake, and at river mile 616.4.

DRAINAGE AREA.--1,006 mi^2.

PERIOD OF RECORD.--December 1922 to September 1982, October 1983 to September 1986, October 1, 1988 to current year. Prior to October 1926, gage heights only. Monthly discharge only for winter periods in water years 1927-30, 1932-33, 1935-38, 1940, 1942-46 published in WSP 1309; figures of daily discharge for these months published in WSP 646, 666, 686, 701, 731, 746, 786, 806, 826, 856, 896, 956, 976, 1006, 1036, and 1056, have been found to be unreliable and should not be used.

REVISED RECORDS.--WSP 1309: See PERIOD OF RECORD. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 7,729.58 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 2, 1928, nonrecording gage at site 450 ft upstream at datum 1.07 ft higher.

REMARKS.--Estimated daily discharges: Dec. 20 to Mar. 22. Records good except those for estimated daily discharges, which are poor. No artificial regulation. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--62 years (1927-82, 1984-86, 1989-91), 1,329 ft^3/s, 17.94 in/yr, 962,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,170 ft^3/s, June 28, 1974, gage height, 8.20 ft; minimum daily, 110 ft^3/s, Feb. 13-15, 1989, ice affect; minimum gage height, 1.45 ft, Dec. 17, 1936.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,690 ft^3/s, June 20, gage height, 6.97 ft; minimum daily, 170 ft^3/s, Feb. 1,2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	878	639	504	e300	e170	e410	594	639	2830	5070	2680	1410
2	856	631	499	e310	e170	e400	592	642	2920	5000	2630	1370
3	834	629	495	e320	e180	e410	592	649	3040	4920	2560	1340
4	819	626	493	e320	e180	e420	584	654	3150	4820	2500	1310
5	824	616	486	e310	e180	e440	580	657	3460	4690	2460	1280
6	813	606	478	e300	e190	e460	582	665	3700	4660	2400	1260
7	810	604	472	e290	e190	e470	580	673	3940	4620	2340	1250
8	798	597	461	e280	e200	e480	577	675	4170	4540	2300	1240
9	783	592	457	e280	e200	e490	584	697	4380	4450	2250	1240
10	769	589	459	e270	e210	e500	594	735	4590	4330	2200	1200
11	763	580	459	e270	e210	e510	597	766	4800	4270	2150	1220
12	749	575	457	e260	e220	e520	592	804	5010	4220	2100	1200
13	727	570	455	e260	e230	e520	594	831	5230	4130	2060	1180
14	718	565	459	e250	e250	e540	599	847	5430	4010	2010	1160
15	721	563	461	e250	e270	e550	594	875	5560	3930	1960	1140
16	736	554	459	e240	e290	e550	594	901	5620	3800	1920	1130
17	732	547	457	e240	e300	e560	604	947	5660	3730	1890	1100
18	724	547	455	e230	e310	e560	614	1040	5670	3650	1850	1070
19	721	547	455	e230	e320	e570	619	1120	5660	3560	1830	1060
20	713	547	e450	e220	e330	e570	619	1250	5670	3490	1820	1040
21	702	554	e400	e220	e340	e580	616	1440	5670	3410	1780	1020
22	691	561	e350	e210	e350	e580	611	1610	5640	3360	1740	992
23	683	549	e320	e210	e350	589	611	1790	5620	3280	1720	970
24	678	535	e300	e210	e370	592	616	1980	5570	3210	1670	953
25	673	543	e310	e200	e380	594	631	2190	5520	3140	1640	940
26	670	515	e320	e200	e390	606	647	2380	5460	3080	1610	930
27	665	513	e330	e190	e400	619	649	2520	5390	3020	1580	918
28	654	508	e340	e190	e410	616	647	2600	5320	2950	1550	910
29	644	506	e350	e180	---	611	644	2640	5220	2880	1500	910
30	639	506	e340	e180	---	609	642	2730	5120	2780	1470	897
31	642	---	e320	e180	---	604	---	2770	---	2710	1440	---
TOTAL	22829	17014	13051	7600	7590	16530	18199	40717	145020	119710	61610	33640
MEAN	736	567	421	245	271	533	607	1313	4834	3862	1987	1121
MAX	878	639	504	320	410	619	649	2770	5670	5070	2680	1410
MIN	639	506	300	180	170	400	577	639	2830	2710	1440	897
AC-FT	45280	33750	25890	15070	15050	32790	36100	80760	287600	237400	122200	66720
CFSM	.73	.56	.42	.24	.27	.53	.60	1.31	4.81	3.84	1.98	1.11
IN.	.84	.63	.48	.28	.28	.61	.67	1.51	5.36	4.43	2.28	1.24

CAL YR 1990 TOTAL 434489 MEAN 1190 MAX 4290 MIN 300 AC-FT 861800 CFSM 1.18 IN. 16.07
WTR YR 1991 TOTAL 503510 MEAN 1379 MAX 5670 MIN 170 AC-FT 998700 CFSM 1.37 IN. 18.62

e Estimated

06187950 SODA BUTTE CREEK NEAR LAMAR RANGER STATION, YNP

LOCATION.--Lat 44°52'06", long 110°09'53", Yellowstone National Park, Hydrologic Unit 10070001, on left bank, 4 mi southeast of Lamar Ranger Station, and at river mile 1.5.

DRAINAGE AREA.--99.0 mi^2.

PERIOD OF RECORD.--October 1988 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 6,630 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 7, 16, 21, 27, Dec. 2, 5-8, 13, 15, 16, Dec. 19 to Jan. 6, Jan. 8, 19-22, 25, 26, 28-31, Feb. 2, 8, 11, 26-28, Mar. 3, 6, 9-10, 14, 15. Records good except those for estimated daily discharges, which are poor. No regulation or diversion upstream of station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,710 ft^3/s, June 5, 1991, gage height, 5.37 ft; minimum, 11 ft^3/s, Jan. 31, 1989, but may have been less during period of ice effect.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 24	2345	1,250	4.88	June 11	2400	1,570	5.23
June 5	2315	*1,710	*5.37				

Minimum discharge, 12 ft^3/s, Mar. 25, gage height, 1.54 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48	52	31	e30	22	26	23	36	629	397	104	50
2	46	50	e30	e26	e22	24	24	38	833	394	107	49
3	46	40	32	e24	22	e24	25	37	955	388	97	48
4	46	46	33	e23	22	25	26	35	1050	387	102	47
5	46	46	e32	e23	22	24	31	37	1250	418	100	47
6	69	35	e31	e24	22	e22	42	44	1310	381	93	45
7	56	e32	e30	24	22	23	36	57	1190	355	89	45
8	52	39	e32	e24	e21	23	29	68	1130	322	84	60
9	48	42	33	24	21	e24	26	103	1010	304	82	84
10	47	45	36	23	21	e24	29	108	1040	289	81	83
11	47	41	34	24	e21	25	27	156	1150	266	79	102
12	45	39	34	25	21	24	27	160	1320	245	77	68
13	46	40	e34	25	22	24	26	138	1210	235	75	60
14	45	43	34	25	22	e23	27	169	964	230	72	101
15	46	42	e33	25	23	e24	27	222	741	217	70	84
16	49	e35	e33	26	24	24	27	285	726	205	68	72
17	42	40	32	26	25	22	27	406	708	192	67	66
18	43	44	32	26	23	22	26	613	631	180	66	61
19	47	42	e25	e26	23	22	26	639	647	167	64	57
20	43	42	e20	e25	24	22	28	677	666	165	62	56
21	40	e30	e17	e24	25	21	33	785	615	153	59	54
22	46	25	e15	e25	24	20	39	862	559	149	57	53
23	45	33	e18	25	24	20	47	894	520	174	57	50
24	41	35	e20	25	22	20	52	970	513	154	56	49
25	45	40	e22	e24	22	19	47	994	521	141	55	49
26	50	39	e25	e25	e23	21	43	864	473	139	54	48
27	49	e30	e28	26	e22	20	40	640	428	126	55	47
28	50	26	e25	e25	e24	20	39	531	439	120	69	47
29	51	33	e20	e23	---	21	37	500	402	112	61	50
30	51	35	e18	e20	---	22	37	464	425	108	55	49
31	52	---	e25	e21	---	22	---	468	---	103	52	---
TOTAL	1477	1161	864	761	631	697	973	12000	24055	7216	2269	1781
MEAN	47.6	38.7	27.9	24.5	22.5	22.5	32.4	387	802	233	73.2	59.4
MAX	69	52	36	30	25	26	52	994	1320	418	107	102
MIN	40	25	15	20	21	19	23	35	402	103	52	45
AC-FT	2930	2300	1710	1510	1250	1380	1930	23800	47710	14310	4500	3530

CAL YR 1990 TOTAL 56056 MEAN 154 MAX 1220 MIN 15 AC-FT 111200
WTR YR 1991 TOTAL 53885 MEAN 148 MAX 1320 MIN 15 AC-FT 106900

e Estimated

YELLOWSTONE RIVER BASIN

06188000 LAMAR RIVER NEAR TOWER FALLS RANGER STATION, YELLOWSTONE NATIONAL PARK

LOCATION.--Lat 44°55'40", long 110°23'35", Yellowstone National Park, Hydrologic Unit 10070001, on left bank 0.5 mi north of the Cooke City highway, 1.6 mi northeast of Tower Falls Ranger Station, 2.7 mi downstream from Slough Creek, and at river mile 0.5.

DRAINAGE AREA.--660 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1922, April 1923 to September 1969, May 1985 to September 1986 (seasonal records only), October 1988 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 6,000 ft above National Vertical Datum of 1929, from topographic map. Prior to Sept. 16, 1925, nonrecording gage and Sept. 16, 1925 to July 29, 1927, water-stage recorder at same site at datum 1.00 ft higher. July 29, 1927 to Sept. 30, 1969, water-stage recorder at same site and datum. May 1985 to September 1986, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 6-9, 13, 14, Nov. 27 to Apr. 24. Records good except those for estimated daily discharges, which are poor. No regulation or diverion upstream of station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--49 years (water years 1924-69, 1989-91), 836 ft^3/s, 605,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,600 ft^3/s, May 25, 1928, gage height, 9.75 ft; minimum observed, 40 ft^3/s, Mar. 16, 1945, result of discharge measurement, but may have been less during periods of no gage-height record in winter.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,500 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 25	0430	*10,400	*8.57	June 6	0030	9,300	8.15

Minimum daily discharge, 80 ft^3/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	194	312	e180	e120	e110	e100	e180	386	4730	1810	405	171
2	188	281	e170	e110	e120	e110	e200	419	6060	1680	434	163
3	184	189	e160	e100	e120	e120	e250	417	6740	1600	386	155
4	189	234	e170	e95	e120	e120	e300	403	7090	1550	385	150
5	192	272	e180	e90	e120	e120	e400	393	7750	1580	444	150
6	305	e200	e160	e90	e110	e110	e500	489	7530	1450	408	151
7	290	e170	e140	e95	e110	e100	e400	761	7210	1360	372	151
8	247	e220	e140	e95	e110	e100	e350	1090	7160	1240	351	181
9	222	e250	e150	e100	e110	e110	e300	1820	6230	1160	330	281
10	234	265	e160	e100	e110	e110	e330	1770	6160	1130	317	285
11	226	236	e170	e110	e110	e120	e300	2430	6550	1110	304	446
12	215	216	e160	e110	e110	e110	e270	2620	6940	977	292	289
13	220	e210	e150	e120	e120	e100	e250	2030	6230	918	287	231
14	213	e220	e160	e120	e120	e110	e230	2270	5000	875	270	326
15	218	227	e150	e110	e120	e110	e220	2850	3930	840	267	440
16	235	179	e130	e110	e130	e110	e210	3160	3710	777	273	344
17	215	230	e140	e100	e130	e110	e200	4550	3690	729	264	294
18	212	234	e140	e100	e120	e110	e200	6830	3250	679	341	264
19	253	213	e120	e100	e110	e110	e200	7350	3150	636	272	236
20	225	213	e100	e95	e120	e110	e250	6990	3140	613	258	221
21	188	171	e85	e90	e130	e120	e350	7350	2980	597	244	209
22	244	176	e80	e95	e130	e120	e500	7880	2830	586	237	203
23	225	190	e85	e95	e120	e120	e700	7380	2590	655	229	197
24	202	199	e95	e100	e120	e120	e850	7390	2400	703	225	194
25	226	207	e100	e90	e110	e120	776	8650	2350	588	213	191
26	327	201	e110	e95	e110	e120	639	6990	2200	560	238	187
27	332	e160	e120	e100	e110	e120	537	4950	1970	539	273	182
28	309	e170	e110	e95	e110	e120	483	4040	1980	482	237	179
29	325	e180	e90	e85	---	e130	429	4210	1800	449	220	190
30	317	e190	e100	e90	---	e130	425	3910	1860	425	193	193
31	308	---	e110	e100	---	e150	---	3620	---	410	181	---
TOTAL	7480	6415	4115	3105	3270	3570	11229	115398	135210	28708	9150	6854
MEAN	241	214	133	100	117	115	374	3723	4507	926	295	228
MAX	332	312	180	120	130	150	850	8650	7750	1810	444	446
MIN	184	160	80	85	110	100	180	386	1800	410	181	150
AC-FT	14840	12720	8160	6160	6490	7080	22270	228900	268200	56940	18150	13590

CAL YR 1990 TOTAL 344489 MEAN 944 MAX 6870 MIN 80 AC-FT 683300
WTR YR 1991 TOTAL 334504 MEAN 916 MAX 8650 MIN 80 AC-FT 663500

e Estimated

06188000 LAMAR RIVER NEAR TOWER FALLS RANGER STATION, YELLOWSTONE NATIONAL PARK--Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1985-86, 1988 to current year.
PERIOD OF DAILY RECORD.--
SUSPENDED-SEDIMENT DISCHARGE: May 1985 to September 1986, August 1988 to current year (seasonal records only).
REMARKS.--Unpublished records of once-daily water temperature are available in files of District office.
EXTREMES FOR PERIOD OF DAILY RECORD.--
SEDIMENT CONCENTRATION: Maximum daily mean, 8,950 mg/L, Aug. 13, 1990; minimum daily mean, 1 mg/L, on several days in August 1986, October 1988, and September 1989.
SEDIMENT LOAD: Maximum daily, 24,300 tons, May 18, 1991; minimum daily, 0.29 tons, Oct. 2, 15, 16, 1989.
EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATION: Maximum daily mean, 6,640 mg/L, Aug. 27; minimum daily mean, 2 mg/L, July 21, 22.
SEDIMENT LOAD: Maximum daily, 24,300 tons, May 18; minimum daily, 1.4 tons, Sept. 28.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
03...	1230	178	--	--	194	5.0	4.0	4	1.9	69
NOV										
14...	1115	225	--	--	188	6.0	0.0	--	--	--
JAN										
03...	1300	99	--	--	248	-14.0	0.0	--	--	--
FEB										
12...	1330	109	--	--	220	5.0	0.0	--	--	--
MAR										
28...	1100	120	60	1	218	4.0	0.5	12	3.9	--
APR										
24...	1145	776	100	55	130	8.0	2.0	236	494	91
MAY										
21...	1115	6200	20	1	103	22.0	3.0	712	11900	51
JUN										
06...	0615	7830	--	--	75	12.0	4.0	895	18900	55
25...	1700	2050	100	65	87	10.0	9.0	32	177	50
AUG										
14...	1315	269	20	1	189	25.0	15.0	3	2.2	90

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	APRIL MEAN CONCEN-TRATION (MG/L)	APRIL LOADS (T/DAY)	MAY MEAN CONCEN-TRATION (MG/L)	MAY LOADS (T/DAY)	JUNE MEAN CONCEN-TRATION (MG/L)	JUNE LOADS (T/DAY)	JULY MEAN CONCEN-TRATION (MG/L)	JULY LOADS (T/DAY)	AUGUST MEAN CONCEN-TRATION (MG/L)	AUGUST LOADS (T/DAY)	SEPTEMBER MEAN CONCEN-TRATION (MG/L)	SEPTEMBER LOADS (T/DAY)
1	---	---	9	9.4	345	4410	25	122	4	4.4	24	11
2	---	---	13	15	480	7850	20	91	4	4.7	16	7.0
3	---	---	11	12	780	14200	17	73	4	4.2	14	5.9
4	---	---	11	12	720	13800	15	63	10	10	12	4.9
5	---	---	11	12	1060	22200	19	81	1200	1440	11	4.5
6	---	---	12	16	760	15500	12	47	185	204	11	4.5
7	---	---	56	115	665	12900	10	37	27	27	11	4.5
8	---	---	157	462	625	12100	11	37	12	11	10	4.9
9	---	---	415	2040	428	7200	7	22	7	6.2	340	258
10	---	---	430	2050	425	7070	6	18	7	6.0	300	231
11	---	---	770	5050	425	7520	7	21	6	4.9	1280	1540
12	---	---	760	5380	555	10400	5	13	5	3.9	310	242
13	---	---	235	1290	390	6560	5	12	5	3.9	58	36
14	---	---	190	1160	245	3310	5	12	4	2.9	57	50
15	---	---	295	2270	155	1640	7	16	3	2.2	135	160
16	---	---	310	2640	127	1270	5	10	4	2.9	39	36
17	---	---	800	9830	115	1150	4	7.9	3	2.1	19	15
18	4	2.2	1320	24300	100	877	3	5.5	780	718	14	10
19	7	3.8	940	18700	92	782	4	6.9	56	41	9	5.7
20	13	8.8	740	14000	76	644	3	5.0	24	17	6	3.6
21	21	20	870	17300	69	555	2	3.2	10	6.6	5	2.8
22	45	61	935	19900	56	428	2	3.2	6	3.8	4	2.2
23	142	268	805	16000	52	364	14	25	7	4.3	4	2.1
24	224	514	765	15300	41	266	1140	2160	4	2.4	3	1.6
25	103	216	940	22000	40	254	370	587	4	2.3	3	1.5
26	37	64	475	8960	39	232	48	73	400	257	3	1.5
27	26	38	265	3540	27	144	25	36	6640	4890	3	1.5
28	19	25	170	1850	26	139	20	26	310	198	3	1.4
29	15	17	210	2390	21	102	18	22	158	94	4	2.1
30	12	14	165	1740	21	105	13	15	73	38	7	3.6
31	---	---	138	1350	---	---	6	6.6	40	20	---	---
TOTAL	---	1251.8	---	199693.4	---	153972	---	3657.3	---	8032.7	---	2654.8

TOTAL LOAD FOR PERIOD: 369262.0 TONS.

06189000 BLACKTAIL DEER CREEK NEAR MAMMOTH, YELLOWSTONE NATIONAL PARK

LOCATION.--Lat 44°56'50", long 110°35'07", Yellowstone National Park, Hydrologic Unit 10070001, on left bank 0.6 mile upstream from East Fork, 0.7 mile upstream from culvert on Mammoth-Tower Falls highway, and 6.0 mi southeast of Mammoth.

DRAINAGE AREA.--14.3 mi^2.

PERIOD OF RECORD.--December 1937 to October 1945, October 1988 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 6,680 ft above National Geodetic Vertical Datum of 1929, from topographic map. December 1937 to October 1945, water-stage recorder and Cippoletti weir at site 300 ft downstream at different datum.

REMARKS.--Estimated daily discharges: Nov. 3 to Apr. 3. Records good except those for May, which are fair, and those for estimated daily discharges, which are poor. No diversion or regulation upstream of station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--10 years (1939-45, 1989-91), 8.15 ft^3/s, 5,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 198 ft^3/s, May 17, 1991, gage height, 3.99 ft, no flow for short periods Dec. 23, 24, 1937, ice jams upstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 35 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage Height (ft)	Date	Time	Discharge (ft^3/s)	Gage Height (ft)
May 8	2045	60	2.56	June 4	2015	69	2.40
May 17	1900	*198	*3.99	July 23	1800	86	2.67

Minimum daily discharge, 1.0 ft^3/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.5	3.5	e2.4	e1.8	e1.8	e1.7	e3.0	4.9	53	13	4.6	2.8
2	2.6	2.9	e2.5	e1.6	e1.9	e1.8	e5.0	4.3	58	12	4.6	2.7
3	2.7	e2.7	e2.5	e1.5	e2.0	e2.0	e8.0	4.2	58	11	4.4	2.7
4	3.0	e3.2	e2.6	e1.5	e2.1	e2.2	9.6	4.0	58	10	4.3	2.7
5	3.0	e3.0	e2.6	e1.5	e2.2	e2.1	17	4.5	55	11	4.5	2.8
6	4.6	e2.6	e2.5	e1.6	e2.2	e2.0	20	8.5	50	9.5	5.1	2.8
7	3.6	e2.3	e2.6	e1.7	e2.3	e1.9	10	19	46	9.2	4.6	3.0
8	3.5	e2.6	e2.7	e1.7	e2.3	e2.0	6.8	31	42	8.6	4.3	3.9
9	3.9	e2.8	e2.9	e1.8	e2.4	e2.0	7.1	31	39	8.5	4.1	7.4
10	3.6	e2.9	e3.0	e1.8	e2.4	e2.0	5.0	25	36	10	4.1	5.8
11	3.6	e2.9	e2.8	e1.9	e2.4	e1.9	5.5	41	34	9.0	3.8	5.9
12	3.4	e3.0	e2.4	e1.9	e2.3	e1.7	4.6	40	32	8.0	3.8	3.9
13	3.4	e3.0	e2.2	e2.0	e2.2	e1.8	4.5	50	29	7.4	3.6	3.5
14	3.2	e2.9	e2.3	e2.0	e2.1	e1.8	4.4	66	27	7.1	3.5	11
15	3.5	e2.6	e2.3	e1.9	e2.1	e1.8	3.9	76	25	6.7	3.6	6.4
16	3.9	e2.5	e2.4	e1.8	e2.2	e1.9	4.0	101	24	6.5	4.3	4.8
17	3.7	e2.7	e2.5	e1.8	e2.2	e1.9	4.1	135	22	6.2	3.8	4.1
18	3.8	e2.8	e2.0	e1.9	e2.1	e1.9	3.8	167	21	5.9	3.8	3.7
19	3.8	e2.7	e1.7	e1.8	e2.0	e2.0	3.8	145	20	5.7	3.6	3.7
20	3.1	e2.5	e1.5	e1.6	e2.1	e1.9	4.8	144	19	5.6	3.6	3.5
21	4.2	e2.3	e1.2	e1.5	e2.2	e1.9	6.5	145	18	5.5	3.4	3.3
22	3.6	e2.5	e1.0	e1.6	e2.1	e1.8	8.7	141	18	5.6	3.3	3.1
23	3.2	e2.6	e1.1	e1.6	e2.0	e1.8	9.5	124	17	11	3.3	3.1
24	3.5	e2.7	e1.2	e1.5	e2.0	e1.8	8.8	120	16	7.4	3.1	3.1
25	3.8	e2.8	e1.4	e1.4	e1.9	e1.7	7.8	116	15	6.1	2.9	3.1
26	4.1	e2.5	e1.5	e1.5	e1.9	e1.6	6.0	96	19	7.9	2.9	3.1
27	4.0	e2.2	e1.6	e1.6	e2.0	e1.7	5.4	67	15	6.2	3.1	3.1
28	3.8	e2.4	e1.4	e1.4	e2.0	e1.7	4.7	57	16	5.1	3.5	3.1
29	3.8	e2.5	e1.3	e1.2	---	e1.7	4.8	56	14	4.9	3.1	3.4
30	3.7	e2.6	e1.5	e1.4	---	e1.8	4.5	52	15	4.8	2.9	3.3
31	3.6	---	e1.6	e1.6	---	e2.0	---	50	---	4.8	2.8	---
TOTAL	109.7	81.2	63.2	51.4	59.4	57.8	201.6	2125.4	911	240.2	116.3	118.8
MEAN	3.54	2.71	2.04	1.66	2.12	1.86	6.72	68.6	30.4	7.75	3.75	3.96
MAX	4.6	3.5	3.0	2.0	2.4	2.2	20	167	58	13	5.1	11
MIN	2.5	2.2	1.0	1.2	1.8	1.6	3.0	4.0	14	4.8	2.8	2.7
AC-FT	218	161	125	102	118	115	400	4220	1810	476	231	236

CAL YR 1990 TOTAL 3528.6 MEAN 9.67 MAX 68 MIN 1.0 AC-FT 7000
WTR YR 1991 TOTAL 4136.0 MEAN 11.3 MAX 167 MIN 1.0 AC-FT 8200

e Estimated

YELLOWSTONE RIVER BASIN

06190370 GARDNER RIVER ABOVE MAMMOTH SPRINGS OUTFLOW, NEAR MAMMOTH, YELLOWSTONE NATIONAL PARK

LOCATION.--Lat 44°58'05", long 110°40'46", Yellowstone National Park, Hydrologic Unit 10070001, on right bank, 1,200 ft upstream from Mammoth Springs outflow, 0.5 mi upstream from foot bridge.

PERIOD OF RECORD.--Water years 1988 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)
OCT												
04...	0800	104	30	1	223	9.0	7.0	--	--	--	--	--
NOV												
15...	0759	92	30	1	236	1.0	3.0	7.9	95	27	6.6	9.8
JAN												
04...	0900	65	0	0	272	-12.0	0.0	--	--	--	--	--
FEB												
11...	1230	49	0	0	252	10.0	1.0	--	--	--	--	--
MAR												
27...	1000	68	80	2	248	4.0	1.0	--	--	--	--	--
MAY												
08...	0900	170	100	3	210	14.0	6.0	--	--	--	--	--
JUN												
26...	1015	313	35	1	167	18.0	9.0	8.2	72	21	4.7	4.5
AUG												
15...	0915	117	50	1	210	21.0	11.0	--	--	--	--	--
SEP												
30...	1310	112	50	1	227	19.5	9.5	--	--	--	--	--

DATE	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)
OCT												
04...	--	--	--	18	5.4	1.1	--	--	--	--	--	--
NOV												
15...	0.4	2.3	92	20	4.9	1.0	27	154	0.21	38.2	100	25
JAN												
04...	--	--	--	21	7.4	1.5	--	--	--	--	--	--
FEB												
11...	--	--	--	25	7.5	1.2	--	--	--	--	--	--
MAR												
27...	--	--	--	30	7.1	--	--	--	--	--	--	--
MAY												
08...	--	--	--	17	5.1	--	--	--	--	--	--	--
JUN												
26...	0.2	0.90	70	9.4	2.8	0.7	17	103	0.14	87.1	40	39
AUG												
15...	--	--	--	14	4.2	--	--	--	--	--	--	--
SEP												
30...	--	--	--	19	5.0	--	--	--	--	--	--	--

YELLOWSTONE RIVER BASIN

06190415 MAMMOTH SPRINGS OUTFLOW AT MAMMOTH, YELLOWSTONE NATIONAL PARK

LOCATION.--Lat 44°58'08", long 110°41'02", Yellowstone National Park, Hydrologic Unit 10070001, 2,000 ft upstream from mouth.

PERIOD OF RECORD.--Water years 1988 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)
OCT												
04...	0800	1.7	4	1	2020	9.0	14.0	--	--	--	--	--
NOV												
15...	0745	1.5	30	1	2050	0.0	11.0	8.1	750	170	78	130
JAN												
04...	0945	1.6	0	0	2070	-12.0	5.0	--	--	--	--	--
FEB												
11...	1245	1.6	0	0	2020	12.0	13.0	--	--	--	--	--
MAR												
27...	1030	1.6	80	2	2010	4.0	11.0	--	--	--	--	--
MAY												
08...	0930	1.5	100	3	2010	20.0	16.0	--	--	--	--	--
JUN												
26...	1045	1.9	30	3	2060	18.0	21.0	8.0	750	170	78	130
AUG												
15...	0945	2.0	80	1	2050	21.0	21.0	--	--	--	--	--
SEP												
03...	1245	1.7	--	--	1990	23.0	25.0	--	--	--	--	--
30...	1410	1.8	50	1	1960	22.0	22.0	--	--	--	--	--

DATE	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)
OCT												
04...	--	--	--	610	170	--	--	--	--	--	--	--
NOV												
15...	2	58	217	700	160	2.1	48	1480	2.01	5.99	3900	9
JAN												
04...	--	--	--	590	180	2.0	--	--	--	--	--	--
FEB												
11...	--	--	--	720	170	2.3	--	--	--	--	--	--
MAR												
27...	--	--	--	710	170	--	--	--	--	--	--	--
MAY												
08...	--	--	--	740	180	--	--	--	--	--	--	--
JUN												
26...	2	59	199	690	170	1.6	51	1470	2.00	7.56	4200	8
AUG												
15...	--	--	--	650	180	--	--	--	--	--	--	--
SEP												
03...	--	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	670	190	--	--	--	--	--	--	--

YELLOWSTONE RIVER BASIN

06190525 GARDNER RIVER SINKHOLE DIVERSION AT MAMMOTH, YELLOWSTONE NATIONAL PARK

LOCATION.--Lat 44°58'53", long 110°41'09", Yellowstone National Park, Hydrologic Unit 10070001, 0.3 mi upstream from Hot River, 1.0 mi northeast of Mammoth and at mile 3.7.

PERIOD OF RECORD.--Water years 1989 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)
OCT												
04...	1000	8.1	30	1	265	10.0	7.0	--	--	--	--	--
NOV												
15...	1130	8.2	50	1	270	2.0	4.0	8.3	110	30	7.9	12
JAN												
04...	1245	E7.0	0	0	292	-2.0	0.0	--	--	--	--	--
FEB												
11...	1400	E7.0	0	0	329	12.0	2.0	--	--	--	--	--
MAR												
27...	1215	E5.5	100	83	319	4.0	1.0	--	--	--	--	--
MAY												
08...	1200	7.6	100	2	238	19.0	7.0	--	--	--	--	--
JUN												
26...	1515	9.6	80	3	178	23.0	12.0	8.4	76	22	5.1	5.5
AUG												
15...	1200	8.1	80	1	256	24.0	15.0	--	--	--	--	--
SEP												
30...	1730	8.4	50	1	271	20.0	11.0	--	--	--	--	--

DATE	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)
OCT												
04...	--	--	--	31	7.8	1.3	--	--	--	--	--	--
NOV												
15...	0.5	3.4	95	31	8.6	1.2	28	179	0.24	3.97	180	26
JAN												
04...	--	--	--	33	11	1.3	--	--	--	--	--	--
FEB												
11...	--	--	--	44	13	1.2	--	--	--	--	--	--
MAR												
27...	--	--	--	48	13	--	--	--	--	--	--	--
MAY												
08...	--	--	--	28	7.6	--	--	--	--	--	--	--
JUN												
26...	0.3	1.6	70	15	4.4	0.7	18	114	0.16	2.96	80	33
AUG												
15...	--	--	--	28	8.3	--	--	--	--	--	--	--
SEP												
30...	--	--	--	31	8.7	--	--	--	--	--	--	--

06190530 CLEMATIS CREEK AT MAMMOTH, YELLOWSTONE NATIONAL PARK

LOCATION.--Lat 44°58'29", long 110°42'07", Yellowstone National Park, Hydrologic Unit 10070001, on right bank at upstream side of wooden footbridge, 500 ft south of Mammoth Hotel in Mammoth, YNP.

PERIOD OF RECORD.--Water years 1990 to current year.

REMARKS.--Some scheduled sampling was not done as there were periods of no streamflow.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)
OCT												
04...	0900	0.14	40	1	420	9.0	5.0	--	--	--	--	--
NOV												
15...	0930	0.11	30	1	485	4.0	1.0	8.2	220	57	18	25
MAY												
08...	1015	E0.06	90	2	558	22.0	8.0	--	--	--	--	--
JUN												
26...	0915	0.86	30	3	282	18.0	9.0	7.9	110	31	8.6	13
AUG												
15...	0815	E0.16	80	1	379	19.0	11.0	--	--	--	--	--
SEP												
30...	1300	E0.24	50	1	905	17.5	21.5	--	--	--	--	--

DATE	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)
OCT												
04...	--	--	--	71	3.0	0.3	--	--	--	--	--	--
NOV												
15...	0.7	3.0	183	88	3.5	0.4	22	327	0.44	0.10	40	41
MAY												
08...	--	--	--	91	3.0	--	--	--	--	--	--	--
JUN												
26...	0.5	1.9	88	51	2.1	0.2	25	186	0.25	0.43	30	36
AUG												
15...	--	--	--	69	3.9	--	--	--	--	--	--	--
SEP												
30...	--	--	--	230	44	--	--	--	--	--	--	--

YELLOWSTONE RIVER BASIN

06190540 HOT RIVER AT MAMMOTH, YELLOWSTONE NATIONAL PARK

LOCATION.--Lat 44°59'07", long 110°41'18", Yellowstone National Park, Hydrologic Unit 10070001, on left bank, 50 ft downstream from outfall, 150 ft upstream of mouth, 0.8 mile northeast of U.S. Post Office at Mammoth, Yellowstone National Park.

DRAINAGE AREA.--Indeterminate.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1988 to current year. Miscellaneous measurements made at this site 1938-44, 1966-67, and 1986-87 water years.

GAGE.--Water-stage recorder. Datum of gage is 5,666.11 ft above National Geodetic Vertical Datum of 1929. Levels by U.S. National Park Service.

REMARKS.--Estimated daily discharges: Mar. 12-14. Water-discharge records good. No regulation or diversion upstream of station, however, flow is added from sinkholes upstream from spring.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32 ft^3/s, on many days in 1991, gage height, 1.43 ft; minimum, 18 ft^3/s, Jan. 29, Feb. 2, 5, 6, 1990, gage height, 1.12 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 32 ft^3/s, on many days, gage height, 1.43 ft; minimum, 19 ft^3/s, Feb. 28, gage height, 1.15 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	27	25	27	27	25	26	25	30	27	25	25
2	28	27	27	27	26	25	26	25	30	27	25	25
3	28	25	27	27	27	25	26	25	30	27	25	25
4	28	27	28	27	27	26	26	25	30	27	25	25
5	28	27	28	28	27	26	26	25	30	27	25	25
6	28	26	23	28	27	24	26	25	29	27	25	25
7	28	26	24	28	26	23	26	26	29	27	25	26
8	28	27	25	28	26	25	26	26	29	27	25	26
9	28	27	27	28	26	24	25	26	29	26	25	26
10	27	27	27	28	26	24	25	27	29	26	25	26
11	27	27	28	28	26	25	25	27	29	26	25	26
12	27	27	26	28	26	e25	25	29	29	26	25	26
13	27	27	28	28	26	e25	25	29	29	26	25	26
14	27	27	28	28	27	e25	25	30	28	26	25	26
15	27	28	28	28	27	25	25	30	28	26	25	26
16	27	26	28	28	27	25	24	30	28	26	25	26
17	27	28	28	29	26	25	24	30	27	26	25	27
18	27	28	28	29	26	24	24	30	27	26	25	27
19	27	28	29	28	26	25	24	30	27	26	25	27
20	26	28	28	26	26	25	24	30	27	26	25	27
21	26	28	28	25	26	25	24	30	27	26	25	27
22	26	28	29	28	26	25	24	31	27	26	25	27
23	26	28	30	28	26	25	25	32	27	26	25	27
24	26	29	30	28	27	25	25	32	27	25	25	27
25	27	29	29	25	27	25	25	32	27	25	25	27
26	27	28	29	27	25	25	25	32	27	26	25	27
27	27	27	29	29	25	26	25	32	28	26	25	27
28	27	27	29	27	24	26	25	32	28	26	25	27
29	27	27	28	27	---	26	25	31	28	25	25	27
30	27	26	28	27	---	26	25	31	27	25	26	27
31	27	---	28	27	---	26	---	30	---	26	26	---
TOTAL	841	817	857	854	734	776	751	895	847	810	777	788
MEAN	27.1	27.2	27.6	27.5	26.2	25.0	25.0	28.9	28.2	26.1	25.1	26.3
MAX	28	29	30	29	27	26	26	32	30	27	26	27
MIN	26	25	23	25	24	23	24	25	27	25	25	25
AC-FT	1670	1620	1700	1690	1460	1540	1490	1780	1680	1610	1540	1560

CAL YR 1990 TOTAL 9686 MEAN 26.5 MAX 30 MIN 21 AC-FT 19210
WTR YR 1991 TOTAL 9747 MEAN 26.7 MAX 32 MIN 23 AC-FT 19330

e Estimated

06190540 HOT RIVER AT MAMMOTH, YELLOWSTONE NATIONAL PARK--Continued

WATER QUALITY RECORDS

PERIOD OF RECORD.--Water years 1988 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1988 to September 1990.
WATER TEMPERATURE: October 1988 to September 1990.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1989-90): Maximum, 2410 microsiemens, Jan. 29, 1990; minimum, 1500 microsiemens, July 17, 22-23, 1990.
WATER TEMPERATURE (water years 1989-1990): Maximum, 55.5°C, Feb. 28, 1990; minimum, 38°C, June 16, 17, 1989, April 19, 1990.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)
OCT										
03...	1700	28	--	--	1650	5.0	43.0	--	--	--
04...	1030	28	30	1	1660	11.0	43.0	430	120	2.3
NOV										
14...	1500	28	--	--	1680	16.0	46.0	--	--	--
15...	1150	28	50	1	1680	2.0	46.0	480	120	2.2
JAN										
04...	1200	27	0	0	1660	-2.0	43.0	430	100	2.2
24...	0940	28	--	--	1640	-2.0	42.0	--	--	--
FEB										
11...	1430	26	0	0	1770	14.0	44.0	460	120	2.5
MAR										
14...	1300	25	--	--	1710	15.0	42.5	--	--	--
27...	1300	26	100	83	1710	3.0	43.0	470	120	--
MAY										
07...	1630	26	--	--	1680	18.0	44.0	--	--	--
08...	1215	26	100	51	1680	22.0	43.0	430	100	--
JUN										
26...	1445	27	100	13	1570	22.0	42.0	410	100	1.7
AUG										
15...	1120	25	80	1	1640	26.0	44.0	420	110	--
SEP										
30...	1630	27	50	1	1600	20.0	43.5	440	110	--

DATE	TIME	PH LAB (STANDARD UNITS) (00403)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)
NOV								
15...	1150	6.8	660	180	51	90	2	38
JUN								
26...	1445	6.7	640	180	47	79	1	36

DATE	ALKALINITY LAB (MG/L AS CACO3) (90410)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)
NOV							
15...	196	44	1130	1.53	85.1	2700	20
JUN							
26...	337	40	1100	1.49	80.1	2400	35

YELLOWSTONE RIVER BASIN

06191000 GARDNER RIVER NEAR MAMMOTH, YELLOWSTONE NATIONAL PARK

LOCATION.--Lat 44°59'33", long 110°41'26", Yellowstone National Park, Hydrologic Unit 10070001, on left bank at Wyoming-Montana state line, 400 ft upstream from highway bridge, 0.5 mi downstream from Hot River (formerly Boiling River), 1.5 mi north of Mammoth, and at river mile 2.9.

DRAINAGE AREA.--202 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1938 to September 1972, April 1984 to current year. Prior to October 1959, published as Gardiner River near Mammoth.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 5,623.97 ft above National Geodetic Vertical Datum of 1929 (levels by U. S. National Park Service).

REMARKS.--No estimated daily discharges this year. Records good. No regulation or diversion upstream of station.

AVERAGE DISCHARGE.--41 years (1938-72, 1985-91), 214 ft^3/s, 14.39 in/yr, 155,000 acre ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,080 ft^3/s, June 4, 1956, gage height, 4.46 ft; maximum gage height, 4.78 ft, June 16, 1962, backwater from logs and debris; minimum discharge, 35 ft^3/s, Mar. 28, 1942, gage height, 1.08 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 25	0130	*1,430	*4.36	June 5	0600	1,260	4.14

Minimum discharge, 56 ft^3/s, Jan. 29, gage height, 1.80 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	112	114	96	88	88	89	86	106	725	312	153	123
2	113	108	99	89	87	89	89	114	856	288	154	121
3	112	99	98	88	86	85	94	111	1030	275	148	119
4	114	109	104	87	88	86	97	108	1100	267	151	119
5	115	110	102	88	88	89	108	107	1160	267	159	122
6	136	104	92	89	88	79	128	124	1060	259	155	120
7	120	86	88	89	85	84	122	172	992	254	154	122
8	118	110	94	91	85	84	106	224	926	242	149	137
9	118	111	99	91	87	83	101	290	862	235	145	158
10	119	109	101	92	87	84	99	244	830	247	143	165
11	120	108	105	92	86	84	95	298	847	236	139	166
12	116	105	98	92	91	83	92	316	911	223	138	142
13	116	105	102	92	90	84	91	316	852	213	135	133
14	116	106	102	92	90	84	92	373	749	208	133	195
15	119	106	91	92	90	84	92	435	629	203	137	166
16	125	99	85	91	93	84	94	571	564	197	137	144
17	118	107	99	92	92	83	94	736	545	191	140	136
18	118	107	97	92	89	82	95	1040	493	187	140	131
19	123	106	86	90	87	83	93	1090	445	183	137	128
20	115	107	78	81	88	82	95	1050	430	180	136	126
21	111	98	83	81	88	82	100	1100	412	178	133	125
22	118	99	87	93	88	82	108	1170	395	177	136	124
23	115	103	92	90	89	82	120	1190	377	186	133	123
24	113	105	94	89	87	83	133	1170	363	181	129	123
25	115	104	94	79	88	83	137	1270	350	178	127	123
26	117	102	92	84	84	83	125	1180	361	181	126	120
27	115	85	92	92	87	82	114	923	333	172	129	120
28	114	97	90	87	87	82	110	775	331	163	132	121
29	113	102	87	71	---	83	107	737	312	159	128	126
30	112	105	88	84	---	82	108	697	321	158	124	123
31	112	---	88	90	---	83	---	699	---	156	124	---
TOTAL	3618	3116	2903	2738	2463	2592	3125	18736	19561	6556	4304	4001
MEAN	117	104	93.6	88.3	88.0	83.6	104	604	652	211	139	133
MAX	136	114	105	93	93	89	137	1270	1160	312	159	195
MIN	111	85	78	71	84	79	86	106	312	156	124	119
AC-FT	7180	6180	5760	5430	4890	5140	6200	37160	38800	13000	8540	7940

CAL YR 1990 TOTAL 68604 MEAN 188 MAX 800 MIN 72 AC-FT 136100
WTR YR 1991 TOTAL 73713 MEAN 202 MAX 1270 MIN 71 AC-FT 146200

06191000 GARDNER RIVER NEAR MAMMOTH, YELLOWSTONE NATIONAL PARK--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1985, 1988 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1984 to September 1985.
WATER TEMPERATURE: October 1984 to September 1985.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water year 1985): Maximum , 941 microsiemens, Mar. 4, 1985; minimum, 186 microsiemens, May 26, 1985.
WATER TEMPERATURE (water year 1985): Maximum, 22.5°C, July 22, 26, 1985; minimum, 4.0°C, Apr. 20, May 12, 1985.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)
OCT										
04...	1100	115	30	1	598	12.0	14.0	110	32	1.4
NOV										
14...	1415	104	--	--	638	15.0	13.0	--	--	--
15...	1245	105	100	71	--	2.0	12.5	120	34	1.3
JAN										
02...	1645	94	--	--	668	-4.0	10.0	--	--	--
04...	1345	84	0	0	758	-2.0	10.5	140	38	1.5
FEB										
11...	1630	98	0	0	688	14.0	11.0	140	38	1.5
MAR										
27...	1630	84	--	1	748	6.0	14.0	160	43	--
28...	1530	84	--	--	762	10.0	17.0	--	--	--
MAY										
08...	1245	189	90	2	468	21.0	12.0	77	22	--
22...	1500	1040	--	--	222	25.0	12.0	--	--	--
JUN										
26...	1500	359	100	13	321	22.0	12.0	47	11	0.6
27...	1245	324	--	--	320	20.0	12.0	--	--	--
AUG										
15...	1700	138	80	1	545	26.0	21.0	100	26	--
SEP										
03...	1645	124	--	--	590	--	22.5	--	--	--
30...	1840	123	50	1	612	19.0	15.0	110	30	--

DATE	TIME	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)
NOV								
15...	1245	7.9	250	69	19	31	0.9	13
JUN								
26...	1500	8.0	130	36	8.7	12	0.5	4.8

DATE	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)
NOV							
15...	160	32	416	0.57	118	790	32
JUN							
26...	93	20	196	0.27	190	260	39

YELLOWSTONE RIVER BASIN

06191400 LaDUKE (CORWIN) HOT SPRINGS NEAR CORWIN SPRINGS, MT

LOCATION.--Lat 45°05'26", long 110°46'28", in NW1/4SE1/4SW1/4 sec.32, T.8 S., R.8 E., Park County, Hydrologic Unit 10070001, downstream end of concrete culvert under U.S. Highway 89, about 4.5 mi north of Gardiner, and 3 mi south of Corwin Springs.

PERIOD OF RECORD.--Water years 1988 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)
OCT												
02...	1215	0.20	10	1	2580	13.0	63.0	--	--	--	--	--
NOV												
15...	1430	0.20	30	1	2580	4.0	63.0	7.2	1000	320	60	230
JAN												
02...	1230	0.20	--	0	2590	-2.0	63.0	--	--	--	--	--
FEB												
11...	1140	0.20	0	0	2610	5.0	63.0	--	--	--	--	--
MAR												
26...	1315	0.20	50	1	2580	2.0	63.0	--	--	--	--	--
MAY												
08...	1410	0.20	90	3	2630	22.0	63.0	--	--	--	--	--
JUN												
25...	1200	0.22	30	3	2620	11.0	62.5	7.3	1000	310	62	240
AUG												
15...	1830	0.20	80	1	2660	24.0	63.0	--	--	--	--	--
SEP												
04...	1245	0.25	--	--	2600	30.0	63.0	--	--	--	--	--
30...	1145	0.20	50	1	2580	24.0	62.5	--	--	--	--	--

DATE	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)
OCT												
02...	--	--	--	1100	45	3.7	--	--	--	--	--	--
NOV												
15...	3	23	155	1300	43	3.1	46	2120	2.88	1.14	520	130
JAN												
02...	--	--	--	1200	42	3.2	--	--	--	--	--	--
FEB												
11...	--	--	--	1500	42	3.2	--	--	--	--	--	--
MAR												
26...	--	--	--	1800	46	--	--	--	--	--	--	--
MAY												
08...	--	--	--	1300	42	--	--	--	--	--	--	--
JUN												
25...	3	24	241	1300	48	3.8	47	2180	2.96	1.29	530	110
AUG												
15...	--	--	--	1300	44	--	--	--	--	--	--	--
SEP												
04...	--	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	1200	46	--	--	--	--	--	--	--

YELLOWSTONE RIVER BASIN

06191500 YELLOWSTONE RIVER AT CORWIN SPRINGS, MT

LOCATION.--Lat 45°06'43", long 110°47'37", in NW1/4SE1/4NW1/4 sec.30, T.8 S., R.8 E., Park County, Hydrologic Unit 10070002, on left bank 20 ft downstream from county road bridge at Corwin Springs, 1.3 mi upstream from Mol Heron Creek, 7 mi northwest of Gardiner, and at river mile 549.7.

DRAINAGE AREA.--2,623 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1889 to November 1893 (published as "at Horr"), September 1910 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1309: 1912. WSP 1509: 1889-94, 1911, 1913, 1916-18, 1920-21, 1925, 1927. WSP 1559: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 5,079.09 ft above National Geodetic Vertical Datum of 1929. Aug. 12, 1889, to Nov. 4, 1893, nonrecording gages at site 2 mi upstream at different datums. Sept. 2, 1910, to Apr. 19, 1935, nonrecording gages on bridge at present datum.

REMARKS.--Estimated daily discharges: Dec. 19 to Jan. 14, Jan. 25, Jan. 27 to Feb. 1, Mar. 1. Water-discharge records good except those for estimated daily discharges, which are poor. Natural storage in Yellowstone Lake. Diversions for irrigation of about 960 acres of which 40 acres lies downstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--85 years, (1890-93, 1911-91) 3,093 ft^3/s, 16.01 in/yr, 2,241,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 32,000 ft^3/s, June 14, 15, 1918, gage height, 11.5 ft, from rating curve extended above 18,000 ft^3/s; minimum, 343 ft^3/s, Feb. 2, 1989, gage height, 0.12 ft, result of freezeup; minimum gage height observed, 0.05 ft, Feb. 23, Mar. 5,9, 1937.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 12,000 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 25	0330	*20,500	*8.61	June 6	0330	19,600	8.42

Minimum daily discharge, 500 ft^3/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1470	1400	1000	e750	e630	e650	1100	1420	11100	8310	3750	2010
2	1460	1340	1060	e700	643	713	1150	1470	14000	7930	3760	1980
3	1430	1170	918	e650	637	707	1260	1470	15600	7670	3600	1940
4	1420	1250	1000	e620	636	711	1290	1460	16500	7480	3540	1900
5	1430	1340	1020	e600	637	740	1400	1430	17400	7450	3550	1860
6	1600	1200	956	e600	641	662	1660	1520	17500	7250	3500	1830
7	1590	1060	937	e620	638	669	1740	1880	16600	7020	3370	1810
8	1470	1190	927	e650	632	708	1500	2340	16800	6750	3270	1870
9	1430	1290	953	e650	640	687	1300	3570	15600	6530	3180	2040
10	1450	1300	941	e650	638	714	1340	3470	15800	6440	3120	2060
11	1440	1220	1020	e680	631	753	1260	4500	16200	6350	3020	2190
12	1400	1190	1000	e700	648	740	1200	5340	17500	6050	2950	2020
13	1400	1170	934	e750	655	757	1170	4330	16700	5850	2890	1890
14	1370	1200	974	e720	658	765	1190	4730	14700	5690	2830	2070
15	1390	1210	908	705	666	797	1200	5730	12700	5570	2780	2210
16	1410	1110	782	688	682	840	1210	6360	12200	5380	2750	2020
17	1410	1130	798	672	690	865	1210	9020	12400	5210	2680	1940
18	1380	1190	859	672	647	861	1220	13200	11600	5060	2710	1850
19	1430	1170	e750	677	641	899	1200	14100	11200	4930	2590	1800
20	1380	1180	e600	623	650	956	1200	13900	11100	4820	2560	1770
21	1290	1120	e550	605	648	974	1310	14900	10900	4740	2510	1740
22	1380	1100	e500	643	656	977	1510	16000	10600	4650	2440	1690
23	1360	1170	e550	659	666	992	1780	15700	10100	4640	2390	1660
24	1310	1140	e600	650	665	1010	1970	15700	9750	4680	2350	1630
25	1320	1150	e650	e600	670	976	1970	17700	9630	4510	2290	1610
26	1410	1160	e700	622	657	1030	1810	15400	9440	4420	2250	1590
27	1440	922	e750	e650	673	1010	1650	11800	8940	4290	2320	1570
28	1410	993	e700	e620	675	987	1570	10200	8790	4130	2250	1550
29	1430	1030	e600	e550	---	1020	1500	10400	8460	4000	2200	1590
30	1410	1110	e650	e600	---	980	1470	9940	8380	3880	2100	1590
31	1390	---	e700	e620	---	1030	---	9610	---	3800	2050	---
TOTAL	43910	35205	25287	20196	18250	26180	42340	248590	388190	175480	87550	55280
MEAN	1416	1173	816	651	652	845	1411	8019	12940	5661	2824	1843
MAX	1600	1400	1060	750	690	1030	1970	17700	17500	8310	3760	2210
MIN	1290	922	500	550	630	650	1100	1420	8380	3800	2050	1550
AC-FT	87100	69830	50160	40060	36200	51930	83980	493100	770000	348100	173700	109600

CAL YR 1990 TOTAL 1091541 MEAN 2991 MAX 14600 MIN 500 AC-FT 2165000
WTR YR 1991 TOTAL 1166458 MEAN 3196 MAX 17700 MIN 500 AC-FT 2314000

e Estimated

06191500 YELLOWSTONE RIVER AT CORWIN SPRINGS, MT--Continued
WATER QUALITY RECORDS

PERIOD OF RECORD.--Water years 1965, 1969-74, 1977-81, 1984-87, 1988 to current year.
PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: March 1984 to September 1985.
WATER TEMPERATURE: June 1977 to September 1981, March 1984 to September 1985.
SUSPENDED-SEDIMENT DISCHARGE: May 1985 to September 1987 seasonal, September 1988 to current year.
REMARKS.--Unpublished records of once-daily water temperature are available in files of District office.
EXTREMES FOR PERIOD OF DAILY RECORDS.--
SPECIFIC CONDUCTANCE (water years 1984-85): Maximum, 311 microsiemens, Feb. 5, 1985; minimum, 71 microsiemens, June 21, 22, 1984.
WATER TEMPERATURE (water years 1977-81, 1984-85): Maximum, 21.5°C, July 22, 23, 1977; minimum, 0.0°C, on many days during winter periods most years.
SEDIMENT CONCENTRATION: Maximum daily mean, 1,330 mg/L, May 19, 1991: minimum daily mean, 1 mg/L, on several days in September 1987.
SEDIMENT LOAD: Maximum daily, 50,700 tons, May 25, 1991; minimum daily, 2.7 tons, Sep. 29, 1987.
EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATION: Maximum daily mean, 1,330 mg/L, May 19; minimum daily mean, 2 mg/L, Sept. 27.
SEDIMENT LOAD: Maximum daily, 50,700 tons, May 25; minimum daily, 8.5 tons, Sept. 27.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
02...	1100	1490	--	--	--	10.0	12.0	4	16	86
NOV										
15...	1545	1190	--	--	242	2.0	4.0	--	--	--
JAN										
02...	1200	--	--	--	325	-2.0	0.0	--	--	--
24...	1200	658	--	--	341	-5.0	1.0	--	--	--
MAR										
26...	1630	1020	90	73	252	3.0	5.0	10	28	87
MAY										
08...	1445	2400	--	--	203	20.0	10.0	65	421	87
22...	1045	16000	--	--	90	25.0	5.0	975	42100	59
JUN										
25...	1015	9810	--	2	107	15.0	11.5	116	3070	45
AUG										
15...	2000	2740	80	1	170	24.0	18.0	6	44	78

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	11	33	6	23	288	8630	80	1790	14	142	9	49
2	14	43	6	24	440	16600	69	1480	14	142	8	43
3	16	54	6	24	521	21900	69	1430	10	97	7	37
4	16	56	6	24	552	24600	72	1450	10	96	6	31
5	29	110	5	19	637	29900	67	1350	19	182	6	30
6	43	193	7	29	630	29800	64	1250	35	331	4	20
7	50	235	19	96	460	20600	50	948	16	146	4	20
8	23	93	58	366	370	16800	45	820	9	79	7	35
9	22	77	540	5210	352	14800	45	793	8	69	18	99
10	15	54	305	2860	390	16600	57	991	10	84	43	239
11	13	44	680	8260	432	18900	54	926	9	73	33	195
12	11	36	635	9160	465	22000	52	849	7	56	102	556
13	8	25	195	2280	411	18500	51	806	9	70	22	112
14	7	22	172	2200	282	11200	43	661	8	61	39	218
15	8	26	345	5340	218	7480	35	526	6	45	32	191
16	7	23	365	6270	207	6820	38	552	7	52	21	115
17	10	33	1120	27300	211	7060	37	520	6	43	10	52
18	10	33	1280	45600	180	5640	30	410	24	176	7	35
19	9	29	1330	50600	143	4320	27	359	16	112	5	24
20	9	29	1080	40500	137	4110	26	338	13	90	4	19
21	12	42	1020	41000	126	3710	24	307	16	108	3	14
22	19	77	930	40200	120	3430	20	251	12	79	3	14
23	31	149	878	37200	136	3710	18	226	9	58	3	13
24	46	245	690	29200	110	2900	292	3690	7	44	3	13
25	36	191	1060	50700	102	2650	90	1100	6	37	3	13
26	21	103	612	25400	107	2730	29	346	7	43	3	13
27	16	71	322	10300	95	2290	24	278	490	3070	2	8.5
28	10	42	212	5840	90	2140	23	256	90	547	3	13
29	8	32	223	6260	81	1850	17	184	39	232	5	21
30	7	28	172	4620	77	1740	15	157	19	108	4	17
31	---	---	148	3840	---	---	14	144	13	72	---	---
TOTAL	---	2228	---	460745	---	333410	---	25188	---	6544	---	2259.5

TOTAL LOAD FOR PERIOD: 830374.5 TONS.

YELLOWSTONE RIVER BASIN

06192500 YELLOWSTONE RIVER NEAR LIVINGSTON, MT
(National stream quality accounting network station)

LOCATION.--Lat 45°35'50", long 110°33'55", in NE1/4NW1/4NW1/4 sec. 12, T.3 S., R.9 E., Park County, Hydrologic Unit 10070002, on right bank 50 ft downstream from bridge on Montana Secondary Highway 540, 2 mi downstream from Suce Creek, 4 mi south of Livingston, and at river mile 501.4.

DRAINAGE AREA.--3,551 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1897 to December 1905, August 1928 to September 1932, October 1937 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1309: 1899. WSP 1509: 1902. WSP 1629: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 4,542.49 ft above National Geodetic Vertical Datum of 1929. May 2, 1897, to Dec. 31, 1905, nonrecording gage on highway bridge at different datum. Aug. 23, 1928, to Sept. 30, 1932, and Mar. 14, 1938, to Feb. 3, 1951, nonrecording gage on highway bridge at present datum.

REMARKS.--Estimated daily discharges: Dec. 18 to Jan. 22, Jan. 28, 29. Water-discharge records good except those for May 12 to June 4, which are fair, and those for estimated daily discharges, which are poor. Diversions for irrigation of about 24,200 acres of which about 2,000 acres is downstream from station.

AVERAGE DISCHARGE.--66 years, 3,717 ft^3/s, 2,693,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 36,300 ft^3/s, June 17, 1974, gage height, 9.21 ft; maximum gage height, 9.34 ft, June 20, 1943; minimum daily discharge, 540 ft^3/s, Feb. 4,5, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 13,500 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 25	1200	22,900	7.88	June 6	1045	*23,000	*7.89

Minimum daily discharge, 600 ft^3/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1810	1840	1490	e1100	1110	1070	1390	1800	12100	9120	3830	2310
2	1820	1850	1420	e1200	1110	1110	1460	1800	15100	8680	3850	2290
3	1840	1720	1410	e1100	1090	1110	1530	1830	17600	8380	3720	2250
4	1810	1630	1370	e1000	1100	1080	1620	1820	19400	8120	3610	2200
5	1840	1790	1470	e950	1130	1110	1660	1780	20600	8010	3590	2180
6	1920	1760	1430	e900	1130	1090	1870	1800	21300	7830	3600	2160
7	2040	1570	1320	e900	1120	1010	2140	2020	20400	7510	3560	2140
8	1920	1560	1300	e950	1110	1040	1970	2460	20600	7250	3440	2190
9	1860	1720	1380	e1000	1090	1060	1770	3450	19100	6970	3300	2290
10	1840	1750	1400	e1000	1090	1050	1680	4120	18900	6840	3220	2420
11	1870	1720	1410	e1000	1080	1110	1730	4430	19200	6700	3160	2420
12	1840	1660	1460	e1050	1080	1100	1630	5850	20800	6400	3080	2500
13	1820	1640	1400	e1100	1100	1100	1560	5200	20400	6160	3020	2290
14	1820	1630	1390	e1200	1100	1120	1540	5260	18200	5970	2960	2390
15	1810	1680	1440	e1150	1130	1130	1570	6420	15500	5830	2920	2650
16	1850	1630	1360	e1100	1170	1160	1600	7060	14500	5640	2880	2540
17	1900	1570	1210	e1100	1190	1200	1580	9060	14400	5440	2840	2440
18	1830	1620	e1100	e1050	1130	1220	1580	12600	13700	5280	2830	2360
19	1850	1640	e900	e1050	1050	1230	1570	15400	13000	5130	2780	2280
20	1880	1620	e700	e1050	1050	1270	1560	15300	12900	4980	2710	2240
21	1790	1620	e650	e1000	1060	1320	1580	16200	12600	4910	2690	2220
22	1770	1560	e600	e950	1050	1330	1730	17400	12100	4780	2640	2190
23	1830	1580	e700	1110	1050	1330	1970	18100	11700	4740	2600	2140
24	1790	1590	e800	1090	1050	1340	2220	18300	11000	4780	2530	2110
25	1750	1560	e900	1040	1040	1360	2360	20700	10700	4680	2480	2090
26	1790	1600	e1000	1010	1040	1340	2260	19900	10500	4590	2430	2080
27	1880	1520	e1100	996	1030	1360	2090	16500	9980	4440	2480	2060
28	1870	1340	e1200	e1050	1050	1340	1970	13500	9580	4280	2440	2040
29	1860	1420	e1100	e950	---	1340	1910	12500	9370	4140	2510	2050
30	1860	1510	e900	888	---	1330	1840	11900	9090	4010	2380	2060
31	1840	---	e1000	944	---	1340	---	11500	---	3900	2340	---
TOTAL	57200	48900	36310	31978	30530	37100	52940	285960	454320	185490	92420	67580
MEAN	1845	1630	1171	1032	1090	1197	1765	9225	15140	5984	2981	2253
MAX	2040	1850	1490	1200	1190	1360	2360	20700	21300	9120	3850	2650
MIN	1750	1340	600	888	1030	1010	1390	1780	9090	3900	2340	2040
AC-FT	113500	96990	72020	63430	60560	73590	105000	567200	901100	367900	183300	134000

CAL YR 1990 TOTAL 1236080 MEAN 3387 MAX 16100 MIN 600 AC-FT 2452000
WTR YR 1991 TOTAL 1380728 MEAN 3783 MAX 21300 MIN 600 AC-FT 2739000

e Estimated

06192500 YELLOWSTONE RIVER NEAR LIVINGSTON, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1965, 1970 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1969 to September 1981.
WATER TEMPERATURE: October 1969 to September 1983.
SUSPENDED-SEDIMENT DISCHARGE: May 1985 to September 1986.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1969-81): Maximum daily, 398 microsiemens, Apr. 3, 1970; minimum daily, 73 microsiemens Jun. 14, 1979.
WATER TEMPERATURE (water years 1969-83): Maximum, 23.0°C, Jul. 9, 1976; minimum, 0.0°C on many days during winter.
SEDIMENT CONCENTRATION (water years 1985-86): Maximum daily mean, 790 mg/L, May 28, 1986; minimum daily mean, 4 mg/L on several days in August 1985 and September 1986.
SEDIMENT LOAD (water years 1985-86): Maximum daily, 33,700 tons, Jun. 2, 1986; minimum daily, 28 tons on several days in August and September of 1985 and 1986.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV												
28...	1545	1380	30	1	272	-2.0	2.0	654	12.0	101	K3	K3
JAN												
22...	1330	945	80	3	325	-2.0	1.0	650	12.5	103	K1	K9
MAR												
06...	1400	1070	70	1	312	1.0	4.0	646	12.5	113	K11	K2
APR												
23...	1130	1930	20	1	241	15.0	10.0	646	10.2	107	31	K9
MAY												
23...	1100	20100	--	--	102	22.0	9.0	--	--	--	--	--
JUN												
04...	1320	20300	--	--	93	18.0	9.5	--	--	--	--	--
24...	1700	10900	40	1	114	21.0	14.0	645	8.9	102	K11	K14
AUG												
20...	1730	2780	--	--	220	31.0	20.0	--	--	--	--	--
21...	0830	2700	0	0	198	12.0	16.0	653	7.7	91	K12	25

DATE	TIME	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)
NOV												
28...	1545	96	0	81	8.2	1.1	84	22	7.0	19	0.9	4.3
JAN												
22...	1330	117	2	99	8.4	1.0	110	28	8.7	23	1	5.2
MAR												
06...	1400	105	5	93	8.7	2.5	98	26	7.9	24	1	5.6
APR												
23...	1130	82	4	74	8.5	4.8	76	20	6.3	18	0.9	4.4
JUN												
24...	1700	46	0	40	8.1	15	35	9.2	2.9	7.5	0.6	1.9
AUG												
21...	0830	76	0	64	8.0	3.0	64	17	5.3	15	0.8	3.4

06192500 YELLOWSTONE RIVER NEAR LIVINGSTON, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRATE TOTAL (MG/L AS N) (00620)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)
NOV												
28...	88	27	13	0.5	24	162	165	0.22	604	--	<0.01	<0.01
JAN												
22...	103	41	15	0.8	29	201	212	0.27	513	0.39	0.01	<0.01
MAR												
06...	96	47	12	0.8	27	192	208	0.26	555	--	<0.01	<0.01
APR												
23...	77	29	10	0.7	21	163	154	0.22	849	0.06	0.01	0.01
JUN												
24...	41	8.6	4.3	0.4	15	85	73	0.12	2500	0.15	0.01	<0.01
AUG												
21...	67	22	9.2	0.6	19	133	130	0.18	970	--	<0.01	<0.01

DATE	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV											
28...	0.20	0.20	0.05	0.05	0.02	0.03	0.01	0.01	6	22	67
JAN											
22...	0.40	0.40	0.07	0.09	0.04	0.02	0.02	0.02	19	48	83
MAR											
06...	0.20	0.22	<0.01	0.03	0.03	<0.01	<0.01	0.02	8	23	71
APR											
23...	0.07	0.13	0.02	0.03	0.04	<0.01	<0.01	<0.01	21	109	75
JUN											
24...	0.16	0.09	0.04	0.06	0.07	0.02	0.03	0.01	132	3880	49
AUG											
21...	0.12	0.11	<0.01	<0.01	0.04	0.01	0.03	0.01	15	109	81

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)
NOV											
28...	1545	50	24	34	<0.5	<1.0	<1	<3	2	27	<1
MAR											
06...	1400	70	26	38	<0.5	1.0	1	<3	2	36	1
JUN											
24...	1700	50	9	15	<0.5	<1.0	<1	<3	4	34	<1
AUG											
21...	0830	30	23	26	<0.5	<1.0	<1	<3	3	13	<1

DATE	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
NOV										
28...	86	5	0.1	<10	5	<1	<1.0	140	<6	7
MAR										
06...	120	4	<0.1	<10	<1	<1	<1.0	170	<6	5
JUN										
24...	30	4	<0.1	<10	<1	<1	<1.0	58	<6	9
AUG										
21...	65	3	--	<10	<1	<1	<1.0	100	<6	<3

YELLOWSTONE RIVER BASIN

06195600 SHIELDS RIVER NEAR LIVINGSTON, MT

LOCATION.--Lat 45°44'18", long 110°28'45", in NE1/4SE1/4NW1/4 sec.22, T.1 S., R.10 E., Park County, Hydrologic Unit 10070003, on right bank 0.2 mi downstream from private road bridge, 6.5 mi northeast of Livingston, and at river mile 2.0.

DRAINAGE AREA.--852 mi^2.

PERIOD OF RECORD.--October 1978 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 4,420 ft above National Geodetic Vertical Datum of 1929, from topographic map. Oct. 1, 1978, to Aug. 12, 1980, water-stage recorder at site 0.2 mi upstream at datum 7.89 ft higher.

REMARKS.--Estimated daily discharges: Dec. 13 to Feb. 3, Feb. 10, 11, and Mar. 6-8. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 32,000 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--13 years, 282 ft^3/s, 204,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,600 ft^3/s, June 20, 1979, gage height, 6.80 ft, previous datum; minimum, 17 ft^3/s, Aug. 20, 1988, gage height, 1.44 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,090 ft^3/s, May 21, gage height, 5.80 ft; minimum daily, 35 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	98	115	92	e60	e80	65	104	187	1050	304	52	51
2	96	115	113	e65	e90	78	125	188	1100	266	54	52
3	97	106	116	e62	e100	94	147	195	1410	239	52	50
4	102	117	115	e60	102	90	152	198	1590	220	48	50
5	98	131	113	e60	97	92	171	189	1830	214	52	51
6	99	121	110	e62	95	e75	199	192	2030	200	56	52
7	107	101	101	e65	93	e70	195	229	2000	164	63	51
8	111	122	107	e68	94	e70	165	280	1670	164	62	55
9	111	129	109	e70	92	73	143	370	1250	145	65	67
10	113	132	108	e70	e90	86	141	480	1120	129	67	80
11	112	137	112	e75	e90	88	139	549	1040	127	68	78
12	113	133	93	e85	88	76	134	785	1010	125	68	78
13	113	130	e90	e95	88	80	129	783	860	115	69	76
14	111	130	e88	e95	85	86	126	916	717	107	67	83
15	111	130	e85	e90	86	81	130	1160	596	107	62	95
16	118	115	e82	e90	94	80	135	1220	481	105	63	103
17	127	114	e80	e90	104	81	136	1320	410	106	64	100
18	125	130	e60	e85	95	78	138	1870	366	96	64	102
19	121	128	e40	e85	85	84	147	2530	339	91	61	101
20	120	129	e37	e85	94	90	156	2690	362	86	60	101
21	122	116	e35	e80	99	113	174	2750	376	86	56	99
22	124	124	e40	e80	94	113	194	2600	350	78	52	99
23	127	129	e50	e80	94	106	217	2460	325	63	54	99
24	125	126	e60	e75	85	100	245	2400	311	62	57	98
25	127	125	e65	e70	92	97	274	2300	292	64	59	98
26	122	125	e70	e70	77	94	271	2410	280	70	57	95
27	117	104	e75	e70	84	93	234	1920	272	64	61	93
28	120	109	e60	e65	80	90	215	1510	260	62	65	93
29	120	124	e50	e60	---	90	202	1250	264	62	67	106
30	116	121	e50	e65	---	89	193	1130	247	57	63	111
31	117	---	e55	e70	---	93	---	1110	---	53	60	---
TOTAL	3540	3668	2461	2302	2547	2695	5131	38171	24208	3831	1868	2467
MEAN	114	122	79.4	74.3	91.0	86.9	171	1231	807	124	60.3	82.2
MAX	127	137	116	95	104	113	274	2750	2030	304	69	111
MIN	96	101	35	60	77	65	104	187	247	53	48	50
AC-FT	7020	7280	4880	4570	5050	5350	10180	75710	48020	7600	3710	4890

CAL YR 1990 TOTAL 92911 MEAN 255 MAX 1620 MIN 35 AC-FT 184300
WTR YR 1991 TOTAL 92889 MEAN 254 MAX 2750 MIN 35 AC-FT 184200

e Estimated

YELLOWSTONE RIVER BASIN

06200000 BOULDER RIVER AT BIG TIMBER, MT

LOCATION.--Lat 45°50'03", long 109°56'17", in SE1/4NE1/4SE1/4 sec.14, T.1 N., R.14 E., Sweet Grass County, Hydrologic Unit 10070002, on left bank 150 ft upstream from Old Boulder Bridge, 1 mi east of Big Timber, and at river mile 1.6.

DRAINAGE AREA.--523 mi^2.

PERIOD OF RECORD.--April 1947 to December 1953, March 1955 to current year. Monthly discharge only for April 1947, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 4,056.39 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--Estimated daily discharges: Dec. 13 to Jan. 11, Jan. 23 to Feb. 3. Records good except those for periods of estimated daily discharges, which are poor. Diversions for irrigation of about 13,300 acres, of which about 250 acres is downstream of station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--42 years, 582 ft^3/s, 421,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,840 ft^3/s, May 28, 1956, gage height, 7.84 ft; maximum gage height, 8.25 ft, July 8, 1975; minimum discharge, 10 ft^3/s, about Aug. 26 or 27, 1961.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 25	0800	4,140	5.86	June 12	0800	*6,900	*7.60

Minimum daily discharge, 30 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	79	181	119	e80	e130	91	98	190	1590	1770	165	65
2	84	181	135	e60	e140	75	101	192	2220	1640	162	64
3	88	169	127	e60	e140	125	106	188	3140	1540	155	63
4	83	154	160	e55	136	115	110	176	3960	1480	152	62
5	82	190	162	e55	128	113	109	169	4460	1560	148	60
6	120	182	139	e60	128	102	128	172	4330	1470	140	60
7	134	148	151	e90	125	95	158	195	4040	1280	137	62
8	111	148	151	e80	128	109	140	229	4430	1130	131	67
9	103	173	153	e120	127	99	124	390	3820	1020	122	78
10	105	168	150	e200	123	106	118	503	4000	970	117	88
11	111	161	150	e300	116	112	130	498	4240	934	116	101
12	105	153	138	e400	115	105	118	507	5890	816	109	113
13	111	151	e100	e430	112	102	108	507	5250	737	100	102
14	128	151	e90	e400	111	105	121	601	4120	679	97	114
15	127	157	e80	e350	114	102	136	781	2650	609	98	168
16	130	156	e100	e300	122	101	142	798	2360	561	104	168
17	135	146	e140	248	129	101	136	936	2760	517	100	205
18	125	155	e90	138	115	99	145	1460	2520	466	97	216
19	128	165	e40	120	110	100	143	1870	2360	435	97	198
20	132	162	e35	113	113	102	138	2020	2540	402	93	204
21	132	161	e30	155	114	107	150	2390	2590	404	88	217
22	129	151	e40	182	111	104	171	2580	2500	375	85	229
23	141	164	e50	e140	111	101	200	2970	2220	353	82	206
24	138	163	e70	e120	111	102	239	3090	2100	329	80	202
25	140	161	e90	e110	108	101	277	3740	2280	302	76	200
26	147	164	e110	e130	104	104	258	3660	2020	284	71	197
27	161	147	e80	e150	104	100	227	2670	1810	267	72	199
28	178	119	e60	e120	109	96	207	2010	1760	252	72	204
29	180	141	e45	e90	---	97	197	1750	1680	215	71	209
30	183	163	e60	e100	---	96	192	1630	1700	182	70	223
31	180	---	e100	e120	---	96	---	1610	---	169	68	---
TOTAL	3930	4785	3145	5076	3334	3163	4627	40482	91340	23148	3275	4344
MEAN	127	159	101	164	119	102	154	1306	3045	747	106	145
MAX	183	190	162	430	140	125	277	3740	5890	1770	165	229
MIN	79	119	30	55	104	75	98	169	1590	169	68	60
AC-FT	7800	9490	6240	10070	6610	6270	9180	80300	181200	45910	6500	8620

CAL YR 1990 TOTAL 169585 MEAN 465 MAX 4220 MIN 30 AC-FT 336400
WTR YR 1991 TOTAL 190649 MEAN 522 MAX 5890 MIN 30 AC-FT 378200

e Estimated

YELLOWSTONE RIVER BASIN

06202510 STILLWATER RIVER ABOVE NYE CREEK, NEAR NYE, MT

LOCATION.--45°23'46", long 109°52'14", in SW1/4NE1/4SW1/4 sec.15, T.5 S., R.15 E., Stillwater County, Hydrologic Unit 10007005, at private bridge 200 ft above Nye Creek, 1.0 mi below Mountain View Creek, 4.3 mi southwest of Nye, and at river mile 41.3.

DRAINAGE AREA.--193 mi^2.

PERIOD OF RECORD.--November 1979 to September, 1991 (discontinued).

GAGE.--Nonrecording gage and crest-stage gage. Elevation of gage is 4,880 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 25-29, Dec. 13 to Jan. 11, Jan. 20-31, Mar. 1-3, 6, 7. Records fair except those for estimated daily discharges, which are poor. There are no known diversions or regulation upstream from gage. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--11 years, 373 ft^3/s, 270,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,400 ft^3/s, July 10, 1983, gage height, 7.60 ft; minimum observed, 16 ft^3/s, Nov. 28, 1989, result of discharge measurement.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,670 ft^3/s, June 5, gage height, 7.13 ft; minimum daily, 20 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	126	111	76	e55	53	e45	66	111	1370	1440	326	140
2	123	102	76	e50	57	e40	66	111	1980	1520	352	134
3	118	78	80	e45	54	e45	77	111	2670	1420	330	134
4	118	99	80	e40	54	49	76	118	2890	1390	313	129
5	126	97	76	e40	51	53	86	133	3810	1610	308	126
6	198	97	78	e45	50	e50	94	129	3270	1460	279	121
7	146	99	82	e50	50	e55	125	456	3050	1480	271	118
8	142	99	80	e45	50	63	109	474	3090	1370	255	121
9	131	99	61	e50	50	68	97	474	2940	1240	247	147
10	129	104	66	e60	47	58	92	427	2940	1180	240	156
11	142	99	70	e70	46	47	86	406	3060	1020	232	162
12	137	97	63	80	48	57	86	401	3830	931	225	177
13	137	97	e55	82	47	75	86	533	3400	961	211	163
14	131	92	e55	80	44	67	88	609	2690	914	211	184
15	131	92	e50	76	44	58	86	715	2090	882	194	194
16	131	90	e55	70	57	50	86	855	2020	889	191	191
17	131	88	e50	72	89	57	86	1090	2200	873	187	210
18	129	88	e45	66	76	47	86	1750	2160	820	187	211
19	131	90	e30	61	50	46	82	1600	1980	706	178	185
20	129	86	e25	e50	50	46	74	1650	2240	612	169	169
21	131	47	e20	e45	53	44	103	1780	2180	567	162	171
22	131	75	e25	e45	47	42	133	1940	1900	476	159	157
23	111	82	e30	e40	42	45	156	2280	1890	463	162	153
24	108	76	e40	e45	45	42	171	2470	1820	427	162	148
25	120	e65	e40	e35	48	36	168	2930	1790	446	156	148
26	131	e55	e45	e40	47	37	154	2640	1720	432	153	134
27	131	e55	e60	e45	46	42	134	1800	1700	426	156	134
28	131	e70	e40	e40	46	42	134	1440	1700	392	153	134
29	123	e75	e30	e35	---	42	121	1250	1410	377	162	121
30	126	76	e40	e35	---	37	109	1210	1530	372	156	121
31	123	---	e60	e50	---	52	---	1160	---	353	156	---
TOTAL	4052	2580	1683	1642	1441	1537	3117	33053	71320	27449	6643	4593
MEAN	131	86.0	54.3	53.0	51.5	49.6	104	1066	2377	885	214	153
MAX	198	111	82	82	89	75	171	2930	3830	1610	352	211
MIN	108	47	20	35	42	36	66	111	1370	353	153	118
AC-FT	8040	5120	3340	3260	2860	3050	6180	65560	141500	54450	13180	9110

CAL YR 1990 TOTAL 147579 MEAN 404 MAX 3630 MIN 20 AC-FT 292700
WTR YR 1991 TOTAL 159110 MEAN 436 MAX 3830 MIN 20 AC-FT 315600

e Estimated

YELLOWSTONE RIVER BASIN

06204050 WEST ROSEBUD CREEK NEAR ROSCOE, MT

LOCATION.--Lat 45°14'35", long 109°43'50", in NE1/4 sec.10, T.7 S., R.16 E., Stillwater County, Hydrologic Unit 10070005, on left bank at Mystic Lake powerplant, 2.0 mi downstream from Mystic Lake, 13.5 mi southwest of Roscoe, and at river mile 26.8.

DRAINAGE AREA.--52.1 mi^2.

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

GAGE.--Water-stage recorder and rectangular weir. Datum of gage is 6,535.60 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Oct. 18-24. Records good. Flow regulated by Mystic Lake (station number 06204000). Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--26 years, 124 ft^3/s, 32.32 in/yr, 89,840 acre-ft/yr, adjusted for change in contents in Mystic Lake.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,630 ft^3/s, July 6, 1975, gage height, 4.71 ft; minimum daily, 2.5 ft^3/s, Apr. 3, 4, 6, 7, 1967.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 632 ft^3/s, July 6, gage height, 2.84 ft; minimum daily, 22 ft^3/s, Apr. 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	79	113	92	84	56	37	23	25	135	358	205	151
2	79	115	90	86	55	37	24	26	129	372	191	152
3	78	111	89	83	55	38	25	23	132	383	190	152
4	80	111	89	84	55	38	25	25	139	413	190	93
5	102	121	90	84	55	38	26	26	185	506	188	60
6	90	132	90	83	56	37	25	26	201	609	186	59
7	114	126	90	83	55	37	25	31	200	549	185	58
8	114	130	89	83	55	37	25	41	198	483	183	59
9	113	130	91	79	56	36	25	46	196	447	183	68
10	112	130	92	82	56	37	25	39	196	444	182	61
11	111	132	90	84	52	39	23	37	202	438	181	63
12	110	132	74	82	50	38	22	34	211	402	180	63
13	111	132	80	83	50	37	25	37	209	376	154	61
14	109	132	81	82	51	37	26	42	202	371	158	60
15	109	134	85	74	51	31	26	44	195	361	157	64
16	116	134	86	84	51	24	25	44	193	375	156	61
17	117	134	78	83	50	24	24	69	193	373	154	63
18	e110	134	79	67	49	23	24	95	212	274	153	62
19	e110	134	84	54	43	23	24	97	290	302	152	62
20	e110	132	85	55	38	24	25	124	395	289	152	61
21	e110	134	115	53	34	25	25	158	479	282	151	62
22	e110	134	95	55	36	24	25	165	482	267	151	60
23	e110	134	93	55	41	23	29	167	445	222	152	60
24	e110	134	86	54	43	23	30	168	413	192	153	65
25	102	134	82	55	40	24	27	166	443	192	152	65
26	102	134	83	57	38	25	26	162	444	191	152	64
27	102	134	82	53	38	25	25	150	392	207	151	60
28	102	134	83	54	37	24	24	143	361	218	150	61
29	107	102	83	55	---	23	24	142	350	215	150	62
30	111	90	82	55	---	23	26	159	342	208	150	62
31	115	---	84	55	---	23	---	156	---	202	150	---
TOTAL	3255	3813	2692	2180	1346	934	753	2667	8164	10521	5142	2154
MEAN	105	127	86.8	70.3	48.1	30.1	25.1	86.0	272	339	166	71.8
MAX	117	134	115	86	56	39	30	168	482	609	205	152
MIN	78	90	74	53	34	23	22	23	129	191	150	58
AC-FT	6460	7560	5340	4320	2670	1850	1490	5290	16190	20870	10200	4270
MEAN †	48.3	26.6	18.5	17.5	13.9	15.3	22.5	166	519	349	127	80.0
CFSM †	.92	.51	.36	.34	.27	.29	.43	3.19	9.96	6.70	2.44	1.54
IN †	1.07	.57	.41	.39	.28	.34	.48	3.67	11.1	7.72	2.82	1.71
AC-FT †	2970	1580	1140	1080	770	940	1340	10210	30890	21450	7830	4760

OBSERVED

CAL YR 1990	TOTAL	38778	MEAN	106	MAX	715	MIN	18	AC-FT	76920
WTR YR 1991	TOTAL	43621	MEAN	120	MAX	609	MIN	22	AC-FT	86520

ADJUSTED

CAL YR 1990	TOTAL	38205	MEAN	105	CFSM	2.01	IN	27.27	AC-FT	75790
WTR YR 1991	TOTAL	42833	MEAN	117	CFSM	1.86	IN	30.56	AC-FT	84790

† Adjusted for change in contents of Mystic Lake.

YELLOWSTONE RIVER BASIN

06205000 STILLWATER RIVER NEAR ABSAROKEE, MT

LOCATION.--Lat 45°33'04", long 109°23'12", in NE1/4NE1/4NW1/4 sec.28, T.3 S., R.19 E., Stillwater County, Hydrologic Unit 10070005, on right bank 3 mi downstream from Rosebud Creek, 3.5 mi northeast of Absarokee, 9 mi southwest of Columbus, and at river mile 9.4.

DRAINAGE AREA.--975 mi^2.

PERIOD OF RECORD.--July 1910 to September 1914 (no winter records), March 1935 to current year.

REVISED RECORDS.--WSP 1309: 1911(M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,873.8 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 1, 1914, nonrecording gage, and Mar. 26, 1935, to Sept. 30, 1942, nonrecording gage, at bridge 2 mi upstream at different datums.

REMARKS.--Estimated daily discharges: Nov. 27-29, Dec. 13 to Feb. 19, Aug. 7-9. Records good except those for estimated daily discharges, which are poor. Flow partly regulated by Mystic Lake (station number 06204000). Diversions for irrigation of about 24,300 acres, of which 400 acres lies downstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--56 years (1935-91), 950 ft^3/s, 688,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft^3/s, June 15, 1967, gage height, 7.17 ft; minimum observed, 58 ft^3/s, Apr. 2, 1936.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,400 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 25	1000	5,440	5.21	June 12	1030	*9,020	*6.34

Minimum daily discharge, 80 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	430	476	307	e230	e310	183	201	523	2540	2820	843	451
2	419	489	318	e200	e300	171	209	541	3240	2730	864	451
3	422	458	295	e180	e290	222	217	543	4240	2750	824	450
4	421	443	347	e180	e270	215	226	529	5300	2810	786	455
5	412	496	359	e160	e270	242	232	517	7190	3100	764	413
6	624	485	306	e160	e260	204	266	550	7430	3380	730	375
7	605	426	338	e180	e250	186	304	718	7180	3100	e700	363
8	599	453	349	e160	e240	206	276	915	7090	2850	e680	375
9	589	500	347	e160	e230	202	246	1330	6070	2610	e640	420
10	598	491	338	e170	e240	215	238	1730	6040	2550	615	506
11	610	461	337	e200	e250	222	255	1950	6130	2470	610	589
12	582	450	318	e230	e240	201	242	1790	7940	2210	610	606
13	546	445	e250	e300	e230	198	217	1620	7680	2050	610	576
14	550	436	e240	e290	e220	210	239	1670	6120	1990	601	577
15	537	438	e220	e280	e230	204	267	2190	4350	1990	605	673
16	553	427	e210	e270	e240	202	276	2060	3710	1940	605	637
17	554	431	e230	e290	e240	200	267	2120	4010	1860	605	684
18	543	433	e230	e300	e250	195	288	2670	3590	1740	610	668
19	524	427	e150	e290	e240	199	301	2840	3520	1620	574	644
20	519	422	e90	e250	236	204	319	2930	4030	1470	517	623
21	496	400	e80	e270	233	209	387	3280	4200	1390	481	648
22	504	378	e140	e280	212	206	472	3740	3970	1330	467	689
23	487	414	e200	e270	218	200	636	4270	3630	1250	498	637
24	483	410	e200	e220	212	191	865	4460	3360	1150	531	604
25	467	402	e210	e180	206	194	1030	5080	3700	1090	536	577
26	473	403	e240	e200	195	198	834	5030	3500	1120	497	550
27	480	e330	e270	e230	198	189	656	3880	3010	1050	476	533
28	479	e310	e190	e190	197	191	586	3010	2910	997	478	519
29	469	e340	e150	e220	---	195	567	2630	2760	976	466	505
30	482	360	e200	e250	---	193	541	2540	2780	947	458	494
31	481	---	e260	e280	---	193	---	2530	---	877	456	---
TOTAL	15938	12834	7719	7070	6707	6240	11660	70186	141220	60217	18737	16292
MEAN	514	428	249	228	240	201	389	2264	4707	1942	604	543
MAX	624	500	359	300	310	242	1030	5080	7940	3380	864	689
MIN	412	310	80	160	195	171	201	517	2540	877	456	363
AC-FT	31610	25460	15310	14020	13300	12380	23130	139200	280100	119400	37160	32320

CAL YR 1990 TOTAL 291098 MEAN 798 MAX 5500 MIN 80 AC-FT 577400
WTR YR 1991 TOTAL 374820 MEAN 1027 MAX 7940 MIN 80 AC-FT 743500

e Estimated

YELLOWSTONE RIVER BASIN

06207500 CLARKS FORK YELLOWSTONE RIVER NEAR BELFRY, MT

LOCATION.--Lat 45°00'37", long 109°03'53", in NW1/4SW1/4NW1/4 sec.32, T.9 S., R.22 E., Carbon County, Hydrologic Unit 10070006, on left bank 0.2 mi upstream from county road bridge and Big Sand Coulee, 0.8 mi north of Wyoming-Montana State line, 9.5 mi southwest of Belfry, and at river mile 71.2.

DRAINAGE AREA.--1,154 mi^2.

PERIOD OF RECORD.--July 1921 to current year. Monthly discharge only for some periods, published in WSP 1309. Published as Clarks Fork at Chance prior to October 1956 and as Clarks Fork Yellowstone River at Chance October 1956 to September 1968.

REVISED RECORDS.--WSP 1309: 1922 (M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,986.24 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Nov. 15, 1934, nonrecording gage, and Nov. 15, 1934, to July 26, 1951, water-stage recorder at bridge 0.4 mi downstream of different datum. July 27, 1951 to Sept. 30, 1953, water-stage recorder at present site at datum 0.98 ft higher.

REMARKS.--Estimated daily discharges: Nov. 25-29, Dec. 15 to Jan. 12, 21-31. Water-discharge records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 11,100 acres upstream from station.

AVERAGE DISCHARGE.--70 years, 934 ft^3/s, 676,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,800 ft^3/s, June 9, 1981, gage height, 9.97 ft; minimum observed, 32 ft^3/s, Apr. 26, 1961, result of discharge measurement.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,400 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 25	0400	6,940	6.71	June 13	0400	8,560	7.50
June 6	0300	*8,940	*7.97				

Minimum daily discharge, 80 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	94	294	335	e200	240	180	211	235	2280	2280	533	140
2	91	298	300	e180	235	183	237	227	3260	2320	544	128
3	88	280	276	e160	248	219	284	232	4050	2380	524	117
4	86	239	287	e150	244	213	321	224	5120	2490	492	110
5	89	306	352	e150	244	217	336	215	7340	2720	484	107
6	129	305	311	e170	245	209	446	212	7670	3000	447	105
7	148	251	292	e200	237	178	440	242	7840	2760	411	101
8	153	234	302	e200	233	204	299	379	7190	2540	367	161
9	153	298	314	e200	228	208	194	744	6160	2320	336	209
10	140	310	312	e250	232	215	171	916	6060	2100	325	209
11	149	308	311	e280	230	210	171	799	6340	2000	310	842
12	150	295	312	e330	234	207	195	1020	7630	1820	291	304
13	147	311	275	285	231	207	250	856	7650	1640	274	242
14	145	324	283	244	220	215	246	1060	6210	1570	256	386
15	138	347	e230	244	213	207	242	1350	4400	1510	244	573
16	148	343	e210	245	230	208	243	1190	3700	1490	235	386
17	184	299	e200	240	233	200	247	1980	4000	1430	291	350
18	186	344	e190	241	210	201	271	3300	3710	1320	310	344
19	206	344	e120	240	191	194	287	3830	3390	1230	263	312
20	209	351	e100	236	214	202	280	3910	3600	1120	226	293
21	185	345	e80	e220	214	204	298	4470	3640	1010	220	276
22	178	317	e90	e220	205	203	370	5350	3580	942	215	267
23	189	332	e100	e210	202	202	445	5620	3360	919	192	253
24	186	344	e110	e200	202	197	505	5270	3080	884	189	243
25	181	e350	e120	e180	193	196	492	5960	3160	838	181	230
26	229	e350	e150	e190	191	193	436	5260	3010	837	174	217
27	313	e310	e200	e200	188	196	385	3920	2630	778	175	206
28	290	e270	e170	e180	196	194	340	3080	2440	701	173	198
29	289	e280	e140	e170	---	197	317	2810	2260	647	171	196
30	292	323	e170	e210	---	197	274	2620	2240	602	157	197
31	292	---	e200	e270	---	197	---	2350	---	572	149	---
TOTAL	5457	9302	6842	6695	6183	6253	9233	69631	137000	48770	9159	7702
MEAN	176	310	221	216	221	202	308	2246	4567	1573	295	257
MAX	313	351	352	330	248	219	505	5960	7840	3000	544	842
MIN	86	234	80	150	188	178	171	212	2240	572	149	101
AC-FT	10820	18450	13570	13280	12260	12400	18310	138100	271700	96740	18170	15280

CAL YR 1990 TOTAL 305672 MEAN 837 MAX 6190 MIN 80 AC-FT 606300
WTR YR 1991 TOTAL 322227 MEAN 883 MAX 7840 MIN 80 AC-FT 639100

e Estimated

YELLOWSTONE RIVER BASIN

06208500 CLARKS FORK YELLOWSTONE RIVER AT EDGAR, MT

LOCATION.--Lat 45°27'58", long 108°50'35", in SE1/4SE1/4SE1/4 sec.23, T.4 S., R.23 E., Carbon County, Hydrologic Unit 10070006, on right bank 400 ft downstream from county bridge, 0.5 mi east of Edgar, 6 mi upstream from Rock Creek, and at river mile 22.1.

DRAINAGE AREA.--2,032 mi^2.

PERIOD OF RECORD.--July 1921 to September 1969, October 1986 to current year.

REVISED RECORDS.--WSP 1509: 1924, 1932(M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,460 ft, from topographic map. Prior to Aug. 31, 1953, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 26-28, Dec. 13 to Feb. 11, Mar. 1-4. Records good except those for the estimated daily discharges, which are poor. Diversions for irrigation of about 41,500 acres, of which about 840 acres lies downstream from the station. In addition, about 6,300 acres of land upstream from the station are irrigated by diversions from the adjoining Rock Creek basin. Figures of discharge given herein have the flow of White Horse Canal subtracted.

AVERAGE DISCHARGE.--53 years (water years 1922-69, 1987-91), 1,029 ft^3/s, 745,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 10,900 ft^3/s, June 2, 1936, gage height, 8.62 ft; maximum gage height, 8.66 ft, June 6, 1991; minimum discharge, 36 ft^3/s, Apr. 22, 1961.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,300 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 25	1425	6,370	7.25	June 6	1710	*9,520	*8.66

Minimum discharge, 124 ft^3/s, Aug. 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	350	621	492	e250	e400	e240	300	438	2400	2300	493	141
2	354	608	492	e230	e450	e230	312	429	2950	2240	477	152
3	362	613	499	e210	e500	e300	336	450	3800	2170	473	149
4	387	577	460	e210	e540	e360	382	463	4600	2240	508	147
5	378	548	470	e210	e600	356	412	437	5750	2380	485	144
6	450	616	506	e210	e620	346	445	416	8020	2600	461	139
7	543	564	523	e240	e640	318	563	419	7840	2580	388	150
8	569	516	487	e230	e660	293	548	469	7470	2410	335	147
9	588	514	462	e230	e620	317	435	633	6530	2190	280	214
10	577	565	463	e280	e580	319	394	1140	6040	1990	234	366
11	571	569	452	e300	e540	328	389	1170	5970	1890	215	1380
12	571	579	450	e340	527	325	401	1210	6550	1780	202	1030
13	571	552	e420	e400	445	321	387	1290	7030	1580	176	610
14	556	553	e400	e390	390	318	387	1180	6320	1470	155	622
15	547	552	e350	e380	373	321	372	1490	4870	1450	145	1330
16	546	548	e350	e370	366	318	381	1590	3780	1350	150	1050
17	566	543	e350	e350	401	318	399	1880	3660	1310	160	852
18	588	508	e300	e360	385	312	448	2820	3560	1200	189	786
19	588	554	e250	e350	345	312	576	4410	3230	1120	234	771
20	587	548	e200	e330	331	306	571	4030	3250	1030	204	723
21	582	543	e150	e300	344	312	659	4280	3410	978	164	720
22	570	529	e180	e310	342	315	660	4880	3510	909	161	726
23	561	491	e210	e300	336	314	670	5330	3440	802	147	710
24	558	501	e250	e280	332	314	719	5210	3140	792	151	670
25	547	513	e250	e220	324	309	740	5600	2950	771	150	650
26	542	e520	e280	e240	314	307	682	5430	3040	844	142	638
27	597	e500	e330	e270	312	299	599	4580	2800	814	131	626
28	633	e490	e290	e250	305	303	533	3600	2530	760	136	615
29	603	477	e230	e200	---	304	496	3120	2380	677	132	600
30	602	451	e190	e250	---	302	468	2860	2280	591	132	582
31	613	---	e260	e350	---	301	---	2610	---	523	133	---
TOTAL	16657	16263	10996	8840	12322	9638	14664	73864	133100	45741	7543	17440
MEAN	537	542	355	285	440	311	489	2383	4437	1476	243	581
MAX	633	621	523	400	660	360	740	5600	8020	2600	508	1380
MIN	350	451	150	200	305	230	300	416	2280	523	131	139
AC-FT	33040	32260	21810	17530	24440	19120	29090	146500	264000	90730	14960	34590

CAL YR 1990 TOTAL 357540 MEAN 980 MAX 5640 MIN 150 AC-FT 709200
WTR YR 1991 TOTAL 367068 MEAN 1006 MAX 8020 MIN 131 AC-FT 728100

e Estimated

06211000 RED LODGE CREEK ABOVE COONEY RESERVOIR, NEAR BOYD, MT

LOCATION.--Lat 45°26'16", long 109°15'11", in NE1/4SE1/4SE1/4 sec.33, T.4 S., R.20 E., Carbon County, Hydrologic Unit 10070006, on right bank 0.6 mi upstream from Cooney Reservoir, 9.5 mi west of Boyd, and at river mile 15.0.

DRAINAGE AREA.--143 mi^2.

PERIOD OF RECORD.--May 1937 to current year (no winter records most years).

REVISED RECORDS.--WSP 1729: Drainage area. WSP 2116: 1937(M), 1942(M), 1943(P), 1944(M), 1948(M), 1952(M), 1957(P), 1962(M), 1963(M).

GAGE.--Water-stage recorder. Datum of gage is 4,248.0 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges this year. Seasonal records good. Some return flow from lands irrigated by water diverted from Rock Creek and East Rosebud Creek basins. Diversions for irrigation of about 5,100 acres upstream from station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,260 ft^3/s, June 15, 1967, gage height, 7.00 ft, from rating curve extended above 1,700 ft^3/s on basis of contracted-opening measurement of peak flow; no flow on many days in 1949.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 1,620 ft^3/s, June 5, gage height, 6.39 ft; minimum, 8.6 ft^3/s, Aug. 10,11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25						39	122	244	154	21	23
2	25						41	128	256	138	19	29
3	26						44	135	303	127	14	33
4	28						45	166	274	123	14	30
5	26						47	163	419	115	13	33
6	48						57	161	541	115	14	35
7	50						57	229	368	116	16	36
8	44						49	222	359	119	13	39
9	49						39	236	350	101	11	58
10	54						39	401	338	95	9.3	72
11	62						39	518	327	93	10	78
12	59						33	372	336	88	11	77
13	58						32	330	336	82	12	66
14	50						36	326	322	76	14	84
15	47						48	664	295	70	20	95
16	48						49	468	264	69	20	72
17	52						44	376	249	66	21	86
18	51						47	375	229	59	24	84
19	55						47	363	207	55	27	74
20	52						60	338	222	59	26	68
21	46						111	332	222	56	19	75
22	45						205	329	221	49	22	95
23	45						285	325	198	44	19	77
24	44						339	319	209	43	22	71
25	42						303	319	212	37	19	67
26	41						187	338	194	40	24	65
27	41						134	319	183	56	24	63
28	35						125	293	170	35	28	62
29	32						132	260	161	32	28	64
30	31						125	242	160	23	31	65
31	30						---	249	---	20	28	---
TOTAL	1341						2838	9418	8169	2355	593.3	1876
MEAN	43.3						94.6	304	272	76.0	19.1	62.5
MAX	62						339	664	541	154	31	95
MIN	25						32	122	160	20	9.3	23
AC-FT	2660						5630	18680	16200	4670	1180	3720

YELLOWSTONE RIVER BASIN

06211500 WILLOW CREEK NEAR BOYD, MT

LOCATION.--Lat 45°25'20", long 109°13'47", in SW1/4SW1/4SW1/4 sec.2, T.5 S., R.20 E., Carbon County, Hydrologic Unit 10070006, on left bank 0.5 mi upstream from Cooney Reservoir, 8 mi west of Boyd, and at rivr mile 2.1.

DRAINAGE AREA.--53.3 mi^2.

PERIOD OF RECORD.--June 1937 to current year (no winter records most years).

REVISED RECORDS.--WSP 1729: Drainage area. WSP 2116: 1957, 1962. WDR MT-87-1: 1986.

GAGE.--Water-stage recorder. Elevation of gage is 4,260 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Apr. 23, 1948, at site 0.5 mi downstream at different datum.

REMARKS.--No estimated daily discharges this year. Records good. Diversions for irrigation of about 1,800 acres upstream from station. Some return flow from lands irrigated by water diverted from Rock Creek basin. Several observations of water temperature and specific conductance were obtained during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,720 ft^3/s, June 15, 1967, gage height, 7.08 ft, from rating curve extended above 400 ft^3/s on basis of slope-area measurement of peak flow; maximum gage height, 7.24 ft, May 29, 1942, backwater from Cooney Reservoir, site and datum then in use; no flow May 29, 30, 1969.

EXTREMES FOR CURRENT SEASON.--Peak discharges greater than base discharge of 150 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 23	1930	262	4.36	May 15	1300	226	4.12
May 9	0530	199	3.93	June 6	0230	*309	*4.66

Minimum discharge, 6.6 ft^3/s, Apr. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	31						25	57	63	71	42	24
2	30						29	63	58	64	46	25
3	29						30	62	78	65	44	25
4	30						31	70	64	65	42	25
5	30						32	69	82	74	42	25
6	41						40	71	137	72	38	26
7	41						34	105	75	61	36	27
8	40						25	126	67	61	36	28
9	39						21	141	69	59	35	38
10	45						20	147	71	60	34	47
11	50						19	176	67	67	30	48
12	47						16	141	58	65	30	45
13	44						13	103	58	64	31	40
14	43						16	95	60	65	31	49
15	40						21	173	59	66	29	63
16	39						20	135	59	63	30	54
17	40						19	95	58	61	31	59
18	39						18	95	54	58	30	56
19	39						19	93	56	57	29	49
20	37						20	79	64	60	27	49
21	33						36	76	71	66	26	47
22	31						63	73	76	63	28	61
23	30						126	69	73	61	28	51
24	29						130	67	73	54	28	46
25	28						112	63	77	56	26	42
26	28						79	68	82	55	26	42
27	26						61	68	78	53	26	41
28	26						58	61	68	47	31	40
29	25						59	59	68	45	29	40
30	25						57	59	69	45	26	39
31	25						---	64	---	45	25	---
TOTAL	1080						1249	2823	2092	1868	992	1251
MEAN	34.8						41.6	91.1	69.7	60.3	32.0	41.7
MAX	50						130	176	137	74	46	63
MIN	25						13	57	54	45	25	24
AC-FT	2140						2480	5600	4150	3710	1970	2480

YELLOWSTONE RIVER BASIN

06212500 RED LODGE CREEK BELOW COONEY RESERVOIR, NEAR BOYD, MT

LOCATION.--Lat 45°26'59", long 109°11'06", in NE1/4NW1/4NW1/4 sec.31, T.4 S., R.21 E., Carbon County, Hydrologic Unit 10070006, on right bank 250 ft upstream from Cottonwood Creek, 1.5 mi downstream from Cooney Dam, 6 mi west of Boyd, and at river mile 10.5.

DRAINAGE AREA.--210 mi^2.

PERIOD OF RECORD.--September 1937 to current year.

REVISED RECORDS.--WSP 1309: 1942(M), 1944(M). WSP 2116: 1957(M).

GAGE.--Water-stage recorder. Datum of gage is 4,139.12 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Dec. 13, 14, Dec. 17 to Jan. 6, Jan. 25-31. Records good except those for estimated daily discharges, which are poor. Some return flow from lands irrigated by water diverted from Rock Creek and East Rosebud Creek basins. Flow completely regulated by Cooney Reservoir (station number 06212000). Diversions for irrigation of about 6,900 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--54 years, 101 ft^3/s, 73,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,470 ft^3/s, June 15, 1967, gage height, 10.17 ft; no flow Oct. 6, 7, 1948, Oct. 7, 8, 12, 16, 17, 1975.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 513 ft^3/s, Apr. 14, gage height, 4.31 ft; maximum gage height, 4.32 ft, Apr. 25; minimum daily discharge, 10 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48	16	34	e13	17	16	15	143	197	202	180	187
2	48	16	34	e14	17	16	15	125	197	180	141	166
3	48	16	34	e15	17	16	14	85	199	182	135	156
4	48	16	34	e17	16	16	14	88	199	182	157	148
5	48	16	34	e17	16	16	14	87	200	182	158	139
6	49	16	29	e17	16	15	14	85	242	182	165	137
7	50	16	25	15	17	15	15	86	305	182	183	117
8	22	14	25	15	17	15	14	165	304	182	182	117
9	21	16	25	15	17	16	14	278	307	182	232	112
10	21	15	25	15	17	15	14	285	329	178	292	90
11	21	15	25	15	17	15	15	319	365	124	290	90
12	21	15	25	15	17	15	15	414	365	124	288	83
13	20	15	e22	15	17	15	21	411	367	122	284	70
14	20	15	e20	14	17	15	252	411	369	117	262	71
15	20	15	22	15	17	15	505	424	371	110	258	70
16	19	26	16	15	17	15	391	435	371	110	236	70
17	19	50	e15	15	17	15	245	460	372	110	231	70
18	19	50	e15	15	17	15	241	460	373	109	233	70
19	19	50	e12	15	17	15	239	459	374	134	221	70
20	17	50	e11	15	17	15	237	459	374	184	214	70
21	17	50	e10	15	17	15	238	458	343	183	260	70
22	17	50	e12	15	17	15	247	427	281	183	260	62
23	17	50	e12	15	16	15	265	382	281	182	254	42
24	18	50	e13	15	16	15	277	380	281	182	193	42
25	18	50	e13	e14	16	15	396	345	252	182	197	36
26	17	50	e13	e14	16	15	487	346	218	180	226	28
27	17	50	e14	e14	16	15	480	348	217	180	224	27
28	16	50	e12	e15	16	15	476	348	216	179	224	27
29	16	50	e12	e15	---	15	471	266	215	179	224	27
30	16	45	e11	e13	---	15	322	196	214	178	217	28
31	16	---	e12	e16	---	15	---	198	---	180	204	---
TOTAL	783	953	616	463	467	471	5963	9373	8698	5066	6825	2492
MEAN	25.3	31.8	19.9	14.9	16.7	15.2	199	302	290	163	220	83.1
MAX	50	50	34	17	17	16	505	460	374	202	292	187
MIN	16	14	10	13	16	15	14	85	197	109	135	27
AC-FT	1550	1890	1220	918	926	934	11830	18590	17250	10050	13540	4940

CAL YR 1990 TOTAL 24637 MEAN 67.5 MAX 244 MIN 10 AC-FT 48870
WTR YR 1991 TOTAL 42170 MEAN 116 MAX 505 MIN 10 AC-FT 83640

e Estimated

06214500 YELLOWSTONE RIVER AT BILLINGS, MT
(National stream quality accounting network)

LOCATION.--Lat 45°48'00", long 108°28'00", in SE1/4SE1/4SE1/4 sec.27, T.1 N., R.26 E., Yellowstone County, Hydrologic Unit 10070007, on right bank 0.3 mi downstream from bridge on U.S. Highway 87, 1 mi northeast of Billings, 10 mi upstream from Pryor Creek, and at river mile 360.3.

DRAINAGE AREA.--11,795 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1904 to December 1905 (gage heights only January to March, December 1905), August 1928 to current year. Monthly discharge only for some periods, published in WSP 1309. Published as "near Billings" 1904-5.

REVISED RECORDS.--WDR MT 1968: 1967 (M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,080 ft above National Geodetic Vertical Datum of 1929, from topographic map. May 1904 to December 1905, nonrecording gage at bridge 0.3 ft upstream at different datum. Aug. 24, 1928, to June 30, 1932, nonrecording gage at bridge 0.3 mi upstream at datum 2.0 ft higher. July 1, 1932, to Oct. 12, 1937, water-stage recorder at old diversion dam 3.3 mi upstream at different datum. Oct. 13, 1937, to Jan. 9, 1963 and Dec. 2, 1967 to Sept. 12, 1990, water-stage recorder 0.3 mi upstream at datum 3,081.36 ft above National Geodetic Vertical Datum of 1929. Jan. 10, 1963 to Dec. 2, 1967, water-stage recorder at City of Billings Water Department intake, 2.1 mi upstream at datum 3,069.9 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Dec. 18 to Jan. 12. Water-discharge records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 350,000 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--63 years (water years 1928-91), 6,965 ft³/s, 5,046,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 69,500 ft³/s, June 19, 1974, gage height, 14.60 ft; maximum gage height, 14.76 ft, June 16, 1967, present datum, from floodmark; minimum discharge, 430 ft³/s, Dec. 12, 1932.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 51,500 ft³/s, June 7, gage height, 12.44 ft; minimum daily, 1,100 ft³/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2690	3640	3020	e1900	2040	2160	2390	3880	21300	18500	4730	2690
2	2690	3620	3060	e1800	2160	2110	2420	3650	22500	18200	4660	2640
3	2670	3630	2860	e1800	2300	2100	2470	3720	28800	17200	4610	2500
4	2740	3520	2850	e1700	2400	2320	2540	3700	34400	16800	4500	2440
5	2790	3460	2940	e1700	2460	2310	2640	3610	39300	16600	4350	2390
6	3010	3640	2840	e1900	2380	2280	2690	3490	47400	17300	4070	2350
7	3390	3580	2840	e2000	2410	2230	2930	3550	50700	16800	3980	2350
8	3480	3320	2860	e1900	2390	2160	3310	4000	48500	15700	3880	2380
9	3470	3220	2910	e1900	2450	2170	3250	5120	46200	14500	3650	2570
10	3390	3430	2860	e2000	2430	2180	2980	7890	41500	13600	3480	3080
11	3450	3490	2870	e2200	2420	2200	2880	10300	40200	13200	3400	3960
12	3510	3470	2850	e2300	2460	2260	3040	11200	41100	12500	3280	5080
13	3500	3380	2740	2410	2470	2240	3000	12500	46200	11500	3080	4100
14	3480	3360	2740	2400	2450	2220	2830	11600	44700	10900	3050	3860
15	3530	3270	2710	2360	2400	2240	2990	13000	36800	10400	3010	4790
16	3540	3320	2710	2340	2470	2250	3230	16000	29400	9770	3080	5210
17	3650	3300	2690	2300	2630	2280	3310	15600	27300	9400	3000	4920
18	3680	3250	e2100	2320	2630	2280	3280	19200	27100	8850	3060	4710
19	3710	3240	e1800	2370	2430	2290	3700	27000	25300	8330	3370	4500
20	3680	3320	e1400	2260	2400	2320	3710	31400	25900	8020	2840	4250
21	3630	3270	e1200	2200	2400	2330	3780	32100	26300	7740	2600	4000
22	3580	3240	e1100	2190	2370	2390	3960	34000	26100	7440	2530	3840
23	3490	3130	e1500	2190	2310	2410	4240	36400	24900	6920	2480	3520
24	3560	3140	e2000	2170	2260	2380	4960	37800	23400	6570	2450	3980
25	3540	3160	e2500	2120	2230	2390	5820	37600	23100	6410	2490	3860
26	3480	3160	e2900	2100	2200	2390	6360	41200	22800	6510	2450	3740
27	3440	3090	e3000	2040	2180	2400	5740	39100	21500	6460	2410	3610
28	3610	3000	e2500	1980	2160	2390	5090	30500	20100	6120	2540	3540
29	3670	2930	e1800	2050	---	2390	4640	25000	19500	5750	2600	3490
30	3610	2950	e1400	1980	---	2390	4360	23000	18600	5340	2630	3470
31	3660	---	e1700	1940	---	2380	---	22100	---	4970	2700	---
TOTAL	105320	99530	75250	64820	66290	70840	108540	569210	950900	338300	100960	107820
MEAN	3397	3318	2427	2091	2367	2285	3618	18360	31700	10910	3257	3594
MAX	3710	3640	3060	2410	2630	2410	6360	41200	50700	18500	4730	5210
MIN	2670	2930	1100	1700	2040	2100	2390	3490	18600	4970	2410	2350
AC-FT	208900	197400	149300	128600	131500	140500	215300	1129000	1886000	671000	200300	213900

CAL YR 1990 TOTAL 2245530 MEAN 6152 MAX 32700 MIN 1100 AC-FT 4454000
WTR YR 1991 TOTAL 2657780 MEAN 7282 MAX 50700 MIN 1100 AC-FT 5272000

e Estimated

06214500 YELLOWSTONE RIVER AT BILLINGS, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1946, 1950-58, 1963 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1965 to September 1981.
WATER TEMPERATURE: December 1950 to September 1958, July 1963 to September 1979.
SUSPENDED-SEDIMENT DISCHARGE: October 1976 to September 1981.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1965-81): Maximum daily, 720 microsiemens, Jan. 12, 1980; minimum daily, 111 microsiemens, June 9, 1973.
WATER TEMPERATURE (water years 1951-58, 1963-79): Maximum, 26.5°C, July 24, 1955; minimum, 0.0°C, on many days during winter.
SEDIMENT CONCENTRATION (water years 1977-81): Maximum daily mean, 4,260 mg/L, May 18, 1978; minimum daily mean, 1 mg/L, Oct. 27, 30, 1976, Jan. 11, 12, 1978.
SEDIMENT LOAD (water years 1977-81): Maximum daily, 493,000 tons, May 19, 1978; minimum daily, 11 tons, Jan. 12, 1978.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT												
30...	0942	3640	--	--	395	6.0	7.0	--	--	--	--	--
DEC												
18...	0925	2110	100	2	477	-1.5	0.0	671	12.8	100	28	62
FEB												
06...	1030	2330	0	0	445	1.5	0.5	693	13.0	99	K10	150
APR												
24...	1510	5360	--	--	405	21.0	14.0	--	--	--	--	--
MAY												
13...	0945	12600	--	--	288	16.0	10.0	--	--	--	--	--
15...	0945	12400	100	2	258	11.0	12.0	683	9.4	97	250	270
JUN												
07...	1125	49400	--	--	157	21.0	15.5	--	--	--	--	--
JUL												
26...	1445	6430	--	--	270	25.5	21.0	--	--	--	--	--
SEP												
11...	0900	3740	90	2	429	17.5	16.0	681	8.8	100	860	6400

DATE	TIME	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)
DEC											
18...	0925	168	0	134	8.6	2.4	180	46	15	28	0.9
FEB											
06...	1030	152	6	133	8.8	3.0	160	42	14	25	0.9
MAY											
15...	0945	113	0	91	7.9	71	100	27	7.9	14	0.6
SEP											
11...	0900	149	0	121	8.5	21	160	39	14	26	0.9

DATE	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE TOTAL (MG/L AS N) (00620)
DEC											
18...	3.3	143	83	10	0.5	17	300	288	0.41	1710	--
FEB											
06...	3.3	127	76	8.3	0.5	16	262	268	0.36	1650	--
MAY											
15...	1.9	97	30	3.6	0.3	14	148	157	0.20	4960	0.47
SEP											
11...	3.3	138	83	8.2	0.5	13	260	262	0.35	2630	0.20

YELLOWSTONE RIVER BASIN

06214500 YELLOWSTONE RIVER AT BILLINGS, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)
DEC											
18...	<0.01	<0.01	0.40	0.40	0.02	0.03	<0.01	<0.01	<0.01	<0.01	40
FEB											
06...	<0.01	0.02	0.40	0.40	<0.01	0.02	0.01	0.02	0.02	0.01	20
MAY											
15...	0.06	0.01	0.53	0.54	0.11	0.07	0.24	0.04	0.09	0.02	20
SEP											
11...	0.01	<0.01	0.21	0.24	0.01	0.01	0.07	0.01	<0.01	<0.01	<10

DATE	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)
DEC											
18...	11	59	<0.5	<1	<1	<3	4	19	1	57	10
FEB											
06...	11	49	<0.5	<1	<1	<3	3	20	2	54	8
MAY											
15...	6	34	<0.5	<1	<1	<3	3	30	<1	18	3
SEP											
11...	7	45	<0.5	<1	<1	<3	2	11	<1	45	2

DATE	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
DEC											
18...	0.2	<10	2	<2	<1	390	<6	6	6	34	96
FEB											
06...	0.1	<10	1	<1	1	340	<6	6	11	69	95
MAY											
15...	0.2	<10	2	<1	<1	240	<6	<3	252	8440	81
SEP											
11...	0.2	<10	1	<1	<1	360	<6	<3	67	677	91

WATER QUALITY DATA, WATER YEARS OCTOBER 1989 TO SEPTEMBER 1991

DATE	TIME	ALPHA, COUNT, 2 SIGMA WAT DIS AS NAT U (UG/L) (75986)	ALPHA COUNT, 2 SIGMA WAT DIS AS TH-230 (PCI/L) (75987)	ALPHA, 2 SIGMA SED SUS TOT DRY AS TH-230 (PCI/L) (76004)	GROSS ALPHA, DISSOLVED (UG/L AS U-NAT) (80030)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT) (80040)	BETA, 2 SIGMA WATER, DISS, AS SR90 /Y90 (PCI/L (75988)	BETA, 2 SIGMA WATER, DISS, AS CS-137 (PCI/L) (75989)	BETA, 2 SIGMA SED, SUSP, TOT DRY SR90Y90 (PCI/L) (76005)
JUN 1990									
28...	0940	0.90	<0.60	0.3	0.7	<0.6	0.6	0.8	0.5
SEP									
19...	0915	1.9	1.9	0.3	3.0	<0.6	0.8	1.3	0.6
MAY 1991									
15...	0945	1.4	1.6	7.0	2.3	19	0.7	0.9	1.7
SEP									
11...	0900	2.2	2.3	1.1	3.1	0.9	1.0	1.2	0.8

DATE	GROSS BETA, DISSOLVED (PCI/L AS CS-137) (03515)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137) (03516)	GROSS BETA, DISSOLVED (PCI/L AS SR/YT-90) (80050)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/YT-90) (80060)	RA-226 2 SIGMA WATER, DISS, (PCI/L) (76001)	RADIUM 226, DISSOLVED, RADON METHOD (PCI/L) (09511)	URANIUM NATURAL 2 SIGMA WATER, DISS, (UG/L) (75990)	URANIUM NATURAL DISSOLVED (UG/L AS U) (22703)
JUN 1990								
28...	2.6	<0.6	2.2	<0.6	0.020	0.07	<1	0.21
SEP								
19...	4.7	<0.6	3.3	<0.6	0.020	0.14	<1	2.0
MAY 1991								
15...	2.4	7.0	1.8	6.5	0.100	0.51	<1	0.91
SEP								
11...	5.5	2.0	4.2	1.9	0.020	0.07	<1	1.9

YELLOWSTONE RIVER BASIN

06216000 PRYOR CREEK AT PRYOR, MT

LOCATION.--Lat 45°26'06", long 108°32'01", in NE1/4NW1/4NE1/4 sec.5, T.5 S., R.26 E., Big Horn County, Hydrologic Unit 10070008, on left bank 60 ft upstream from county bridge, 0.5 mi north of Pryor, 1.4 mi downstream from Lost Creek, and at river mile 82.7.

DRAINAGE AREA.--117 mi^2.

PERIOD OF RECORD.--June 1921 to September 1924 (no winter records), October 1966 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1729: Drainage area. WDR MT-87-1: 1982-83 (M), 1986 (M).

GAGE.--Water-stage recorder. Datum of gage is 4,007.35 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 14, 1966, nonrecording gage at approximately same site at different datum.

REMARKS.--Estimated daily discharges: Dec. 20-22, 28, 29, Jan. 29. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 1,100 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--25 years (water years 1967-91), 35.5 ft^3/s, 25,720 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,280 ft^3/s, May 19, 1978, gage height, 8.88 ft, from floodmark, from rating curve extended above 410 ft^3/s on basis of contracted-opening measurement of peak flow; minimum, 1.8 ft^3/s, July 31, Aug. 1, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 55 ft^3/s, Apr. 24, gage height, 3.79 ft; minimum, 5.6 ft^3/s, July 30,31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	21	20	23	25	21	22	28	35	14	8.3	9.9
2	12	22	20	22	25	23	22	28	34	14	10	9.2
3	13	22	21	22	26	25	20	29	34	15	11	9.3
4	14	22	20	21	26	25	20	29	34	13	12	11
5	14	23	20	21	27	26	19	28	34	12	12	11
6	19	23	20	20	25	26	19	27	35	14	13	14
7	20	22	20	22	24	26	19	27	40	23	14	15
8	19	22	20	21	24	25	21	27	38	25	13	17
9	19	21	20	20	25	25	22	26	35	24	13	18
10	19	22	20	20	24	27	23	27	34	13	13	17
11	20	21	20	21	23	26	26	27	33	11	12	18
12	19	21	20	22	22	26	26	29	32	10	12	17
13	19	21	22	23	23	26	26	27	25	9.7	12	18
14	20	21	21	22	23	26	25	26	26	10	13	23
15	20	21	21	22	23	25	26	28	26	11	14	28
16	20	21	22	22	23	24	30	34	25	11	19	26
17	21	21	21	21	26	24	30	34	26	11	20	26
18	19	22	20	22	25	23	32	35	24	9.3	20	26
19	20	22	20	22	24	23	34	39	15	7.7	21	23
20	20	23	e20	21	24	21	34	43	13	7.4	21	22
21	19	23	e18	21	24	21	35	45	15	7.4	20	24
22	19	23	e19	21	23	21	40	45	17	8.3	14	26
23	19	23	21	22	23	21	44	43	18	9.5	12	23
24	19	22	21	23	23	20	44	41	16	14	12	23
25	20	21	21	22	23	21	41	40	15	17	12	23
26	19	21	21	24	22	23	36	40	15	17	11	26
27	20	21	21	25	24	23	34	42	17	16	8.4	26
28	19	20	e20	23	22	22	30	39	16	7.2	8.6	26
29	19	20	e19	e20	---	23	29	37	14	6.9	8.6	26
30	19	20	23	25	---	22	28	35	14	6.8	8.8	26
31	20	---	22	25	---	22	---	36	---	6.4	9.5	---
TOTAL	572	648	634	681	671	732	857	1041	755	381.6	408.2	607.4
MEAN	18.5	21.6	20.5	22.0	24.0	23.6	28.6	33.6	25.2	12.3	13.2	20.2
MAX	21	23	23	25	27	27	44	45	40	25	21	28
MIN	12	20	18	20	22	20	19	26	13	6.4	8.3	9.2
AC-FT	1130	1290	1260	1350	1330	1450	1700	2060	1500	757	810	1200

CAL YR 1990 TOTAL 7086.2 MEAN 19.4 MAX 29 MIN 5.3 AC-FT 14060
WTR YR 1991 TOTAL 7988.2 MEAN 21.9 MAX 45 MIN 6.4 AC-FT 15840

e Estimated

YELLOWSTONE RIVER BASIN

06216900 PRYOR CREEK NEAR HUNTLEY, MT

LOCATION.--Lat 45°49'19", long 108°17'23", in NE1/4SE1/4NW1/4 sec.19, T.1 N., R.28 E., Yellowstone County, Hydrologic Unit 10070008, on left bank 250 ft upstream from county bridge on Indian Creek road, 1.9 mi downstream from Indian Creek, 4.9 mi south of Huntley, and at river mile 11.2.

DRAINAGE AREA.--582 mi^2.

PERIOD OF RECORD.--October 1978 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,140 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 26 to Dec. 3, Dec. 7, 8, Dec. 12 to Feb. 9, Mar. 1, 2. Records fair except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year. Diversions for irrigation of about 3,200 acres upstream from station.

AVERAGE DISCHARGE.--13 years, 66.8 ft^3/s, 48,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,670 ft^3/s, May 8, 1988, result of discharge measurement, gage height, 6.81 ft; maximum gage height, 7.54 ft, Mar. 12, 1979, ice jam; no flow parts of some days 1988-90.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 19, 1978, reached a discharge of 18,200 ft^3/s, from slope-area measurement of peak flow at site 10.5 mi downstream. Floodmarks at this site not recovered.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 24	0500	*531	*2.51	No other peak greater than base discharge.			

No flow part of each day Aug. 14-16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	32	e50	e25	e30	e40	37	80	81	36	5.2	14
2	15	31	e40	e20	e35	e45	34	73	77	34	3.1	15
3	12	31	e40	e20	e45	46	28	71	72	32	2.9	17
4	14	33	35	e20	e45	54	33	88	71	31	5.6	24
5	15	35	38	e20	e50	51	30	98	68	30	8.8	14
6	24	35	57	e20	e60	54	30	99	73	26	5.6	10
7	32	36	e35	e25	e50	63	28	84	111	20	3.7	30
8	31	37	e35	e20	e60	49	35	77	219	9.8	2.0	25
9	29	37	36	e20	e70	48	43	68	112	4.0	1.4	43
10	29	36	58	e25	72	46	55	66	87	7.9	.64	48
11	26	37	31	e30	64	43	74	71	75	7.3	.54	57
12	26	37	e40	e35	52	43	91	75	67	4.9	.32	44
13	30	37	e40	e40	40	40	94	75	60	2.0	.48	38
14	29	37	e35	e35	40	40	83	74	54	1.2	.00	35
15	27	35	e25	e30	46	40	87	67	50	1.2	.01	81
16	27	34	e25	e35	32	40	113	91	49	.94	.27	100
17	30	33	e30	e35	37	39	177	139	48	1.2	.78	58
18	36	35	e30	e35	48	39	201	99	42	.90	.16	42
19	39	36	e10	e30	51	39	244	90	43	1.6	1.7	40
20	34	37	e8.0	e30	51	39	296	91	48	2.1	1.7	38
21	34	37	e7.0	e30	67	39	344	91	54	1.5	4.4	36
22	36	38	e9.0	e30	79	40	385	92	53	3.3	6.1	50
23	32	37	e15	e25	64	46	367	91	84	2.6	3.7	74
24	31	38	e25	e25	60	46	381	86	85	2.9	1.1	48
25	32	36	e25	e20	55	40	320	85	60	2.8	.66	39
26	32	e35	e25	e25	54	38	241	82	48	4.1	1.2	35
27	31	e30	e30	e30	59	37	241	85	47	7.6	1.1	34
28	30	e25	e20	e25	54	39	147	105	69	5.4	1.8	36
29	31	e35	e15	e20	---	38	109	90	50	6.3	1.8	37
30	32	e45	e20	e20	---	37	91	82	39	5.9	.84	37
31	31	---	e30	e25	---	37	---	78	---	6.8	11	---
TOTAL	869	1057	919.0	825	1470	1335	4439	2643	2096	303.24	78.60	1199
MEAN	28.0	35.2	29.6	26.6	52.5	43.1	148	85.3	69.9	9.78	2.54	40.0
MAX	39	45	58	40	79	63	385	139	219	36	11	100
MIN	12	25	7.0	20	30	37	28	66	39	.90	.00	10
AC-FT	1720	2100	1820	1640	2920	2650	8800	5240	4160	601	156	2380

CAL YR 1990 TOTAL 14709.57 MEAN 40.3 MAX 154 MIN .40 AC-FT 29180
WTR YR 1991 TOTAL 17233.84 MEAN 47.2 MAX 385 MIN .00 AC-FT 34180

e Estimated

YELLOWSTONE RIVER BASIN

06279500 BIGHORN RIVER AT KANE, WY

LOCATION.--Lat 44°45'31", long 108°10'51", in NW1/4NE1/4SW1/4 sec.9, T.55 N., R.94 W., Big Horn County, Hydrologic Unit 10080010, on right bank 180 ft upstream from Bighorn Canyon National Recreation Area boundary, 0.5 mi upstream from normal high-water line of Bighorn Lake at elevation 3,660 ft, 1.3 mi upstream from Five Springs Creek, and 5.9 mi south of Kane.

DRAINAGE AREA.--15,765 mi^2. Area at sites used prior to May 17, 1956, 15,846 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1928 to current year.

REVISED RECORDS.--WSP 1309: 1929(M). WSP 1509: 1929. WSP 1709: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,660 ft above National Geodetic Vertical Datum of 1929, from topographic map. Aug. 29, 1928, to Apr. 25, 1932, nonrecording gage, and Apr. 25, 1932, to May 16, 1956, water-stage recorder at site 12.5 mi downstream at different datum.

REMARKS.--Estimated daily discharges: Nov. 29 to Feb. 18 and Feb. 26 to Mar. 14. Water-discharge records good except those for July 1 to Sept. 30, which are fair and those for estimated daily discharges, which are poor. Some regulation by Boysen Reservoir (station 06258900) since October 1951. Diversions for irrigation of about 376,000 acres upstream from station. U.S. Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--63 years, 2,242 ft^3/s, 1,624,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 25,200 ft^3/s, June 16, 1935, gage height, 11.10 ft, site and datum then in use; minimum daily, 179 ft^3/s, July 22, 1934.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1923, 14.8 ft, Sept. 30, 1923, site and datum in use April 1932 to May 1956.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 17,800 ft^3/s, June 8, gage height, 8.81 ft; minimum daily discharge, 900 ft^3/s, Dec. 20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1200	1320	1300	980	1400	1300	1020	1170	4670	7080	1390	1260
2	1190	1370	1250	970	1450	1120	1010	1150	5010	6370	1370	1300
3	1180	1400	1250	960	1500	1140	1010	1170	6730	4720	1340	1300
4	1230	1340	1210	950	1540	1200	1010	1220	7750	3890	1340	1240
5	1260	1340	1200	930	1550	1330	1030	1290	8750	3540	1410	1230
6	1290	1400	1200	930	1480	1420	1070	1290	11000	3400	1450	1240
7	1390	1350	1180	1000	1300	1340	1120	1220	14400	2610	1370	1290
8	1380	1310	1180	1200	1350	1260	1180	1240	17000	2530	1310	1690
9	1470	1370	1180	1200	1300	1220	1170	1340	14000	2450	1240	3070
10	1440	1390	1170	1300	1400	1210	1140	1660	12400	2410	1240	3510
11	1630	1400	1160	1300	1500	1210	1230	2390	13000	2620	1290	5670
12	1510	1390	1150	1400	1600	1180	1250	3270	14000	2520	1280	5630
13	1510	1380	1100	1380	1450	1120	1240	3420	15500	2420	1210	3190
14	1490	1360	1070	1350	1350	1190	1190	3260	15300	2120	1200	2900
15	1490	1360	1100	1300	1400	1100	1250	3310	14700	2060	1190	4510
16	1480	1350	1100	1250	1400	1110	1350	3900	13700	2140	1210	3620
17	1520	1330	1100	1250	1350	1100	1350	4230	13900	2050	1290	2880
18	1520	1340	1010	1220	1300	1090	1270	4270	14200	2020	1780	2770
19	1500	1350	960	1200	1320	1100	1640	5700	14500	1970	1710	2640
20	1540	1340	900	1200	1260	1100	2280	7220	13300	1950	1490	2580
21	1480	1320	920	1270	1270	1110	1760	8140	12400	1890	1370	2540
22	1380	1310	950	1300	1290	1120	1420	8580	13000	1950	1300	2440
23	1350	1300	970	1250	1320	1100	1280	8270	13500	1920	1240	2440
24	1350	1310	1000	1200	1350	1080	1240	6740	12300	2430	1210	2400
25	1330	1340	1030	1150	1260	1070	1210	6240	11600	2620	1200	2380
26	1340	1340	1030	1150	1260	1040	1250	6380	10500	2770	1220	2350
27	1320	1290	1000	1200	1220	1030	1460	5960	9680	2670	1220	2230
28	1310	1260	1000	1200	1210	1020	1400	5430	8890	2540	1200	2230
29	1300	1250	950	1100	---	1010	1270	5030	8260	2030	1200	2060
30	1300	1300	930	1250	---	1010	1210	4640	7170	1750	1200	2000
31	1310	---	990	1400	---	1010	---	4620	---	1510	1220	---
TOTAL	42990	40210	33540	36740	38380	35440	38310	123750	351110	84950	40690	76590
MEAN	1387	1340	1082	1185	1371	1143	1277	3992	11700	2740	1313	2553
MAX	1630	1400	1300	1400	1600	1420	2280	8580	17000	7080	1780	5670
MIN	1180	1250	900	930	1210	1010	1010	1150	4670	1510	1190	1230
AC-FT	85270	79760	66530	72870	76130	70300	75990	245500	696400	168500	80710	151900

CAL YR 1990 TOTAL 550188 MEAN 1507 MAX 5690 MIN 680 AC-FT 1091000
WTR YR 1991 TOTAL 942700 MEAN 2583 MAX 17000 MIN 900 AC-FT 1870000

YELLOWSTONE RIVER BASIN

06279500 BIGHORN RIVER AT KANE, WY--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1947 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	SEDI-MENT, SUS-PENDED (MG/L)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY)
NOV							
02...	1015	1360	950	8.7	5.0	38	140
FEB							
05...	1720	1550	985	8.3	0.0	45	188
MAR							
14...	1600	1080	1200	8.6	6.0	123	359
MAY							
23...	1345	8360	--	--	--	1290	29000
JUN							
12...	1800	13700	535	--	18.5	5220	194000
AUG							
08...	1730	1520	950	--	25.0	375	1540
14...	1630	1190	890	--	24.0	138	443
SEP							
11...	0920	5130	865	--	16.5	14700	204000
20...	0855	2650	730	--	12.5	380	2720

DATE	TIME	HARD-NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SILICA, DIS-SOLVED (MG/L AS SIO2)	ALUM-INUM, DIS-SOLVED (UG/L AS AL)	ARSENIC DIS-SOLVED (UG/L AS AS)
NOV									
02...	1015	--	--	--	--	--	--	20	<1
FEB									
05...	1720	--	--	--	--	--	--	20	<1
MAR									
14...	1600	370	93	32	92	2	7.4	10	1

DATE	BARIUM, DIS-SOLVED (UG/L AS BA)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE)	BORON, DIS-SOLVED (UG/L AS B)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COBALT, DIS-SOLVED (UG/L AS CO)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)
NOV								
02...	--	--	120	--	3	--	3	--
FEB								
05...	--	--	110	--	<1	--	4	--
MAR								
14...	52	<0.5	140	3.0	<1	<3	4	9

DATE	LEAD, DIS-SOLVED (UG/L AS PB)	LITHIUM DIS-SOLVED (UG/L AS LI)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	STRON-TIUM, DIS-SOLVED (UG/L AS SR)	ZINC, DIS-SOLVED (UG/L AS ZN)
NOV								
02...	1	--	--	0.1	<2	--	--	--
FEB								
05...	<1	--	--	<0.1	<1	--	--	--
MAR								
14...	<1	49	29	<0.1	3	<1	990	16

YELLOWSTONE RIVER BASIN

06279500 BIGHORN RIVER AT KANE, WY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	TEMPER-ATURE WATER (DEG C)	DICAMBA (MED-IBEN) (BAN-VEL D) TOTAL (UG/L)	PICLO-RAM (TOR-DON) (AMDON) TOTAL (UG/L)	2,4-D, TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)	CLOPY-RALID (CURTAIL) TOTAL (UG/L)
JUN										
27...	1800	9720	19.5	0.01	0.01	0.04	<0.01	<0.01	<0.01	--
AUG										
08...	1730	1520	25.0	0.01	0.03	0.05	<0.01	<0.01	<0.01	0.03

DATE	TIME	SED. SUSP. FALL DIAM. % FINER THAN .002 MM	SED. SUSP. FALL DIAM. % FINER THAN .004 MM	SED. SUSP. FALL DIAM. % FINER THAN .008 MM	SED. SUSP. FALL DIAM. % FINER THAN .016 MM	SED. SUSP. FALL DIAM. % FINER THAN .031 MM	SED. SUSP. FALL DIAM. % FINER THAN .062 MM	SED. SUSP. FALL DIAM. % FINER THAN .125 MM	SED. SUSP. FALL DIAM. % FINER THAN .250 MM	SED. SUSP. FALL DIAM. % FINER THAN .500 MM
MAY										
23...	1345	43	51	64	74	86	96	100	100	--
JUN										
12...	1800	14	15	16	22	30	43	85	100	100

YELLOWSTONE RIVER BASIN

06285100 SHOSHONE RIVER NEAR LOVELL, WY

LOCATION.--Lat 44°50'19", long 108°26'04", in NW1/4NE1/4NE1/4 sec.17, T.56 N., R.96 W., Big Horn County, Hydrologic Unit 10080014, on left bank 20 ft upstream from bridge on County Road 9 and 1.5 mi west of Lovell.

DRAINAGE AREA.--2,350 mi^2, approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1966 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,850 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Oct. 1, 1976, at site 500 ft downstream, at datum 2.00 ft higher. Oct. 1, 1976 to Sept. 30, 1980, at site 500 ft downstream, at datum 1.00 ft higher. Oct. 1, 1981 to Nov. 13, 1986, at site 500 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Dec. 17 to Feb. 23, and June 15-27. Water-discharge records fair except those for estimated daily discharges, which are poor. Flow regulated by Buffalo Bill Reservoir. (See station 06281500.) Natural flow of stream affected by storage reservoirs, power development, diversions upstream from station for irrigation of about 143,000 acres, of which about 8,000 acres are downstream from station, and return flow from irrigated areas.

AVERAGE DISCHARGE.--25 years, 925 ft^3/s, 670,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,400 ft^3/s, June 10, 1981, gage height, 9.16 ft, site then in use, at present datum; maximum gage height, 10.09 ft, Feb. 3, 1972 (backwater from ice), site then in use, at present datum; minimum daily discharge, 27 ft^3/s, May 31, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,470 ft^3/s, Sept. 11, gage height, 8.07 ft; minimum daily, 182 ft^3/s, Apr. 10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	616	509	668	220	220	281	271	577	2020	2580	826	725
2	574	527	659	220	220	286	286	529	2020	2440	890	818
3	562	504	656	220	230	325	287	682	2090	2230	962	740
4	607	476	750	220	240	322	281	664	2520	2190	1020	749
5	609	563	733	220	250	331	273	597	2220	2150	866	712
6	662	581	650	220	330	304	289	589	2590	2060	733	535
7	805	566	674	220	350	282	322	564	3750	2010	686	569
8	792	583	692	220	340	285	224	517	2680	2030	686	1740
9	719	585	629	220	330	291	203	490	2590	2050	696	1250
10	629	631	635	220	310	297	182	508	2640	2160	690	2830
11	617	657	636	220	300	304	322	591	2930	2040	766	3390
12	597	649	624	220	300	289	316	626	2870	2230	689	1640
13	436	651	614	220	290	297	305	655	3540	2240	602	1330
14	435	661	607	220	280	301	372	590	3590	2250	528	2250
15	650	732	536	220	270	295	359	551	4500	2270	572	2380
16	797	728	492	220	270	291	563	536	4500	1830	571	1600
17	638	734	470	220	270	286	618	492	4600	1860	604	1670
18	586	728	350	230	270	289	670	633	4640	1870	707	1520
19	575	718	223	240	270	291	801	1150	4400	1620	652	1510
20	574	725	220	240	270	292	772	680	3500	1240	535	1450
21	560	712	220	240	275	302	687	1580	3000	1260	526	1390
22	549	709	230	240	280	300	581	2270	2900	1310	545	1370
23	534	701	240	240	290	285	510	2290	3000	967	507	1320
24	515	700	250	240	310	281	650	2340	2900	799	546	1270
25	553	692	250	240	299	287	726	2310	3000	777	558	1200
26	574	700	250	240	285	283	872	2260	2900	898	554	1140
27	553	682	250	230	292	272	756	2360	2930	1020	506	1090
28	550	675	230	230	294	268	692	2290	2680	1100	469	988
29	547	687	220	220	---	273	627	2210	2660	1040	473	742
30	542	683	200	210	---	268	567	2210	2640	925	540	715
31	534	---	210	220	---	271	---	1970	---	843	626	---
TOTAL	18491	19449	14068	7000	7935	9029	14384	36311	92800	52289	20131	40633
MEAN	596	648	454	226	283	291	479	1171	3093	1687	649	1354
MAX	805	734	750	240	350	331	872	2360	4640	2580	1020	3390
MIN	435	476	200	210	220	268	182	490	2020	777	469	535
AC-FT	36680	38580	27900	13880	15740	17910	28530	72020	184100	103700	39930	80600

CAL YR 1990 TOTAL 283560 MEAN 777 MAX 3150 MIN 200 AC-FT 562400
WTR YR 1991 TOTAL 332520 MEAN 911 MAX 4640 MIN 182 AC-FT 659600

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1967 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1966 to September 1983.
WATER TEMPERATURES: October 1966 to September 1983.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SEDI-MENT, SUS-PENDED (MG/L)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY)
NOV					
01...	1515	508	--	65	89
FEB					
28...	1300	279	<1	48	36
JUN					
27...	1500	3000	--	286	2320
AUG					
22...	1600	560	2	111	168

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	TEMPER-ATURE WATER (DEG C)	SPE-CIFIC CON-DUCT-ANCE (US/CM)
NOV				
01...	1515	508	9.0	1010
DEC				
19...	0900	223	0.0	1050
FEB				
28...	1300	279	3.5	1290
MAR				
15...	0815	300	4.5	1290
MAY				
01...	1250	639	9.0	655
JUN				
27...	1500	3000	15.0	342
AUG				
22...	1600	560	22.0	605
28...	1230	620	21.0	740
SEP				
10...	1530	4270	15.5	500
26...	1930	1000	16.5	690

YELLOWSTONE RIVER BASIN

06286400 BIGHORN LAKE NEAR ST. XAVIER, MT

LOCATION.--Lat 45°18'27", long 107°57'26", in SW1/4SE1/4 sec.18, T.6 S., R.31 E., Big Horn County, Hydrologic Unit 10080010, in block 13 of Yellowtail Dam on Bighorn River, 1.3 mi upstream from Grapevine Creek, 15.5 mi southeast of St. Xavier, and at river mile 86.6.

DRAINAGE AREA.--19,626 mi^2.

PERIOD OF RECORD.--November 1965 to current year (monthend contents only). Prior to October 1969, published as "Yellowtail Reservoir." Records of daily elevations and contents on file in Helena district office.

GAGE.--Water-stage recorder in powerhouse control room. Datum of gage is referenced to National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

REMARKS.--Reservoir is formed by thin concrete-arch dam; construction began in 1961; completed in 1967. Storage began Nov. 3, 1965. Usable capacity, 1,356,000 acre-ft between elevation 3,296.50 ft, river outlet invert, and 3,657.00 ft, top of flood control. Elevation of spillway crest, 3,593.00 ft. Normal maximum operating level, 1,097,000 acre-ft, elevation, 3,640.00 ft. Minimum operating level, 483,400 acre-ft, elevation, 3,547.00 ft. Dead storage, 16,010 acre-ft, below elevation 3,296.50 ft. Figures given herein represent usable contents. Water is used for power production, flood control, irrigation, and recreation.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,346,000 acre-ft, July 6, 1967, elevation, 3,656.43 ft; minimum since first filling, 641,900 acre-ft, Apr. 14, 1989, elevation 3,583.30 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,151,000 acre-ft, June 26, elevation, 3,647.11 ft; minimum, 700,300 acre-ft, Apr. 11, elevation, 3,594.77 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	3,632.87	972,200	---
Oct. 31	3,633.03	973,900	+1,700
Nov. 30	3,631.42	957,400	-16,500
Dec. 31	3,622.80	879,800	-77,600
CAL YR 1990			+15,800
Jan. 31	3,608.11	775,500	-104,300
Feb. 28	3,600.96	733,900	-41,600
Mar. 31	3,596.35	708,700	-25,200
Apr. 30	3,598.88	722,400	+13,700
May 31	3,627.19	917,400	+195,000
June 30	3,646.34	1,141,000	+223,600
July 31	3,637.52	1,024,000	-117,000
Aug. 31	3,635.00	995,000	-29,000
Sept. 30	3,639.36	1,046,000	+51,000
WTR YR 1991			+73,800

YELLOWSTONE RIVER BASIN

06287000 BIGHORN RIVER NEAR ST. XAVIER, MT

LOCATION.--Lat 45°19'00", long 107°55'05", in NW1/4NW1/4NE1/4 sec.16, T.6 S., R.31 E., Big Horn County, Hydrologic Unit 10080015, on right bank 800 ft downstream from Yellowtail afterbay dam, 1,500 ft downstream from Lime Kiln Creek, 14 mi southwest of St. Xavier, and at river mile 83.9.

DRAINAGE AREA.--19,667 mi^2. Area at site used prior to Apr. 16, 1963, 19,626 mi^2.

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

GAGE.--Water-stage recorder. Datum of gage is 3,158.38 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Apr. 16, 1963, and June 13, 1964, to Mar. 31, 1965, water-stage recorder at site 1.2 mi upstream at different datum. Apr. 1, 1965, to July 31, 1966, water-stage recorder at site 1,300 ft downstream at present datum.

REMARKS.--No estimated daily discharges during year. Records good. Figures of discharge given herein are sum of river flow and flow of Bighorn Canal. Some regulation by 14 reservoirs in Wyoming with combined capacity of 1,400,000 acre-ft and complete regulation by Bighorn Lake (see preceding page) since Nov. 3, 1965. Diversions for irrigation of about 375,000 acres upstream from station. U.S. Bureau of Reclamation satellite telemeter at station.

AVERAGE DISCHARGE.--57 years, 3,517 ft^3/s, 2,548,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,400 ft^3/s, June 16, 1935; minimum observed, 49 ft^3/s, Mar. 29, 1966, result of discharge measurement (dam closure); minimum daily, 112 ft^3/s, Apr. 2, 1967.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12,700 ft^3/s, June 12; minimum daily, 1,880 ft^3/s, May 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2250	2340	2610	3330	3080	2200	2010	1910	4460	12400	3340	2630
2	3370	2320	2610	3340	3100	2210	2000	1910	4460	12400	3310	2610
3	2220	2320	2630	3340	3090	2200	2000	1920	4490	11800	3300	2600
4	2160	2330	2630	3350	3110	2200	1990	1900	4500	10200	3290	2580
5	2150	2340	2640	3350	3120	2210	1990	1910	4940	10100	3150	2570
6	2110	2350	2650	3360	3120	2210	1990	1900	4950	9160	2810	2560
7	2090	2360	2660	3370	3130	2220	1980	1900	5570	9080	2780	2900
8	2070	2370	2670	3390	3130	2200	1980	1900	7890	8660	2770	2910
9	2080	2400	2680	3420	2510	2210	1980	1900	10600	7300	2760	2860
10	2000	2380	2700	3440	2510	2200	1970	1900	10700	7210	2730	2820
11	2150	2400	2720	3470	2510	2210	1960	1890	11300	7170	2710	2830
12	2240	2400	2730	3340	2510	2200	1950	1890	12700	6890	2700	2830
13	2240	2420	2730	3340	2520	2210	1940	1880	12200	6070	2760	2840
14	2250	2420	2900	3330	2500	2190	1940	1970	11500	6000	2780	2840
15	2250	2430	3110	3350	2520	2200	1940	2050	11500	5980	2770	2860
16	2260	2450	3130	3360	2510	2200	1930	2050	12100	5980	2750	3090
17	2280	2430	3140	3140	2510	2200	1930	2040	12500	5710	2740	3380
18	2280	2430	3140	3140	2500	2200	1930	2050	12500	5000	2720	3380
19	2290	2390	3140	3160	2500	2200	1920	2040	12500	4940	2700	3390
20	2280	2460	3160	3160	2500	2200	1930	2030	12500	4940	2680	3410
21	2300	2490	3170	3190	2510	2200	1920	2590	12600	4900	2670	3910
22	2300	2500	3180	3180	2490	2190	1920	3000	12600	4710	2650	3940
23	2300	2510	3200	3200	2500	2180	1910	3390	12600	3970	2630	3930
24	2310	2520	3200	3210	2500	2180	1920	4000	12600	3930	2620	4080
25	2330	2520	3140	3240	2500	2190	1920	3980	12600	3460	2600	4490
26	2320	2530	3240	3240	2200	2200	1920	3980	12600	3460	2580	4490
27	2330	2550	3250	3260	2200	2190	1920	3990	12600	3420	2560	4490
28	2330	2560	3270	3250	2210	2180	1920	4000	12500	3430	2550	4490
29	2330	2580	3250	3280	---	2020	1910	4060	12500	3400	2530	4510
30	2350	2580	3290	3290	---	2010	1910	4450	12400	3380	2600	4500
31	2340	---	3300	3280	---	2010	---	4470	---	3370	2650	---
TOTAL	70560	73080	91870	102100	74090	67620	58430	80850	309460	198420	86190	100720
MEAN	2276	2436	2964	3294	2646	2181	1948	2608	10320	6401	2780	3357
MAX	3370	2580	3300	3470	3130	2220	2010	4470	12700	12400	3340	4510
MIN	2000	2320	2610	3140	2200	2010	1910	1880	4460	3370	2530	2560
AC-FT	140000	145000	182200	202500	147000	134100	115900	160400	613800	393600	171000	199800

CAL YR 1990 TOTAL 952720 MEAN 2610 MAX 3430 MIN 1830 AC-FT 1890000
WTR YR 1991 TOTAL 1313390 MEAN 3598 MAX 12700 MIN 1880 AC-FT 2605000

YELLOWSTONE RIVER BASIN

06289000 LITTLE BIGHORN RIVER AT STATE LINE, NEAR WYOLA, MT

LOCATION.--Lat 45°00'25", long 107°36'52", in SW1/4NW1/4 sec.36, T.9 S., R.33 E., Bighorn County, Hydrologic Unit 10080016, on right bank 20 ft downstream from county bridge, 0.5 mi north of Wyoming-Montana State line, 1 mi downstream from West Fork, 13 mi southwest of Wyola, and at river mile 115.2.

DRAINAGE AREA.--193 mi^2.

PERIOD OF RECORD.--March 1939 to current year. Prior to October 1940, published as Little Horn River at State Line, near Wyola.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 4,350 ft above National Geodetic Vertial Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Dec. 19-31, Jan. 25-30. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of 163 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--52 years, 151 ft^3/s, 109,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,730 ft^3/s, June 3, 1944, gage height, 4.87 ft, from rating curve extended above 1,400 ft^3/s; maximum gage height recorded, 5.93 ft, June 9, 1944 (log jam); minimum daily discharge, 18 ft^3/s, Feb. 2, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 510 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 21	2200	*1,190	*3.66	June 7	2030	1,190	3.66

Minimum daily discharge, 19 ft^3/s, Dec. 20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	77	77	65	66	65	53	58	71	583	253	132	95
2	78	67	64	64	61	51	61	72	690	241	134	93
3	77	58	56	62	60	59	62	72	833	231	128	92
4	78	71	73	60	60	58	64	70	894	223	126	92
5	78	77	70	59	59	61	68	69	930	217	126	91
6	97	68	66	54	59	57	77	73	906	212	125	91
7	94	56	67	62	58	53	75	87	1000	207	123	90
8	93	70	66	64	58	58	68	106	907	202	121	95
9	95	71	67	66	58	56	63	162	777	199	119	101
10	100	71	68	65	58	56	65	196	720	196	118	101
11	99	71	68	64	58	57	63	207	696	190	117	113
12	90	70	67	63	58	55	54	240	693	183	115	93
13	98	70	63	61	58	55	49	240	681	178	115	90
14	95	72	69	60	58	56	64	288	660	174	113	96
15	94	72	60	60	57	57	66	375	564	172	113	98
16	95	65	61	60	58	57	64	378	505	168	110	94
17	90	72	60	59	59	56	63	376	474	164	108	98
18	91	71	67	60	59	56	63	433	441	162	107	91
19	95	71	e25	60	58	56	61	623	422	158	105	88
20	88	71	e19	59	58	57	62	853	401	157	104	89
21	79	67	e20	59	58	57	64	977	402	152	103	89
22	93	70	e25	59	57	57	67	923	388	149	102	88
23	87	71	e35	58	58	56	72	833	349	149	102	86
24	83	71	e50	57	57	56	77	825	332	147	102	84
25	86	71	e54	e40	57	57	91	884	320	146	100	83
26	85	70	e58	e45	56	58	87	841	304	150	101	82
27	80	60	e60	e50	58	56	80	651	290	145	100	82
28	82	63	e45	e45	58	56	77	591	281	140	99	82
29	80	69	e35	e38	---	57	76	598	268	136	97	82
30	78	72	e45	e50	---	56	74	614	265	133	96	82
31	75	---	e56	64	---	56	---	596	---	131	95	---
TOTAL	2710	2075	1704	1793	1636	1746	2035	13324	16976	5465	3456	2731
MEAN	87.4	69.2	55.0	57.8	58.4	56.3	67.8	430	566	176	111	91.0
MAX	100	77	73	66	65	61	91	977	1000	253	134	113
MIN	75	56	19	38	56	51	49	69	265	131	95	82
AC-FT	5380	4120	3380	3560	3250	3460	4040	26430	33670	10840	6850	5420

CAL YR 1990 TOTAL 53299 MEAN 146 MAX 1020 MIN 19 AC-FT 105700
WTR YR 1991 TOTAL 55651 MEAN 152 MAX 1000 MIN 19 AC-FT 110400

e Estimated

YELLOWSTONE RIVER BASIN

06289600 WEST PASS CREEK NEAR PARKMAN, WY

LOCATION.--Lat 44°59'16", long 107°28'56", in NE1/4NE1/4SE1/4 sec.21, T.58 N., R.88 W., Sheridan County, Hydrologic Unit 10080016, on right bank, anchored to concrete headwall of culvert on county road and 7.6 mi northwest of Parkman.

DRAINAGE AREA.--15.4 mi^2.

PERIOD OF RECORD.--October 1982 to current year (no winter records water years 1985-87).

GAGE.--Water-stage recorder. Elevation of gage is 4,550 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Apr. 2, 1985, at site 100 ft north (on abandoned channel) at datum 3.28 ft lower. Apr. 2, 1985 to Mar. 27, 1986, at site 300 ft upstream at datum 1.95 ft higher.

REMARKS.--Estimated daily discharges: Nov. 7, 8, 25-29, Dec. 1-6, Dec. 13 to Jan. 12, and Mar. 1-22. Records good except those for estimated daily discharges, which are poor. Natural flow of stream affected by diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--6 years (water years 1983-84, 1988-91), 12.0 ft^3/s, 8,670 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 195 ft^3/s, May 16, 1984, gage height, 4.62 ft, site and datum then in use; maximum gage height, 4.76 ft, Apr. 28, 1984 (backwater from ice and snow), site and datum then in use; minimum daily discharge, 0.02 ft^3/s, Jan. 7, 1988, result of channel blockage or diversion upstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 20 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 22	1730	49	1.53	May 20	2300	*107	*2.01

Minimum daily discharge, 2.8 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.4	6.6	6.2	3.8	6.6	5.8	6.3	16	37	15	9.5	7.5
2	6.4	6.9	5.9	3.8	6.4	5.7	6.3	15	37	14	9.6	7.5
3	6.5	6.4	6.0	3.9	6.4	5.6	6.4	16	41	14	9.4	7.5
4	6.3	6.7	6.3	4.0	6.2	5.6	6.4	15	43	14	9.4	7.6
5	6.1	7.0	6.1	4.2	6.3	5.5	6.6	14	41	13	9.3	7.4
6	7.1	6.1	6.0	4.3	6.2	5.4	6.9	14	39	13	9.2	7.5
7	6.4	5.9	6.3	4.4	5.9	5.4	7.1	15	41	13	9.0	7.4
8	6.4	6.3	6.3	4.5	5.8	5.6	7.0	18	40	13	8.8	7.8
9	6.4	7.0	6.3	4.9	5.7	5.5	6.8	24	37	13	8.7	8.4
10	6.5	7.0	6.2	5.1	5.8	5.4	7.1	30	34	14	8.6	8.2
11	6.8	6.7	6.3	5.4	5.8	5.2	7.1	32	33	13	8.4	8.3
12	6.1	6.7	6.2	5.7	5.9	5.2	6.1	36	32	12	8.2	8.0
13	6.2	6.7	5.6	6.1	5.8	5.4	5.3	39	30	12	8.1	7.8
14	6.1	6.7	4.4	6.0	5.7	5.4	6.3	44	29	12	8.1	9.0
15	6.1	6.7	4.2	6.3	5.9	5.4	8.3	61	26	12	8.5	9.3
16	6.4	6.5	4.3	6.3	6.5	5.4	8.7	70	24	11	8.3	8.2
17	6.4	6.7	4.7	6.1	6.6	5.4	9.7	62	23	11	8.2	9.3
18	6.1	6.5	5.2	6.1	6.0	5.6	9.5	62	21	11	8.0	8.5
19	6.5	6.5	4.1	6.1	6.1	5.4	11	69	20	11	7.9	8.1
20	6.2	6.5	3.3	6.0	7.3	5.6	15	86	20	11	7.8	7.8
21	6.0	6.4	2.8	6.0	6.5	5.8	21	92	19	11	7.7	8.1
22	6.0	6.3	3.2	6.0	6.2	5.6	25	86	19	11	7.7	8.2
23	6.2	6.2	3.6	5.7	6.2	6.1	21	70	18	10	7.8	7.8
24	5.9	6.1	4.1	5.4	5.8	5.9	17	62	17	10	7.7	7.6
25	6.5	6.0	4.6	4.7	5.5	5.9	19	58	17	10	7.6	7.4
26	6.3	5.8	4.3	5.1	5.5	6.0	20	58	17	10	7.6	7.4
27	6.3	5.9	4.7	5.4	5.7	5.8	20	51	16	10	7.6	7.5
28	6.3	6.2	4.3	5.6	5.6	6.0	19	45	16	9.7	7.7	7.5
29	6.5	6.3	3.8	4.2	---	6.2	18	43	15	9.6	7.5	7.4
30	6.5	6.5	3.4	5.3	---	6.0	17	43	15	9.5	7.4	7.4
31	6.5	---	3.9	6.2	---	6.1	---	40	---	9.4	7.3	---
TOTAL	196.4	193.8	152.6	162.6	169.9	174.9	350.9	1386	817	362.2	256.6	237.4
MEAN	6.34	6.46	4.92	5.25	6.07	5.64	11.7	44.7	27.2	11.7	8.28	7.91
MAX	7.1	7.0	6.3	6.3	7.3	6.2	25	92	43	15	9.6	9.3
MIN	5.9	5.8	2.8	3.8	5.5	5.2	5.3	14	15	9.4	7.3	7.4
AC-FT	390	384	303	323	337	347	696	2750	1620	718	509	471

CAL YR 1990 TOTAL 4052.4 MEAN 11.1 MAX 43 MIN 1.5 AC-FT 8040
WTR YR 1991 TOTAL 4460.3 MEAN 12.2 MAX 92 MIN 2.8 AC-FT 8850

YELLOWSTONE RIVER BASIN

06289820 EAST PASS CREEK NEAR DAYTON, WY

LOCATION.--Lat 44°59'23", long 107°25'20", in SE1/4SE1/4NE1/4 sec.24, T.58 N., R.88 W., Sheridan County, Hydrologic Unit 10080016, on left bank 0.3 mi downstream from bridge on county road, 5.0 mi northwest of Parkman, and 11.2 mi northwest of Dayton.

DRAINAGE AREA.--21.7 mi^2.

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 4,410 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 7, 26-28, Dec. 1-3, 6, Dec. 13 to Jan. 8, Jan. 24-28, Jan. 30 to Feb. 2, Feb. 2, Feb. 26 to Mar. 2, and Mar. 5-9, 12, 27. Records good except those for estimated daily discharges, which are poor. Several small reservoirs upstream from station, combined capacity, 415 acre-ft, for irrigation. Diversions for irrigation of about 2,900 acres upstream from station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 197 ft3/s, May 16, 1984, gage height, 3.14 ft; maximum gage height, 3.47 ft, Dec. 18, 1984 (backwater from ice); minimum daily discharge, 1.7 ft3/s, Aug. 6, 7, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 25 ft3/s and maximum (*):

Date	Time	Discharge (ft3/s)	Gage height (ft)	Date	Time	Discharge (ft3/s)	Gage height (ft)
Apr. 25	2030	32	1.69	June 7	2200	74	2.15
May 21	0400	*113	*2.49	July 10	1630	25	1.57

Minimum daily discharge, 2.7 ft3/s, Aug. 31, Sept. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.3	8.0	7.5	6.9	8.7	7.5	8.1	18	50	19	7.9	2.9
2	4.4	8.2	7.4	6.6	8.7	8.1	7.9	17	51	19	8.4	3.0
3	4.4	7.7	7.7	6.7	8.9	8.5	8.0	17	60	18	7.6	2.7
4	4.2	8.1	8.0	6.8	8.7	8.4	8.4	16	66	18	7.4	3.2
5	4.1	8.6	7.7	7.1	8.7	7.9	8.7	15	65	16	7.4	3.3
6	5.4	7.9	7.5	7.3	9.2	7.3	9.5	16	64	8.7	9.7	3.7
7	4.9	7.5	7.3	7.4	8.7	7.5	9.8	18	72	7.3	9.6	3.7
8	5.0	8.2	7.3	7.7	8.7	7.8	9.6	24	71	7.1	8.2	4.0
9	5.0	8.5	7.3	7.9	8.7	7.8	9.0	40	64	7.5	4.6	4.4
10	5.3	8.6	7.3	8.0	8.7	7.9	9.5	51	54	10	4.6	4.2
11	6.0	8.0	7.4	7.7	8.6	8.0	9.6	50	50	9.2	4.6	4.5
12	5.4	7.9	7.2	8.0	8.7	7.9	8.6	57	48	12	4.5	5.6
13	5.4	7.9	7.1	8.4	8.7	7.6	9.6	58	46	12	4.3	5.6
14	5.2	7.9	6.9	8.2	8.5	7.6	9.8	66	44	11	4.1	6.6
15	5.2	7.8	6.5	8.3	8.4	7.6	9.8	84	40	11	4.7	7.2
16	5.7	7.5	6.7	8.2	9.2	7.7	10	91	38	11	4.4	6.1
17	5.7	7.6	7.1	7.9	10	7.6	11	85	35	10	4.0	7.1
18	5.3	7.6	6.1	8.3	9.1	7.6	11	84	34	9.8	4.0	6.5
19	5.8	7.6	5.2	8.4	9.0	7.2	11	97	32	9.7	4.0	6.4
20	6.2	7.7	4.9	7.7	10	7.5	13	106	31	9.5	3.9	7.9
21	6.9	7.8	5.5	8.3	9.9	8.0	17	109	30	9.0	3.9	8.4
22	6.8	7.8	5.8	8.3	9.4	9.1	21	106	29	8.7	3.9	8.6
23	6.8	7.5	6.1	7.2	9.2	8.6	21	91	27	8.4	4.0	8.3
24	6.6	7.7	6.5	8.5	8.8	8.4	22	83	24	8.3	3.9	8.1
25	6.4	7.8	5.9	7.9	8.5	8.2	29	80	23	8.6	3.7	7.9
26	6.3	7.5	6.3	8.1	8.1	8.7	29	82	23	11	3.8	7.8
27	6.3	7.4	6.0	7.0	7.7	8.2	24	73	22	9.0	3.9	7.6
28	6.3	7.6	5.9	6.6	7.6	8.3	22	64	21	8.4	3.8	7.7
29	7.1	7.7	6.1	5.7	---	8.5	20	61	20	8.2	3.7	7.6
30	7.6	7.6	6.7	7.9	---	8.3	18	62	21	7.9	3.3	7.7
31	7.6	---	7.3	8.6	---	8.3	---	55	---	7.8	2.7	---
TOTAL	177.6	235.2	208.2	237.6	247.1	247.6	414.9	1876	1255	331.1	158.5	178.3
MEAN	5.73	7.84	6.72	7.66	8.82	7.99	13.8	60.5	41.8	10.7	5.11	5.94
MAX	7.6	8.6	8.0	8.6	10	9.1	29	109	72	19	9.7	8.6
MIN	4.1	7.4	4.9	5.7	7.6	7.2	7.9	15	20	7.1	2.7	2.7
AC-FT	352	467	413	471	490	491	823	3720	2490	657	314	354

CAL YR 1990 TOTAL 4627.7 MEAN 12.7 MAX 61 MIN 3.2 AC-FT 9180
WTR YR 1991 TOTAL 5567.1 MEAN 15.3 MAX 109 MIN 2.7 AC-FT 11040

06290000 PASS CREEK NEAR WYOLA, MT

LOCATION.--Lat 45°03'23", long 107°21'19", in NE1/4NE1/4SE1/4 sec.13, T.9 S., R.35 E., Big Horn County, Hydrologic Unit 10080016, on right bank 125 ft downstream from bridge on U.S. Highway 87, 2.0 mi downstream from Twin Creek, 5.5 mi south of Wyola, and at river mile 10.2.

DRAINAGE AREA.--111 mi^2. Drainage area at site used prior to Sept. 30, 1956, 119 mi^2.

PERIOD OF RECORD.--June 1935 to September 1956 (no winter records prior to 1939), October 1982 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,920 ft above National Geodetic Vertical Datum of 1929, from topographic map. Dec. 21, 1950, to Sept. 30, 1956, water-stage recorder, and June 4, 1935, to Dec. 20, 1950, nonrecording gage at site 0.3 mi upstream at different datum. Flow is equivalent.

REMARKS.--Estimated daily discharges: Nov. 26 to Dec. 5, Dec. 12 to Feb. 4. Records good except those for estimmated daily discharges, which are poor. Diversions for irrigation of about 2,500 acres upstream of station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--27 years (water years 1939-56, 1983-91), 35.2 ft^3/s, 25,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 1,150 ft^3/s, June 4, 1944, gage height, 4.82 ft, from rating curve extended above 400 ft^3/s; maximum gage height observed, 6.22 ft, Mar. 25, 1943, ice jam; no flow Aug. 3, 9, 10, 1935.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 100 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 22	0400	220	*4.16	May 16	1030	*242	4.14

Minimum daily discharge, 2.5 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	16	e9.0	e5.0	e13	24	16	72	112	36	14	6.3
2	10	17	e9.0	e4.5	e15	17	15	67	107	33	14	6.9
3	11	16	e9.0	e4.5	e15	32	13	65	114	32	16	7.5
4	11	16	e10	e4.5	e16	33	12	67	118	32	19	7.5
5	7.0	19	e12	e4.5	18	44	11	62	117	31	18	7.8
6	9.1	17	13	e4.5	21	39	10	59	113	26	16	7.5
7	13	11	16	e5.0	29	41	9.4	53	117	24	15	8.3
8	12	19	16	e6.0	34	43	11	59	118	23	14	9.0
9	13	20	18	e6.0	38	38	9.3	71	110	22	11	11
10	14	21	18	e8.0	36	39	9.1	92	101	24	11	13
11	16	18	19	e11	33	42	14	107	94	31	11	15
12	14	16	e18	e15	32	40	17	115	89	26	11	12
13	15	16	e16	e15	33	38	22	122	84	26	10	11
14	14	15	e15	e14	29	38	28	126	80	23	9.8	11
15	13	15	e14	e14	27	40	33	161	75	22	10	17
16	14	14	e14	e13	31	42	38	226	70	23	10	14
17	17	14	e14	e13	38	42	19	189	63	20	9.5	15
18	15	14	e13	e14	40	38	42	176	60	19	8.9	17
19	15	14	e6.0	e12	34	37	82	187	57	18	8.3	15
20	16	14	e3.0	e11	40	38	108	206	56	17	8.0	15
21	16	14	e2.5	e10	54	38	144	219	56	15	8.3	15
22	15	10	e3.5	e10	50	43	167	220	55	15	7.8	17
23	15	7.3	e5.0	e9.0	39	47	160	198	53	14	7.4	16
24	15	8.7	e5.0	e8.0	34	35	116	175	49	16	7.5	15
25	15	8.2	e5.5	e9.0	31	29	98	163	42	14	7.4	15
26	15	e8.0	e6.0	e10	23	26	115	160	45	15	7.6	15
27	15	e7.0	e5.0	e11	30	22	112	160	46	18	8.0	15
28	16	e8.0	e3.5	e9.0	29	20	114	143	42	15	7.0	15
29	15	e10	e3.0	e7.0	---	22	93	133	39	14	7.5	14
30	16	e9.0	e5.0	e9.0	---	20	83	129	39	14	6.9	14
31	16	---	e7.0	e11	---	17	---	122	---	13	5.9	---
TOTAL	428.1	412.2	313.0	287.5	862	1064	1720.8	4104	2321	671	325.8	377.8
MEAN	13.8	13.7	10.1	9.27	30.8	34.3	57.4	132	77.4	21.6	10.5	12.6
MAX	17	21	19	15	54	47	167	226	118	36	19	17
MIN	7.0	7.0	2.5	4.5	13	17	9.1	53	39	13	5.9	6.3
AC-FT	849	818	621	570	1710	2110	3410	8140	4600	1330	646	749

CAL YR 1990 TOTAL 11683.7 MEAN 32.0 MAX 154 MIN 2.5 AC-FT 23170
WTR YR 1991 TOTAL 12887.2 MEAN 35.3 MAX 226 MIN 2.5 AC-FT 25560

e Estimated

YELLOWSTONE RIVER BASIN

06290500 LITTLE BIGHORN RIVER BELOW PASS CREEK, NEAR WYOLA, MT

LOCATION.--Lat 45°10'38", long 107°23'36", in W1/2SW1/4 sec.35, T.7 S., R.35 E., Big Horn County, Hydrologic Unit 10080016, on right bank 3.5 mi north of Wyola, 6 mi downstream from Pass Creek, and at river mile 92.3.

DRAINAGE AREA.--428 mi^2.

PERIOD OF RECORD.--March 1939 to December 1958, August 1959 to September 1975, October 1976 to current year. Prior to October 1940, published as Little Horn River below Pass Creek, near Wyola.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,600 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 26 to Feb. 9. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 8,300 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--50 years, 208 ft^3/s, 150,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,010 ft^3/s, May 19, 1978, gage height, 10.02 ft, from rating curve extended above 2,800 ft^3/s on basis of slope-area measurement of peak flow; minimum, 12 ft^3/s, Aug. 5, 7, 8, 1961, gage height, 0.89 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 22	1430	*1,210	*4.81	June 8	1300	1,120	4.64

Minimum daily discharge, 20 ft^3/s, Dec. 20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	71	106	e95	e80	e70	87	95	185	735	317	109	73
2	74	111	e95	e70	e80	85	95	173	753	296	112	73
3	80	105	e100	e65	e80	100	96	169	879	275	110	72
4	80	105	e95	e65	e90	94	97	170	947	255	110	75
5	74	117	e95	e65	e110	113	97	158	982	238	114	76
6	98	115	e100	e60	e120	109	101	149	984	225	110	76
7	101	98	e110	e70	e130	98	108	150	1030	212	110	75
8	99	110	e90	e80	e130	104	112	168	1090	207	107	81
9	107	110	e90	e75	e120	95	106	205	1020	195	101	92
10	106	110	e90	e90	110	98	104	276	929	209	99	101
11	119	107	e85	e100	108	101	113	314	878	217	100	112
12	112	103	e85	e120	106	95	126	374	869	200	102	108
13	110	102	e85	e110	105	94	110	390	839	188	98	98
14	108	102	e85	e110	100	96	120	411	809	181	91	102
15	107	102	e80	e100	92	95	132	513	792	175	97	131
16	110	99	e85	e100	95	98	164	687	686	171	102	112
17	123	98	e90	e110	118	101	196	637	623	161	94	112
18	113	100	e95	e120	111	98	207	606	588	152	93	114
19	117	99	e45	e100	104	97	238	742	538	143	90	111
20	116	99	e20	e90	107	99	261	946	515	140	84	107
21	109	101	e45	e100	118	100	326	1090	508	133	82	112
22	111	98	e60	e90	115	112	365	1160	501	133	81	120
23	110	96	e70	e85	104	119	351	1090	478	128	82	112
24	108	95	e80	e80	100	108	264	1000	439	131	86	109
25	109	94	e75	e65	94	103	234	1020	417	121	81	105
26	107	e95	e80	e80	89	103	329	1060	403	125	80	104
27	106	e95	e85	e100	89	100	302	965	380	143	81	104
28	105	e95	e60	e80	90	100	281	811	348	122	78	106
29	105	e95	e40	e60	---	103	236	767	331	116	73	104
30	106	e95	e70	e65	---	103	210	773	319	109	74	102
31	105	---	e100	e70	---	94	---	774	---	107	72	---
TOTAL	3206	3057	2480	2655	2885	3102	5576	17933	20610	5525	2903	2979
MEAN	103	102	80.0	85.6	103	100	186	578	687	178	93.6	99.3
MAX	123	117	110	120	130	119	365	1160	1090	317	114	131
MIN	71	94	20	60	70	85	95	149	319	107	72	72
AC-FT	6360	6060	4920	5270	5720	6150	11060	35570	40880	10960	5760	5910

CAL YR 1990 TOTAL 70550 MEAN 193 MAX 1050 MIN 20 AC-FT 139900
WTR YR 1991 TOTAL 72911 MEAN 200 MAX 1160 MIN 20 AC-FT 144600

e Estimated

06291000 OWL CREEK NEAR LODGE GRASS, MT

LOCATION.--Lat 45°16'05", long 107°18'03", in NW1/4NE1/4SE1/4, sec.33, T.6 S., R.36 E., Big Horn County, Hydrologic Unit 10080016, on right bank 1.4 mi downstream from Sioux Pass Creek, 5.0 mi southeast of Lodge Grass, and at river mile 7.0.

DRAINAGE AREA.--163 mi^2.

PERIOD OF RECORD.--April 1939 to September 1945, October 1979 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,460 ft above National Geodetic Vertical Datum of 1929, from topographic map. April 1939 to September 1945, recording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 21 to Mar. 19. Records poor. Numerous diversions for irrigation upstream from station. Several observations of water temperature and specific water conductance were made during the year.

AVERAGE DISCHARGE.--18 years (water years 1940-45, 1980-91), 10.0 ft^3/s, 7,250 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,020 ft^3/s, June 18, 1944, gage height, 14.18 ft; maximum gage height, 14.50 ft, Mar. 18, 1944, ice jam; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 60 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 19	1930	*164	*6.09	Apr. 28	2115	84	4.39

No flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.75	2.2	e2.5	e2.0	e3.0	e4.5	9.5	31	7.0	3.3	1.1	.00
2	.91	2.6	e2.5	e1.5	e3.5	e4.5	8.3	24	6.5	2.6	.74	.00
3	.85	2.6	e2.5	e1.0	e3.5	e4.0	8.1	24	6.4	2.0	.94	.00
4	.84	2.9	e2.5	e1.0	e3.5	e5.0	7.1	20	6.5	1.7	1.2	.00
5	1.0	3.2	e2.5	e1.0	e4.0	e7.0	6.8	18	6.3	1.4	1.0	.00
6	1.7	3.4	e2.5	e1.0	e4.0	e15	6.3	15	6.1	1.6	.60	.00
7	2.1	3.4	e3.0	e.90	e4.0	e11	5.4	17	5.8	1.7	.39	.00
8	2.1	3.6	e3.5	e1.1	e6.0	e10	5.8	17	6.3	.94	.15	.00
9	2.0	3.5	e3.5	e1.1	e10	e10	6.4	16	6.6	.82	.00	.00
10	2.2	3.5	e3.5	e1.3	e15	e8.0	6.7	14	5.8	.73	.00	.00
11	2.4	3.7	e3.0	e1.5	e17	e7.0	7.9	12	5.1	1.3	.00	.00
12	2.0	3.6	e3.0	e2.0	e18	e9.0	11	12	4.2	3.0	.00	1.5
13	2.1	3.2	e3.0	e2.0	e19	e8.0	14	17	4.0	2.2	.00	.00
14	2.3	3.1	e2.5	e2.0	e22	e8.0	13	14	4.1	2.9	.00	.00
15	2.2	3.0	e2.5	e2.5	e15	e7.0	15	9.8	4.4	5.3	.00	.00
16	2.4	2.8	e2.5	e3.0	e12	e8.0	19	9.1	5.2	5.5	.00	.00
17	2.8	2.9	e3.0	e3.5	e18	e8.0	49	13	4.9	5.6	.00	.00
18	2.8	3.0	e3.0	e4.0	e35	e9.0	53	11	4.2	5.1	.00	.00
19	3.5	3.1	e2.0	e3.5	e25	e9.0	80	8.6	3.9	6.1	.00	.00
20	3.4	3.2	e.50	e3.0	e15	10	114	7.2	3.6	6.0	.00	.00
21	3.2	e3.0	e.50	e2.5	e14	13	87	6.9	3.6	6.2	.00	.00
22	3.2	e3.0	e.60	e2.5	e20	14	66	8.3	3.6	6.0	.00	.00
23	2.8	e3.0	e.60	e2.5	e15	14	47	7.0	3.9	5.1	.00	.00
24	2.6	e3.0	e.70	e2.0	e10	14	37	6.3	4.0	4.6	.00	.00
25	2.6	e2.5	e.90	e2.0	e8.0	11	28	5.4	3.9	3.5	.00	.00
26	2.5	e2.5	e1.0	e2.0	e7.0	8.9	26	5.3	3.6	3.8	.00	.00
27	2.3	e2.5	e1.5	e3.0	e6.0	8.8	45	8.0	5.3	3.3	.00	.00
28	2.2	e2.5	e1.0	e2.5	e5.0	8.7	60	14	5.1	3.5	.00	.00
29	2.2	e2.5	e.90	e2.0	---	8.4	69	12	4.2	3.0	.00	.00
30	2.3	e2.5	e.70	e2.5	---	8.1	44	10	3.4	2.9	.00	.00
31	2.4	---	e2.5	e3.0	---	9.1	---	8.4	---	1.8	.00	---
TOTAL	68.65	89.5	64.40	65.40	337.5	280.0	955.3	401.3	147.5	103.49	6.12	1.50
MEAN	2.21	2.98	2.08	2.11	12.1	9.03	31.8	12.9	4.92	3.34	.20	.050
MAX	3.5	3.7	3.5	4.0	35	15	114	31	7.0	6.2	1.2	1.5
MIN	.75	2.2	.50	.90	3.0	4.0	5.4	5.3	3.4	.73	.00	.00
AC-FT	136	178	128	130	669	555	1890	796	293	205	12	3.0

CAL YR 1990 TOTAL 3090.90 MEAN 8.47 MAX 80 MIN .38 AC-FT 6130
WTR YR 1991 TOTAL 2520.66 MEAN 6.91 MAX 114 MIN .00 AC-FT 5000

e Estimated

YELLOWSTONE RIVER BASIN

06291500 LODGE GRASS CREEK ABOVE WILLOW CREEK DIVERSION, NEAR WYOLA, MT

LOCATION.--Lat 45°07'39", long 107°36'01", in SE1/4NE1/4NE1/4 sec.24, T.8 S., R.33 E., Big Horn County, Hydrologic Unit 10080016, on left bank 0.2 mi upstream from Willow Creek diversion canal, 1.1 mi downstream from Spring Creek, 10 mi west of Wyola, 17 mi southwest of Lodge Grass, and at river mile 43.0.

DRAINAGE AREA.--80.7 mi^2.

PERIOD OF RECORD.--March 1939 to September 1974, October 1982 to current year.

REVISED RECORDS.--WSP 1559: 1944-47. WSP 1629: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 4,170 ft, from topographic map. March 1939 to September 1974 recording gage 0.1 mi upstream at different datum. Flows are equivalent.

REMARKS.--Estimated daily discharges: Dec. 16 to Feb. 3, May 21, 22, June 9, 10. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 400 acres upstream of station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--44 years (1939-74, 1983-91), 48.3 ft^3/s, 34,990 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,130 ft^3/s, June 9, 1964, gage height, 6.14 ft, from rating curve extended above 600 ft^3/s; minimum daily, 3.0 ft^3/s, Jan. 17, 18, 25, 30, 31, 1950, Jan. 15, 16, 1954.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 270 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 21	unknown	331	3.81	June 8	unknown	*402	*4.03
May 26	unknown	329	3.79				

Minimum daily discharge, 4.0 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17	17	14	e10	e10	14	18	29	200	74	31	17
2	17	18	12	e8.0	e11	16	16	28	203	69	30	17
3	17	16	13	e6.4	e12	13	15	28	262	65	30	17
4	17	17	11	e6.5	13	16	15	28	295	64	30	17
5	16	19	15	e6.2	14	23	15	27	316	62	31	17
6	21	17	14	e6.4	16	19	16	25	322	61	29	17
7	20	14	15	e6.6	16	16	17	28	359	59	29	16
8	19	17	15	e7.0	16	16	19	31	382	58	28	19
9	20	17	16	e6.8	16	15	19	37	e350	56	27	21
10	20	18	15	e6.8	16	17	19	45	e320	56	26	22
11	22	17	15	e6.6	16	18	20	49	296	52	25	26
12	20	17	15	e6.6	16	16	20	57	319	47	25	22
13	20	17	13	e6.4	16	16	17	59	319	45	24	20
14	20	17	13	e6.4	15	16	15	70	287	44	24	22
15	19	16	15	e6.2	14	16	18	117	241	43	25	29
16	20	16	e11	e5.0	17	16	22	157	211	44	24	22
17	23	16	e10	e4.5	20	17	28	134	190	43	24	24
18	20	16	e8.0	e4.8	18	16	32	129	166	42	23	22
19	21	16	e7.0	e5.2	16	16	40	165	151	41	22	20
20	21	16	e4.5	e5.6	21	17	55	215	143	40	21	19
21	19	16	e4.0	e6.0	19	17	81	e300	140	39	21	20
22	20	16	e5.0	e5.8	16	19	90	e275	129	38	20	22
23	19	16	e6.0	e7.0	16	19	78	252	118	36	20	20
24	19	16	e8.0	e8.0	16	16	55	233	113	35	20	20
25	18	16	e7.0	e7.0	15	15	46	279	109	36	19	19
26	18	16	e8.0	e7.5	15	16	60	312	103	36	20	18
27	17	14	e9.0	e8.0	14	16	45	274	96	37	20	18
28	17	11	e8.0	e7.0	15	16	38	223	87	34	19	18
29	17	11	e5.5	e6.0	---	18	35	195	83	32	19	17
30	17	15	e8.0	e7.0	---	17	32	187	80	30	18	18
31	17	---	e12	e8.0	---	16	---	194	---	30	18	---
TOTAL	588	481	332.0	205.3	435	514	996	4182	6390	1448	742	596
MEAN	19.0	16.0	10.7	6.62	15.5	16.6	33.2	135	213	46.7	23.9	19.9
MAX	23	19	16	10	21	23	90	312	382	74	31	29
MIN	16	11	4.0	4.5	10	13	15	25	80	30	18	16
AC-FT	1170	954	659	407	863	1020	1980	8290	12670	2870	1470	1180

CAL YR 1990 TOTAL 14316.0 MEAN 39.2 MAX 231 MIN 4.0 AC-FT 28400
WTR YR 1991 TOTAL 16909.3 MEAN 46.3 MAX 382 MIN 4.0 AC-FT 33540

e Estimated

06294000 LITTLE BIGHORN RIVER NEAR HARDIN, MT

LOCATION.--Lat 45°44'09", long 107°33'24", in SE1/4NE1/4NE1/4 sec.19, T.1 S., R.34 E., Big Horn County, Hydrologic Unit 10080016, on left bank 50 ft downstream from bridge on Sarpy Road, 0.2 mi upstream of terminal wasteway of Agency Canal, 0.6 mi upstream from mouth, and 2.3 mi east of Hardin.

DRAINAGE AREA.--1,294 mi^2.

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

REVISED RECORDS.--WDR MT-86-1: 1978.

GAGE.--Water-stage recorder. Datum of gage is 2,882.29 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 7, 1953, nonrecording gage at site 0.4 mi downstream. Oct. 7, 1953, to May 6, 1963, water-stage recorder at site 0.3 mi downstream. May 6, 1963, to Nov. 6, 1963, nonrecording gage at site 0.4 mi downstream. All at different datums. Nov. 7, 1963, to Aug. 15, 1976, water-stage recorder at site 35 ft downstream at present datum. Aug. 15, 1976, to Sept. 30, 1979, water-stage recorders were located on each bank downstream of Sarpy Road bridge and were used depending on control conditions.

REMARKS.--Estimated daily discharges: Nov. 27-29, Dec. 17 to Mar. 8. Water-discharge records good except those for estimated daily discharges, which are poor. Flow partly regulated by Willow Creek Reservoir (capacity 23,000 acre-ft). Diversions for irrigation of 20,980 acres upstream from station. Figures of discharge given herein include flow of terminal wasteway of Agency Canal.

AVERAGE DISCHARGE.--38 years, 295 ft^3/s, 213,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,600 ft^3/s, May 19, 1978, gage height, 11.20 ft, used gage height obtained at bridge on Sarpy Creek Road; maximum gage height, 11.78 ft, Mar. 20, 1960, site and datum then in use, backwater from ice; minimum discharge observed, 0.20 ft^3/s, Aug. 7, 1961, result of discharge measurement.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Feb. 5	1610	unknown	a*4.79	June 9	1930	*1,370	4.34
May 23	1800	1,310	4.32				

a--result of backwater from ice.

Minimum daily discharge, 19 ft^3/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	51	121	109	e90	e90	e100	123	336	846	383	58	65
2	52	122	106	e60	e120	e130	117	284	797	368	57	67
3	52	122	105	e50	e170	e160	115	255	808	345	61	62
4	53	126	106	e50	e230	e140	113	239	862	310	63	60
5	57	126	122	e47	e300	e130	113	231	962	291	64	60
6	71	131	119	e47	e290	e125	112	222	1100	256	59	66
7	78	134	119	e60	e270	e170	111	208	1150	236	56	61
8	88	130	123	e50	e250	e140	131	198	1190	221	58	60
9	96	119	142	e60	e250	146	139	202	1310	159	58	67
10	120	128	147	e70	e240	172	143	218	1310	155	58	70
11	114	126	142	e90	e240	160	156	275	1210	143	56	98
12	117	128	138	e120	e250	146	163	335	1120	130	51	103
13	125	125	117	e150	e240	143	189	366	1080	135	47	111
14	125	122	135	e140	e230	137	194	401	1050	131	47	122
15	121	120	106	e130	e240	134	170	407	1020	125	46	150
16	121	117	84	e130	e230	135	183	461	985	119	52	155
17	127	117	e100	e130	e220	131	218	609	842	108	59	171
18	130	116	e60	e120	e200	139	270	636	753	97	70	168
19	135	117	e40	e120	e210	134	346	601	695	93	74	153
20	129	120	e24	e90	e200	133	425	669	642	94	71	163
21	130	126	e20	e90	e180	130	473	860	619	91	72	180
22	126	121	e19	e85	e150	134	488	1060	632	90	73	191
23	121	122	e30	e70	e150	138	507	1190	602	89	75	185
24	121	119	e45	e60	e150	148	471	1260	566	86	80	162
25	120	116	e60	e50	e130	151	395	1170	532	85	83	156
26	120	111	e50	e60	e110	137	346	1160	512	88	87	153
27	121	e90	e65	e70	e90	130	369	1220	491	91	83	156
28	120	e95	e90	e60	e80	128	441	1220	466	84	70	164
29	119	e115	e35	e50	---	128	404	1010	430	83	62	173
30	119	119	e60	e60	---	125	380	885	413	74	60	176
31	120	---	e120	e70	---	127	---	862	---	63	63	---
TOTAL	3299	3601	2738	2529	5510	4281	7805	19050	24995	4823	1973	3728
MEAN	106	120	88.3	81.6	197	138	260	615	833	156	63.6	124
MAX	135	134	147	150	300	172	507	1260	1310	383	87	191
MIN	51	90	19	47	80	100	111	198	413	63	46	60
AC-FT	6540	7140	5430	5020	10930	8490	15480	37790	49580	9570	3910	7390

CAL YR 1990 TOTAL 77305 MEAN 212 MAX 1060 MIN 19 AC-FT 153300
WTR YR 1991 TOTAL 84332 MEAN 231 MAX 1310 MIN 19 AC-FT 167300

e Estimated

YELLOWSTONE RIVER BASIN

06294500 BIGHORN RIVER ABOVE TULLOCK CREEK, NEAR BIGHORN, MT

LOCATION.--Lat 46°07'29", long 107°28'06", in SE1/4SE1/4NE1/4 sec.3, T.4 N., R.34 E., Treasure County, Hydrologic Unit 10080015, on right bank, 1.9 mi upstream from Tullock Creek, 3.0 mi upstream from mouth, 3.6 mi southwest of Bighorn, and 4.5 mi southeast of Custer.

DRAINAGE AREA.--22,414 mi^2. Area at site used Oct. 7, 1955, to Sept. 30, 1981, 22,885 mi^2.

PERIOD OF RECORD.--October 1981 to current year. Previously published as "06294700 Bighorn River at Bighorn, MT" 1956-81, and as "near Custer" 1945-55. Flows are equivalent at all sites.

GAGE.--Water-stage recorder. Elevation of gage is 2,700 ft above National Geodetic Vertical Datum of 1929, from topographic map. May 11, 1945 to Dec. 6, 1945, nonrecording gage, and Dec. 7, 1945, to Oct. 6, 1955, water-stage recorder 1.7 mi upstream at different datum. Oct. 7, 1955, to Sept. 30, 1981, at site 2.3 mi downstream at different datum.

REMARKS.--Estimated daily discharges: Dec. 18 to Jan. 19, Jan. 25 to Feb. 1. Records good except those for estimated daily discharges, which are poor. Flow regulated by Bighorn Lake beginning November 1965 (usable capacity, 1,356,000 acre-ft). Major regulation prior to November 1965 by 14 reservoirs in Wyoming and 1 in Montana with combined usable capacity of about 1,400,000 acre-ft. Diversion for irrigation of about 445,200 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--46 years (water years 1945-81, 1982-91), 3,824 ft^3/s, 2,770,000 acre-ft/yr, unadjusted.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 59,200 ft^3/s, May 20, 1978, gage height, 14.15 ft; maximum gage height recorded, 14.21 ft, Apr. 2, 1965 (ice jam); minimum discharge, about 275 ft^3/s, Nov. 15, 1959, result of freezeup; minimum daily, 400 ft^3/s, Apr. 4, 1967.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,100 ft^3/s, June 22, 1991, gage height, 7.17 ft, maximum gage height, 9.68 ft, Jan. 31, 1991 (ice jam); minimum daily discharge, 1,020 ft^3/s, Oct. 19, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 16,100 ft^3/s, June 22, gage height, 7.17 ft; maximum gage height, 9.68 ft, Jan. 31, backwater from ice; minimum daily discharge, 1,900 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2680	2780	2890	e3800	e4000	2480	2290	2570	4940	13600	3130	2350
2	2680	2760	2890	e3700	4110	2500	2250	2460	4950	13500	3120	2370
3	3950	2740	2910	e3200	3590	2770	2260	2400	4900	13400	3100	2380
4	2780	2740	2920	e3000	3510	2530	2260	2370	4890	12200	3120	2350
5	2600	2760	2960	e3000	3480	2540	2270	2350	5010	10900	3150	2320
6	2660	2730	2940	e3000	3530	2530	2270	2370	5670	10400	2900	2300
7	2640	2750	2960	e3500	3480	2560	2300	2340	5990	9550	2590	2300
8	2560	2780	2950	e3100	3490	2600	2430	2300	6910	9310	2490	2600
9	2550	2780	2990	e3600	3440	2580	2420	2290	9830	8390	2470	2660
10	2600	2810	3040	e4000	2870	2580	2390	2300	12300	7750	2460	2700
11	2590	2790	3030	e4000	2850	2560	2500	2360	12400	7370	2480	3440
12	2700	2790	3050	e3900	2850	2540	2570	2440	13300	7180	2440	3060
13	2850	2790	3030	e3800	2820	2530	2690	2480	14500	6700	2350	2830
14	2870	2810	3030	e3800	2820	2550	2580	2490	14000	6120	2360	2870
15	2810	2800	3190	e3800	2800	2540	2520	2530	13200	6080	2440	3210
16	2820	2780	3390	e3800	2830	2550	2560	2670	13100	5890	2660	3020
17	2850	2800	3420	e3600	2860	2550	2720	2860	13700	5800	2580	3350
18	2860	2800	e3400	e3600	2900	2560	2880	3000	13800	5390	2570	3460
19	2890	2780	e2500	e3500	2880	2570	3100	2990	13700	4820	2580	3410
20	2880	2770	e2000	3490	2940	2580	3350	2950	13800	4810	2480	3410
21	2830	2860	e1900	3510	2920	2540	3440	3070	13800	4780	2400	3570
22	2840	2880	e2300	3550	2900	2590	3430	3770	15200	4790	2340	4030
23	2810	2870	e2800	3550	2870	2580	3420	4360	14200	4370	2290	4030
24	2780	2860	e3400	3620	2900	2570	3250	4910	14100	3800	2270	4040
25	2780	2870	e3000	e3500	2870	2580	3000	5310	14100	3670	2240	4150
26	2790	2840	e3400	e3700	2820	2580	2830	5190	13900	3320	2210	4500
27	2770	2820	e3700	e3800	2550	2570	2790	5270	13900	3360	2150	4480
28	2790	2820	e3000	e3700	2510	2550	2940	5300	13900	3300	2130	4490
29	2780	2870	e2500	e3500	---	2530	2760	4950	13800	3320	2130	4550
30	2760	2930	e3000	e3000	---	2330	2650	4740	13800	3220	2170	4560
31	2780	---	e3900	e3500	---	2310	---	4980	---	3150	2260	---
TOTAL	86530	84160	92390	110120	86390	78930	81120	102370	341590	210240	78060	98790
MEAN	2791	2805	2980	3552	3085	2546	2704	3302	11390	6782	2518	3293
MAX	3950	2930	3900	4000	4110	2770	3440	5310	15200	13600	3150	4560
MIN	2550	2730	1900	3000	2510	2310	2250	2290	4890	3150	2130	2300
AC-FT	171600	166900	183300	218400	171400	156600	160900	203100	677500	417000	154800	195900

CAL YR 1990 TOTAL 1065580 MEAN 2919 MAX 4200 MIN 1900 AC-FT 2114000
WTR YR 1991 TOTAL 1450690 MEAN 3974 MAX 15200 MIN 1900 AC-FT 2877000

e Estimated

06294700 BIGHORN RIVER AT BIGHORN, MT
(National stream quality accounting network station)

LOCATION.--Lat 46°08'50", long 107°28'00", in NE1/4NE1/4NE1/4 sec.33, T.5 N., R.34 E., Treasure County, Hydrologic Unit 10080015, on right bank 150 ft downstream from bridge on old U.S. Highway 10, 0.3 mi downstream from bridge Interstate Highway 94, 0.7 mi upstream from mouth, 1.3 mi southwest of Bighorn, and 4.4 mi east of Custer.

DRAINAGE AREA.--22,885 mi^2. Area at site used prior to Oct. 7, 1955, 22,410 mi^2.

PERIOD OF RECORD.--Water years 1946 to current year. Prior to October 1948, published as near Custer.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1964 to September 1981.
WATER TEMPERATURE: April 1949 to September 1951, October 1953 to September 1981.
SUSPENDED-SEDIMENT DISCHARGE: July 1947 to September 1954, October 1955 to September 1958, October 1959 to June 1972.

REMARKS.--Water-discharge records for Bighorn River above Tullock Creek near Bighorn (station 06294500) are used, flows are equivalent at these two sites.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1965-81): Maximum daily, 1,460 microsiemens, May 24, 1978; minimum daily, 460 microsiemens, Mar. 13, 1966.
WATER TEMPERATURE (water years 1949-51, 1954-81): Maximum observed, 30.0°C, July 17, 18, 1953; minimum observed, 0.0°C, on many days during winters.
SEDIMENT CONCENTRATION (water years 1947-54, 1955-58, 1959-72): Maximum daily mean, 23,200 mg/L, May 24, 1952; minimum daily mean, 8 mg/L, Oct. 31, 1967.
SEDIMENT LOAD (water years 1947-54, 1955-58, 1959-72): Maximum daily, 727,000 tons, May 24, 1952; minimum daily, 46 tons, Oct. 31, 1967.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRESSURE (MM OF HG) (00025)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	COLIFORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT												
31...	1050	2650	0	0	942	19.0	10.0	686	10.0	99	K15	K140
DEC												
11...	1120	2960	100	2	861	9.5	5.0	686	11.4	100	K22	2100
FEB												
13...	1055	2760	100	2	946	1.5	0.5	691	13.0	100	33	780
APR												
02...	1100	2310	0	0	1010	15.0	10.5	690	10.5	104	K16	K10000
JUN												
05...	1130	4900	90	2	990	20.0	14.0	693	9.4	101	130	360
SEP												
10...	1130	2720	0	0	603	24.0	17.0	694	8.8	100	210	210

DATE	PH (STANDARD UNITS) (00400)	BICARBONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CARBONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	TURBIDITY (NTU) (00076)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)
OCT												
31...	8.8	201	4	169	5.9	310	78	27	81	2	4.0	181
DEC												
11...	8.5	215	0	175	4.5	290	74	26	73	2	3.5	174
FEB												
13...	8.5	210	5	177	5.0	320	81	28	75	2	3.9	188
APR												
02...	8.7	213	8	187	3.3	330	83	30	78	2	3.9	149
JUN												
05...	8.4	204	9	178	32	320	80	29	74	2	3.7	192
SEP												
10...	8.5	145	5	127	9.5	200	53	17	52	2	3.1	134

YELLOWSTONE RIVER BASIN

06294700 BIGHORN RIVER AT BIGHORN, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE TOTAL (MG/L AS N) (00620)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
OCT											
31...	300	10	0.2	8.9	635	615	0.86	4540	--	<0.010	0.020
DEC											
11...	270	11	0.3	7.9	569	573	0.77	4550	--	<0.010	<0.010
FEB											
13...	300	10	0.5	8.0	632	617	0.86	4710	--	<0.010	<0.010
APR											
02...	330	15	0.4	7.3	672	661	0.91	4190	--	<0.010	0.010
JUN											
05...	250	13	0.4	7.8	611	570	0.83	8080	0.370	0.030	<0.010
SEP											
10...	190	8.1	0.3	9.1	390	410	0.53	2860	--	<0.010	<0.010

DATE	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT											
31...	0.40	0.40	0.02	0.02	0.05	0.01	0.02	0.01	49	351	86
DEC											
11...	0.40	0.40	0.03	0.02	0.02	<0.01	<0.01	<0.01	23	184	92
FEB											
13...	0.40	0.40	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	17	127	88
APR											
02...	0.26	0.26	<0.01	0.01	0.01	<0.01	<0.01	<0.01	50	312	90
JUN											
05...	0.40	0.40	0.02	0.03	0.08	<0.01	0.02	<0.01	150	1980	95
SEP											
10...	0.09	0.10	0.02	0.01	0.05	0.02	<0.01	<0.01	35	257	97

DATE	TIME	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)
OCT											
31...	1050	<10	1	55	<0.5	<1.0	<1	<3	6	7	<1
FEB											
13...	1055	<10	2	51	<0.5	<1.0	<1	<3	3	10	1
JUN											
05...	1130	<10	2	61	<0.5	<1.0	<1	<3	3	24	1
SEP											
10...	1130	10	<1	46	<0.5	<1.0	<1	<3	4	10	<1

DATE	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
OCT										
31...	35	6	0.1	<10	2	<1	<1.0	850	<6	8
FEB										
13...	37	13	<0.1	<10	2	<1	<1.0	820	<6	8
JUN										
05...	36	5	0.2	<10	3	<1	<1.0	810	<6	13
SEP										
10...	20	3	0.3	<10	2	<1	<1.0	520	<6	6

YELLOWSTONE RIVER BASIN

06294995 ARMELLS CREEK NEAR FORSYTH, MT

LOCATION.--Lat 46°14'59", long 106°48'22", in SE1/4NW1/4NE1/4 sec.26 T.6 N., R.39 E., Rosebud County, Hydrologic Unit 10100001, on right bank 300 ft upstream from bridge on Interstate Highway I-94, 2.2 mi upstream from mouth, and 6 mi southwest of Forsyth.

DRAINAGE AREA.--370 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1974 to September 1984, October 1987 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,560 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Dec. 13 to Apr. 11. Water-discharge records poor. Diversions for irrigation of about 200 acres upstream of station.

AVERAGE DISCHARGE.--14 years (1974-84, 1988-91), 5.01 ft^3/s, 3,630 acre-ft/yr; median of yearly mean discharges, 2.9 ft^3/s, 2,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,400 ft^3/s, June 30, 1991, gage height, 5.77 ft; maximum gage height observed, 6.62 ft, Mar. 12, 1978, backwater from ice; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 130 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 1	1745	429	4.63	June 30	0145	*1,400	*5.77
June 20	0445	352	4.47				

No flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.1	.09	.07	e.00	e.01	e.01	e.40	1.2	1.2	58	.00	.30
2	.26	.08	.07	e.00	e.02	e.01	e.50	1.0	1.1	7.9	.02	1.2
3	.16	.08	.07	e.00	e.02	e.02	e.50	.05	1.7	2.0	.44	.55
4	.49	.10	.08	e.00	e.02	e.03	e.50	.02	2.0	.95	.52	.01
5	.42	.08	.08	e.00	e.02	e.04	e.50	.01	1.4	.41	.07	.23
6	.08	.07	.07	e.00	e.02	e.04	e.45	.65	1.3	.18	.02	.47
7	.13	.08	.09	e.00	e.02	e.04	e.40	.89	1.2	.08	.02	.60
8	.22	.10	.11	e.00	e.02	e.04	e.40	.75	1.4	.05	.00	.71
9	.48	.14	.09	e.00	e.02	e.04	e.40	.63	1.3	.03	.09	.91
10	.75	.18	.08	e.00	e.02	e.04	e.35	2.4	1.4	.31	2.4	1.2
11	.15	.11	.07	e.01	e.02	e.04	e.40	1.0	1.7	.03	4.3	1.2
12	.40	.15	.07	e.02	e.02	e.04	.21	.74	1.5	.00	2.0	1.3
13	.18	.11	e.04	e.01	e.02	e.04	.24	.61	1.9	.00	.00	1.1
14	.24	.12	e.03	e.01	e.01	e.04	.23	.60	1.6	.00	.00	1.1
15	.43	.08	e.02	e.01	e.01	e.04	.18	.53	1.2	.00	.00	.79
16	.15	.10	e.02	e.01	e.02	e.04	.23	.48	.95	.00	.00	.85
17	.13	.14	e.02	e.01	e.02	e.04	.25	.53	2.1	.00	.16	51
18	.26	.13	e.02	e.01	e.01	e.04	.12	.26	11	.00	1.7	14
19	.11	.12	e.02	e.00	e.02	e.04	.09	.25	24	.00	.95	4.5
20	.09	.13	e.00	e.00	e.02	e.04	.09	.23	108	.00	1.2	2.3
21	.16	.09	e.00	e.00	e.02	e.04	.81	.18	9.1	.00	.86	1.7
22	.23	.12	e.00	e.00	e.02	e.04	.07	.11	38	.00	.98	1.2
23	.10	.16	e.00	e.00	e.02	e.04	.09	.09	15	.00	1.3	.99
24	.17	.15	e.00	e.00	e.02	e.04	.05	.11	6.9	.00	2.1	.94
25	.28	.09	e.00	e.00	e.02	e.04	.02	63	14	.01	2.8	.89
26	.19	.09	e.00	e.00	e.02	e.04	.01	39	18	.00	1.4	1.0
27	.18	.08	e.00	e.00	e.03	e.04	.01	6.1	20	.70	.45	.98
28	.26	.08	e.00	e.00	e.02	e.04	5.9	2.0	29	1.6	1.0	.95
29	.17	.10	e.00	e.00	---	e.04	16	1.1	16	.49	.29	.67
30	.13	.08	e.00	e.00	---	e.10	5.2	1.3	370	.00	.00	.56
31	.17	---	e.00	e.00	---	e.20	---	1.6	---	.00	.19	---
TOTAL	8.27	3.23	1.12	0.09	0.53	1.37	34.60	127.42	703.95	72.74	25.26	94.20
MEAN	.27	.11	.036	.003	.019	.044	1.15	4.11	23.5	2.35	.81	3.14
MAX	1.1	.18	.11	.02	.03	.20	16	63	370	58	4.3	51
MIN	.08	.07	.00	.00	.01	.01	.01	.01	.95	.00	.00	.01
AC-FT	16	6.4	2.2	.2	1.1	2.7	69	253	1400	144	50	187

CAL YR 1990 TOTAL 404.69 MEAN 1.11 MAX 13 MIN .00 AC-FT 803
WTR YR 1991 TOTAL 1072.78 MEAN 2.94 MAX 370 MIN .00 AC-FT 2130

e Estimated

YELLOWSTONE RIVER BASIN

06294995 ARMELLS CREEK NEAR FORSYTH, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1975-86, 1988 to current year.

REMARKS.--Flow is affected during irrigation season by return and wastage from the Yellowstone Canal.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1982 to September 1983.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water year 1983): Maximum daily observed, 5,680 microsiemens, Dec. 16, 1982; minimum daily observed, 1,270 microsiemens, Jan. 11, 1983.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
OCT										
16...	1025	0.14	100	52	3340	9.5	7.5	689	8.6	80
NOV										
27...	1004	0.07	--	--	3790	4.0	0.0	--	--	--
FEB										
27...	0915	0.08	--	--	3200	4.0	0.0	--	--	--
APR										
11...	0945	0.40	100	62	3420	2.0	5.0	692	8.8	77
JUN										
13...	1030	2.0	40	1	5800	22.0	20.0	693	8.2	101
AUG										
06...	1015	0.17	0	0	4740	28.0	22.5	696	7.8	100
SEP										
18...	1048	13	--	--	707	10.5	9.5	--	--	--

DATE	TIME	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)
OCT									
16...	1025	8.0	450	61	72	590	12	7.0	623
APR									
11...	0945	8.4	700	140	85	670	11	7.0	498
JUN									
13...	1030	8.5	1400	150	240	910	11	11	474
AUG									
06...	1015	8.3	640	91	100	930	16	9.7	618

DATE	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
OCT									
16...	1100	24	0.3	10	2240	3.04	0.85	<0.01	<0.10
APR									
11...	1400	24	0.5	6.6	2630	3.58	2.84	0.01	<0.05
JUN									
13...	3000	45	0.6	1.1	4640	6.31	25.1	0.02	<0.05
AUG									
06...	1800	32	0.5	6.7	3340	4.54	1.53	0.02	<0.05

06294995 ARMELLS CREEK NEAR FORSYTH, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT									
16...	0.02	0.48	0.04	0.01	450	60	55	0.02	75
APR									
11...	0.02	0.38	0.04	<0.01	440	40	34	0.04	--
JUN									
13...	<0.01	--	0.03	0.01	870	20	98	0.53	98
AUG									
06...	0.03	0.67	0.05	0.02	660	<10	91	0.04	93

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)
JUN												
13...	1030	1	2	<10	<10	<1	<1	3	<1	4	2	1200
AUG												
06...	1015	--	<1	--	<10	--	<1	--	2	--	2	--

DATE	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	MERCURY DISSOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
JUN												
13...	<1	<1	130	70	<0.10	<0.1	8	5	<1	<1	<10	<10
AUG												
06...	--	<1	--	130	--	0.4	--	3	--	<1	--	<10

YELLOWSTONE RIVER BASIN

06295000 YELLOWSTONE RIVER AT FORSYTH, MT

LOCATION.--Lat 46°15'58", long 106°41'24", in NE1/4NW1/4NW1/4 sec.23, T.6 N., R.40 E., Rosebud County, Hydrologic Unit 10100001, on right bank 0.3 mi downstream from U.S. Highway 12 bridge, at intake for Forsyth water supply, at Forsyth, and at river mile 238.2.

DRAINAGE AREA.--40,339 mi^2.

PERIOD OF RECORD.--July 16, 1921, to September 30, 1923 (no winter records), October 1977 to current year. Miscellaneous discharge measurements were made in 1974 to 1976 and are available in files of Helena district office.

GAGE.--Water-stage recorder. Datum of gage is 2,504.62 ft above National Geodetic Vertical Datum of 1929, from nearby elevation determined by City of Forsyth. July 1921 to March 1922, nonrecording gage on discontinued highway bridge 10 ft downstream from gage at different datum. March 1922 to September 1923, nonrecording gage on discontinued highway bridge 10 ft downstream from gage at datum 2 ft higher.

REMARKS.--Estimated daily discharges: Dec. 16 to Feb. 20. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 838,000 acres upstream from station. Flow regulated to some extent by Bighorn Lake, usable capacity, 1,356,000 acre-ft, on Bighorn River. Small diversion dam about 4,200 ft downstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--14 years (1978-91), 10,540 ft^3/s, 7,636,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 106,000 ft^3/s, May 21, 1978, gage height, 14.53 ft; minimum daily, 1,400 ft^3/s, Nov. 23, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of 1918 reached a stage of about 20 ft, datum used in 1921, information from local residents.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 61,100 ft^3/s, June 14, gage height, 9.85 ft; minimum daily, 2,500 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5580	7040	6290	e6000	e6500	4280	4090	7080	26900	32400	7710	4780
2	5680	7030	6190	e5400	e6500	4380	4040	6650	26000	31900	7510	4880
3	5910	6970	6220	e5000	e6200	4390	3990	6290	27000	31100	7530	4880
4	6870	6970	6260	e4500	e6000	4180	3970	6320	32700	30000	7610	4750
5	6050	6990	6160	e4000	e6000	4250	4090	6330	37800	27800	7620	4620
6	6050	6810	6210	e4000	e6000	4530	4180	6260	43100	26900	7470	4610
7	6330	6930	6200	e4000	e6000	4420	4280	6220	49900	26400	6880	4590
8	6730	7090	6270	e4500	e6000	4370	4590	6150	56200	25400	6400	4610
9	6810	6860	6310	e5000	e6000	4260	5330	6260	58000	23900	6280	4900
10	6980	6710	6330	e5500	e5800	4170	5460	7110	58400	22300	6080	5250
11	6950	6740	6280	e6500	e5600	4220	5490	9490	55700	20900	5920	5950
12	6920	6910	6280	e6500	e5500	4190	5500	12600	53700	19300	5780	7720
13	7090	6910	6310	e6600	e5500	4250	5770	13600	55400	18200	5690	8130
14	7210	6820	6140	e6600	e5500	4300	5780	15000	59600	16600	5380	7410
15	7150	6720	6200	e6600	e5500	4240	5400	14300	60100	16200	5320	7640
16	7160	6650	e6600	e6600	e5500	4170	5400	15300	51400	15300	5500	8100
17	7130	6650	e6200	e6200	e5500	4210	5750	18300	42800	14400	5700	8590
18	7200	6690	e4500	e6200	e5500	4240	6210	18300	40800	13800	5610	8700
19	7220	6670	e3500	e6200	e5500	4290	6270	21600	40600	12800	5620	8490
20	7310	6610	e2600	e6200	e5300	4280	6800	28400	47200	12000	5700	8320
21	7230	6700	e2500	e6000	5220	4300	7210	32800	41800	11800	5400	8170
22	7190	6790	e2600	e6000	5230	4320	7210	34400	47800	11500	5020	8340
23	7130	6670	e3800	e6000	5180	4480	7350	36800	46000	11100	4770	8870
24	6980	6590	e4500	e6000	5100	4530	7450	39300	41500	10000	4730	8870
25	6970	6460	e5500	e6000	4970	4470	7790	41600	42500	9360	4740	8720
26	6980	6500	e6500	e6000	4800	4400	8440	42000	43000	9060	4720	8780
27	6880	6500	e6500	e6000	4600	4360	8920	44800	39500	8840	4660	8780
28	6840	6360	e6000	e6000	4400	4350	8720	45000	37300	8980	4520	8650
29	6920	6440	e5000	e5500	---	4350	8070	36200	35400	8720	4430	8640
30	7060	6430	e4500	e4500	---	4270	7480	30200	34500	8380	4560	8580
31	7020	---	e7000	e5500	---	4120	---	27800	---	7960	4630	---
TOTAL	211530	202210	171450	175600	155400	133570	181030	642460	1332600	543300	179490	213320
MEAN	6824	6740	5531	5665	5550	4309	6034	20720	44420	17530	5790	7111
MAX	7310	7090	7000	6600	6500	4530	8920	45000	60100	32400	7710	8870
MIN	5580	6360	2500	4000	4400	4120	3970	6150	26000	7960	4430	4590
AC-FT	419600	401100	340100	348300	308200	264900	359100	1274000	2643000	1078000	356000	423100

CAL YR 1990 TOTAL 3367590 MEAN 9226 MAX 34000 MIN 2500 AC-FT 6680000
WTR YR 1991 TOTAL 4141960 MEAN 11350 MAX 60100 MIN 2500 AC-FT 8216000

e Estimated

06295113 ROSEBUD CREEK AT RESERVATION BOUNDARY, NEAR KIRBY, MT

LOCATION.--Lat 45°21'40", long 106°59'23", in NE1/4NE1/4SW1/4 sec.36, T.5 S., R.38 E., Big Horn County, Hydrologic Unit 10100003, on right bank, 0.2 mi upstream from Dry Creek, 0.5 mi north of reservation boundary, 1.9 mi downstream from Cache Creek, 2.0 mi north of Kirby, and at river mile 179.6.

DRAINAGE AREA.-- 123 mi^2.

PERIOD OF RECORD.--October 1979 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,780 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 7-9, Nov. 26 to Mar. 4. Records fair except those for estimated discharges, which are poor. Numerous small diversions for irrigation upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--12 years (1980-91), 6.27 ft^3/s, 4,540 acre-ft/yr; median of yearly mean discharges, 5.7 ft^3/s, 4,130 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 127 ft^3/s, Apr. 16, 1985, gage height, 5.71 ft; maximum gage height observed, 6.30 ft, Feb. 21, 1980, backwater from ice; no flow part of each day Sept. 6-10, 1989, and part or all of each day Aug. 23, Sept. 14-19, 1990.

EXTREMES OUTSIDE PERIOD OF RECORD.--A discharge of 231 ft^3/s was measured May 9, 1978, at site 1.9 mi upstream from present site. Flow was known to be higher during flood of May 19-21, 1978, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 46 ft^3/s, May 11, gage height, 3.82 ft; minimum, 0.01 ft^3/s, Sept. 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.40	1.3	e1.0	e.60	e1.5	e4.0	2.9	21	15	4.9	.60	.10
2	.29	1.3	e1.0	e1.0	e2.0	e4.0	2.8	18	13	4.4	.62	.10
3	.25	1.4	e1.5	e1.0	e2.5	e3.5	7.4	18	12	3.8	.61	.11
4	.40	1.4	e1.5	e1.0	e3.0	e3.0	4.8	22	11	3.6	.54	.09
5	.39	1.6	e1.5	e1.0	e3.5	3.3	4.0	21	10	3.4	.55	.04
6	.88	1.8	e1.5	e1.0	e4.5	4.0	3.5	17	9.9	3.1	.54	.04
7	.94	e1.5	e1.5	e1.0	e4.5	3.4	3.1	15	12	2.7	.56	.05
8	1.0	e1.0	e1.5	e1.0	e4.5	3.1	3.4	22	14	2.8	.39	.07
9	1.0	e1.5	e1.5	e1.0	e4.0	3.4	3.5	32	17	2.5	.56	.10
10	.93	1.6	e1.5	e1.0	e3.0	3.3	3.5	35	15	2.3	.37	.26
11	1.0	1.5	e1.0	e1.0	e2.5	3.2	3.9	41	13	2.1	.31	.43
12	.98	1.5	e1.0	e1.5	e2.5	3.2	4.3	36	12	2.0	.29	.36
13	1.1	1.4	e1.0	e1.5	e2.5	3.2	5.0	33	9.4	1.9	.27	.29
14	1.7	1.3	e1.0	e1.5	e2.5	3.5	4.5	31	8.2	3.1	.26	.25
15	1.1	1.3	e1.0	e1.5	e2.5	3.1	4.5	26	7.9	3.7	.25	.81
16	1.1	1.4	e1.0	e1.5	e3.0	2.7	5.0	21	8.0	2.7	.33	.87
17	2.0	1.4	e1.0	e1.5	e3.5	2.5	5.7	19	6.8	2.1	.36	.97
18	1.4	1.3	e.50	e1.5	e3.5	2.4	6.9	18	6.7	1.6	.35	.98
19	2.2	1.4	e.50	e1.5	e3.5	2.3	11	16	6.3	1.2	.32	.81
20	1.8	1.5	e.50	e1.5	e3.5	2.3	12	15	5.7	1.4	.29	.61
21	1.3	1.6	e.50	e1.5	e3.5	2.7	11	14	5.4	1.2	.22	.63
22	1.3	1.5	e.50	e1.5	e3.5	2.8	9.9	14	5.5	.95	.22	.61
23	1.4	1.5	e.50	e1.5	e3.5	3.0	9.1	14	6.5	.90	.24	.69
24	1.2	1.5	e1.0	e1.5	e3.0	3.0	11	14	7.3	.85	.21	.65
25	1.2	1.4	e1.0	e1.0	e3.5	3.0	16	13	6.4	.88	.17	.57
26	1.3	e1.0	e1.0	e1.0	e4.0	2.9	17	13	6.0	.80	.13	.63
27	1.2	e1.0	e1.0	e1.0	e4.0	2.8	19	14	6.1	.77	.13	.58
28	1.4	e1.0	e1.0	e.70	e4.0	2.6	22	14	7.5	.80	.13	.59
29	1.2	e1.0	e.60	e.70	---	2.8	24	15	5.1	.69	.11	.53
30	1.4	e1.0	e.60	e.70	---	2.8	20	16	4.7	.54	.12	.60
31	1.2	---	e.60	e1.0	---	2.9	---	14	---	.61	.14	---
TOTAL	34.96	40.9	30.80	36.20	91.5	94.7	260.7	632	273.4	64.29	10.19	13.42
MEAN	1.13	1.36	.99	1.17	3.27	3.05	8.69	20.4	9.11	2.07	.33	.45
MAX	2.2	1.8	1.5	1.5	4.5	4.0	24	41	17	4.9	.62	.98
MIN	.25	1.0	.50	.60	1.5	2.3	2.8	13	4.7	.54	.11	.04
AC-FT	69	81	61	72	181	188	517	1250	542	128	20	27

CAL YR 1990 TOTAL 1495.82 MEAN 4.10 MAX 19 MIN .00 AC-FT 2970
WTR YR 1991 TOTAL 1583.06 MEAN 4.34 MAX 41 MIN .04 AC-FT 3140

e Estimated

YELLOWSTONE RIVER BASIN

06295250 ROSEBUD CREEK NEAR COLSTRIP, MT

LOCATION.--Lat 45°46'03", long 106°34'10", in SE1/4SW1/4NE1/4 sec.8, T.1 S., R.42 E., Rosebud County, Hydrologic Unit 10100003, on left bank 10 ft downstream from bridge on FAS Route 315, 1.5 mi downstream from Lee Coulee, 8.4 mi southeast of Colstrip, and at river mile 85.6.

DRAINAGE AREA.--799 mi^2.

PERIOD OF RECORD.--October 1974 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,000 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Dec. 8 to Feb. 4, Mar. 1-14. Records poor. Diversions for irrigation of about 800 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--17 years, 29.3 ft^3/s, 21,200 acre-ft/yr; median of yearly mean discharges, 15 ft^3/s, 10,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 605 ft^3/s, May 21, 1978, gage height, 9.03 ft; no flow many days most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 34 ft^3/s, May 15, gage height, 1.56 ft; no flow on many days.

CORRECTIONS.--The median of yearly mean discharges for water year 1990 is 18 ft^3/s, 13,000 acre-ft/yr.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	2.9	e2.0	e6.0	e7.0	6.4	20	18	9.6	1.5	.00
2	.00	.00	2.6	e1.5	e7.0	e7.0	6.1	21	16	8.8	1.2	.00
3	.00	.00	2.6	e1.5	e8.0	e7.0	6.1	21	16	8.5	.94	.00
4	.00	.00	2.7	e1.5	e8.0	e7.5	5.9	21	16	8.6	.60	.00
5	.00	.00	2.9	e1.5	8.6	e7.0	6.3	20	16	8.5	.86	.00
6	.00	.00	2.9	e1.5	8.4	e6.5	6.1	20	15	8.3	.77	.00
7	.00	.58	3.1	e1.5	7.6	e7.0	5.7	18	15	7.8	.45	.00
8	.00	.61	e3.0	e1.5	7.6	e7.0	6.1	18	14	7.6	.25	.00
9	.00	.65	e3.0	e1.5	7.9	e7.0	6.8	19	12	7.8	.21	.00
10	.00	1.2	e3.0	e2.0	8.1	e7.0	7.8	19	11	8.3	.20	.00
11	.00	1.2	e3.0	e3.0	8.8	e6.5	9.5	17	12	8.0	.12	.00
12	.00	4.6	e3.0	e4.0	10	e6.0	9.6	17	11	7.5	.09	.00
13	.00	2.5	e3.0	e6.0	11	e7.0	11	22	10	6.5	.07	.00
14	.00	1.8	e3.0	e6.0	10	e8.5	11	26	9.8	6.0	.06	.00
15	.00	1.4	e3.0	e5.5	9.7	9.4	10	32	9.9	5.5	.03	.00
16	.00	1.4	e2.5	e5.5	10	10	11	29	9.8	5.1	.00	.00
17	.00	1.7	e2.5	e5.5	11	10	12	27	9.5	4.6	.00	.00
18	.00	2.0	e2.5	e5.5	10	9.6	12	26	9.0	4.0	.00	.00
19	.00	2.1	e2.5	e5.5	12	8.2	11	25	8.6	4.0	.00	.00
20	.00	2.5	e2.0	e5.0	12	7.1	12	23	8.5	3.9	.00	.00
21	.00	2.7	e1.5	e5.5	11	6.6	12	21	8.8	3.5	.00	.00
22	.00	2.9	e1.0	e5.5	11	7.3	12	19	8.7	3.1	.00	.00
23	.00	3.1	e1.5	e6.0	12	7.3	12	17	8.7	2.8	.00	.00
24	.00	3.5	e2.0	e6.0	12	7.3	13	16	8.5	2.8	.00	.00
25	.00	3.4	e2.0	e5.5	9.7	7.3	13	18	9.5	3.2	.00	.00
26	.00	3.6	e2.0	e5.5	12	7.3	13	16	9.7	2.8	.00	.00
27	.00	2.6	e2.5	e5.0	9.6	6.9	13	16	9.1	2.7	.00	.00
28	.00	2.9	e2.0	e5.0	7.9	7.0	14	17	9.5	2.4	.00	.00
29	.00	2.9	e1.5	e4.5	---	7.0	17	17	9.8	1.9	.00	.00
30	.00	3.3	e2.0	e3.5	---	6.8	21	17	10	2.1	.00	.00
31	.00	---	e3.0	e4.5	---	6.9	---	18	---	1.8	.00	---
TOTAL	0.00	55.14	76.7	124.0	266.9	230.0	312.4	633	339.4	168.0	7.35	0.00
MEAN	.000	1.84	2.47	4.00	9.53	7.42	10.4	20.4	11.3	5.42	.24	.000
MAX	.00	4.6	3.1	6.0	12	10	21	32	18	9.6	1.5	.00
MIN	.00	.00	1.0	1.5	6.0	6.0	5.7	16	8.5	1.8	.00	.00
AC-FT	.00	109	152	246	529	456	620	1260	673	333	15	.00

CAL YR 1990 TOTAL 2652.06 MEAN 7.27 MAX 43 MIN .00 AC-FT 5260
WTR YR 1991 TOTAL 2212.89 MEAN 6.06 MAX 32 MIN .00 AC-FT 4390

e Estimated

YELLOWSTONE RIVER BASIN

06296003 ROSEBUD CREEK AT MOUTH, NEAR ROSEBUD, MT

LOCATION.--Lat 46°15'53", long 106°28'30", in SW1/4NW1/4NE1/4 sec.21, T.6 N., R.42 E., Rosebud County, Hydrologic Unit 10100003, on left bank 0.4 mi upstream from bridge on Interstate Highway 94, 0.8 mi upstream from mouth, and 1.6 mi southwest of Rosebud.

DRAINAGE AREA.--1,302 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1974 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,480 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 24 to Mar. 9. Water-discharge records poor. Diversions for irrigation of about 2,000 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--17 years, 32.7 ft^3/s, 23,700 acre-ft/yr; median of yearly mean discharges, 15.0 ft^3/s, 10,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,620 ft^3/s, May 19, 1978, gage height, 6.78 ft, from rating curve extended above 1,500 ft^3/s; no flow many days in August and September 1984, 1988, and 1990.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 20	1945	233	2.66	Sept. 16	0930	*345	*3.17

No flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.20	e.20	e.05	e.20	e2.0	1.5	27	135	15	.07	.00
2	.00	.21	e.20	e.05	e.30	e2.0	1.8	7.1	71	4.9	.13	.00
3	.00	.21	e.20	e.05	e.40	e2.5	1.4	4.8	38	2.1	.09	.00
4	.00	.21	e.20	e.05	e.50	e2.5	1.3	8.9	32	2.0	.07	.00
5	.00	.17	e.20	e.05	e.60	e3.0	1.7	6.1	90	2.3	.07	.00
6	.00	.17	e.20	e.05	e.70	e3.0	1.6	13	124	2.2	.07	.00
7	.00	.13	e.20	e.05	e.90	e4.0	1.3	8.5	46	1.8	.06	.00
8	.00	.15	e.20	e.05	e10	e6.0	1.8	14	56	.94	.06	.00
9	.00	.18	e.20	e.05	e20	e7.0	2.0	11	58	.65	.04	.00
10	.00	.20	e.20	e.05	e15	3.4	2.1	8.8	101	.73	.01	.00
11	.00	.20	e.20	e.10	e10	2.3	2.0	11	42	.87	.00	.28
12	.00	.17	e.20	e.15	e10	1.9	43	12	25	.83	.00	6.0
13	.00	.17	e.15	e.20	e10	1.4	44	19	15	1.2	.00	1.8
14	.00	.18	e.15	e.20	e9.0	1.3	41	15	18	1.0	.00	1.4
15	.00	.19	e.10	e.20	e7.0	2.2	51	22	16	.80	.00	114
16	.01	.18	e.10	e.20	e8.0	3.8	117	19	15	.15	.03	228
17	.01	.20	e.10	e.20	e7.0	2.2	138	18	7.7	.39	.04	58
18	.00	.21	e.10	e.20	e7.0	3.5	74	26	5.0	.49	.02	18
19	.00	.23	e.10	e.20	e7.0	4.6	39	23	12	.40	.02	4.4
20	.00	.27	e.00	e.15	e8.0	1.6	30	17	106	.33	.00	1.3
21	.00	.28	e.00	e.10	e8.0	1.3	16	34	65	.31	.00	.87
22	.00	.25	e.00	e.20	e6.0	1.5	12	32	28	.24	.00	.78
23	.00	.24	e.05	e.15	e4.5	2.2	6.2	26	21	.19	.00	1.1
24	.00	e.20	e.10	e.15	e4.5	2.0	7.7	18	67	.17	.00	1.3
25	.06	e.10	e.05	e.15	e2.5	1.7	8.1	17	150	.17	.00	.82
26	.11	e.05	e.05	e.15	e2.5	1.6	8.5	18	66	.15	.00	.62
27	.13	e.10	e.10	e.15	e6.0	1.5	65	32	29	.11	.00	.49
28	.19	e.15	e.05	e.15	e4.5	1.2	131	37	35	.09	.00	.42
29	.20	e.20	e.05	e.15	---	1.1	139	28	99	.09	.00	.40
30	.21	e.25	e.05	e.10	---	.96	50	24	32	.06	.00	.34
31	.22	---	e.10	e.15	---	1.2	---	52	---	.06	.00	---
TOTAL	1.14	5.65	3.80	3.90	170.10	76.46	1039.0	609.2	1604.7	40.72	0.78	440.32
MEAN	.037	.19	.12	.13	6.07	2.47	34.6	19.7	53.5	1.31	.025	14.7
MAX	.22	.28	.20	.20	20	7.0	139	52	150	15	.13	228
MIN	.00	.05	.00	.05	.20	.96	1.3	4.8	5.0	.06	.00	.00
AC-FT	2.3	11	7.5	7.7	337	152	2060	1210	3180	81	1.5	873

CAL YR 1990 TOTAL 2340.68 MEAN 6.41 MAX 125 MIN .00 AC-FT 4640
WTR YR 1991 TOTAL 3995.77 MEAN 10.9 MAX 228 MIN .00 AC-FT 7930

e Estimated

YELLOWSTONE RIVER BASIN

06296003 ROSEBUD CREEK AT MOUTH NEAR ROSEBUD, MT --Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1975-86, 1988 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1978 to September 1981, October 1982 to September 1983.
WATER TEMPERATURE: October 1978 to September 1979.

REMARKS.--Some scheduled sampling was not possible as there were periods of no streamflow.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1979-81, 1983): Maximum daily, 2,890 microsiemens, Oct. 18, 1980; minimum daily, 332 microsiemens, Mar. 9, 1979.
WATER TEMPERATURE (water year 1979): Maximum daily, 27.5°C, Aug. 5, 1979; minimum daily, 0.0°C, on many days during winter.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
NOV										
28...	0807	0.17	--	--	3250	-4.0	0.0	--	--	--
JAN										
23...	1250	0.16	--	--	3600	-15.0	0.0	--	--	--
FEB										
28...	0803	9.6	--	--	1530	1.0	0.5	--	--	--
APR										
12...	0750	22	100	74	2080	3.0	3.5	703	10.0	82
18...	1345	91	100	2	578	10.0	7.0	700	11.2	101
JUN										
13...	0815	5.8	30	1	940	17.0	17.5	694	8.6	99
AUG										
07...	0755	0.06	0	0	2630	23.0	20.5	698	8.0	98
SEP										
17...	1300	45	--	--	521	11.0	12.0	--	--	--

DATE	TIME	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
APR										
12...	0750	8.6	610	78	100	240	4	13	425	670
18...	1345	8.6	97	19	12	85	4	4.0	154	130
JUN										
13...	0815	8.5	240	39	35	110	3	7.4	200	300
AUG										
07...	0755	8.5	650	64	120	390	7	13	439	1000

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE TOTAL (MG/L AS N) (00620)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
APR									
12...	11	0.6	4.4	1370	1.87	81.5	0.04	0.04	0.08
18...	4.4	0.3	6.5	354	0.48	87.1	0.26	0.10	0.36
JUN									
13...	5.9	0.3	8.9	627	0.85	9.81	0.16	0.02	0.18
AUG									
07...	25	0.8	3.1	1880	2.56	0.30	--	0.02	<0.05

YELLOWSTONE RIVER BASIN

06296003 ROSEBUD CREEK AT MOUTH NEAR ROSEBUD, MT --Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR									
12...	0.02	1.1	0.14	0.03	300	20	138	8.2	--
18...	0.08	2.4	1.40	0.12	80	680	4210	1030	99
JUN									
13...	0.04	0.86	0.07	<0.01	140	23	362	5.7	99
AUG									
07...	<0.01	--	0.06	<0.01	480	<10	132	0.02	98

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)
APR												
18...	1345	6	1	<10	<0.5	<1	1	99	<1	76	<1	64000
AUG												
07...	0755	--	<1	--	<10	--	<1	--	<1	--	3	--

DATE	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	MERCURY DISSOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
APR												
18...	58	4	580	20	0.30	1.5	92	9	<2	<1	380	17
AUG												
07...	--	<1	--	30	--	0.2	--	3	--	<1	--	<10

YELLOWSTONE RIVER BASIN

06306300 TONGUE RIVER AT STATE LINE, NEAR DECKER, MT

LOCATION.--Lat 45°00'32", long 106°50'08", in NW1/4NW1/4NE1/4 sec.33, T.9 S., R.40 E., Big Horn County, Hydrologic Unit 10090101, on left bank 1 mi north of Wyoming-Montana State line, 1.4 mi southeast of Decker, 1.6 mi upstream from Badger Creek, and at river mile 200.9.

DRAINAGE AREA.--1,477 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1960 to current year. Records published as "near Decker" May 1928 to September 1938, not equivalent owing to intervening drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,429.14 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--Estimated daily discharges: Nov. 7-8, Nov. 26 to Mar. 13. Water-discharge records good except those for estimated daily discharges, which are poor. Flow regulated by many small reservoirs in Wyoming, combined capacity, about 15,000 acre-ft. Diversions for irrigation of about 64,300 acres upstream from station.

AVERAGE DISCHARGE.--31 years, 464 ft^3/s, 336,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,500 ft^3/s, May 12, 1978, gage height, 14.25 ft; minimum, 3.0 ft^3/s, Aug. 23, 1961.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 22	2100	*3,930	*7.86	June 8	2230	3,050	7.01

Minimum daily discharge, 60 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	196	230	e190	e140	e200	e200	175	310	2070	562	119	79
2	196	237	e180	e120	e200	e250	177	285	2010	506	112	72
3	191	233	e180	e120	e200	e350	180	288	2150	459	110	74
4	201	207	e200	e120	e200	e450	179	282	2260	425	107	80
5	206	215	e220	e120	e200	e500	185	267	2350	386	106	80
6	219	259	e210	e120	e210	e480	193	271	2600	346	106	87
7	266	e190	e200	e130	e220	e450	234	296	2710	314	107	90
8	266	e170	e220	e130	e230	e460	256	313	2950	305	104	106
9	250	237	e240	e130	e230	e470	236	391	2800	298	99	148
10	243	233	e240	e140	e230	e470	210	649	2500	281	97	180
11	273	244	e240	e150	e220	e450	224	841	2250	270	91	197
12	272	235	e220	e170	e210	e400	239	1070	2190	267	96	200
13	243	224	e190	e200	e210	e350	242	1210	2150	247	104	191
14	248	218	e190	e200	e200	317	198	1300	2120	235	95	180
15	243	222	e170	e200	e200	245	204	1570	1960	221	92	200
16	241	217	e170	e200	e210	196	262	1920	1690	211	106	232
17	250	201	e180	e200	e200	190	311	1910	1460	201	118	228
18	247	206	e160	e220	e200	188	359	1920	1320	178	115	239
19	239	216	e120	e210	e210	184	527	2350	1250	163	116	250
20	259	214	e90	e190	e220	185	501	2840	1230	155	114	238
21	245	210	e60	e190	e220	186	446	3170	1150	140	112	228
22	231	198	e65	e200	e210	193	427	3490	1150	138	109	224
23	256	173	e80	e180	e200	203	401	3260	1110	125	100	226
24	238	188	e90	e170	e190	195	390	2840	979	118	98	217
25	229	193	e80	e160	e200	188	378	2710	886	106	103	213
26	241	e180	e90	e160	e210	183	447	2720	830	106	98	210
27	238	e160	e120	e180	e210	181	495	2750	762	149	94	199
28	231	e190	e100	e150	e220	171	432	2670	713	175	90	188
29	232	e250	e80	e130	---	169	363	2400	658	152	85	184
30	232	e230	e80	e150	---	183	331	2300	594	138	81	191
31	229	---	e110	e180	---	176	---	2220	---	123	77	---
TOTAL	7351	6380	4765	5060	5860	8813	9202	50813	50852	7500	3161	5231
MEAN	237	213	154	163	209	284	307	1639	1695	242	102	174
MAX	273	259	240	220	230	500	527	3490	2950	562	119	250
MIN	191	160	60	120	190	169	175	267	594	106	77	72
AC-FT	14580	12650	9450	10040	11620	17480	18250	100800	100900	14880	6270	10380

CAL YR 1990 TOTAL 166563 MEAN 456 MAX 2510 MIN 60 AC-FT 330400
WTR YR 1991 TOTAL 164988 MEAN 452 MAX 3490 MIN 60 AC-FT 327300

e Estimated

06306300 TONGUE RIVER AT STATE LINE, NEAR DECKER, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1966 to current year.
PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1965 to September 1976, November 1980 to December 1986.
WATER TEMPERATURE: October 1965 to September 1976.
EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1966-76, 1981-87): Maximum daily, 1,490 microsiemens, Aug. 12, 1966, Jan. 11, 1972; minimum daily, 192 microsiemens, June 7, 1976.
WATER TEMPERATURE (water years 1966-76): Maximum, 30.5°C, July 16, 1966; minimum, 0.0°C on many days during winter.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
NOV							
07...	1635	213	--	--	620	0.5	--
FEB							
12...	1050	201	--	--	585	2.5	0.0
MAR							
19...	1110	193	--	--	770	6.5	5.5
MAY							
07...	1030	302	--	--	655	14.0	--
21...	1430	3490	--	1	180	25.0	13.5
23...	1700	3200	70	1	205	18.0	13.5
JUN							
13...	1030	2050	100	1	175	14.0	15.5
28...	0930	727	--	--	332	21.5	18.5
AUG							
15...	1000	95	--	--	720	20.0	21.5
SEP							
24...	1015	221	--	--	610	9.0	9.5

DATE	TIME	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)
MAY												
21...	1430	7.7	81	21	7.0	4.4	0.2	1.8	81	16	0.4	<0.1
23...	1700	7.7	90	22	8.5	5.1	0.2	1.5	79	22	0.4	<0.1
JUN												
13...	1030	8.1	81	20	7.6	4.7	0.2	0.90	74	22	0.4	0.1
SEP												
24...	1015	8.4	290	59	35	22	0.6	2.6	216	120	4.2	0.2

DATE	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)
MAY												
21...	7.8	107	0.15	1010	0.39	--	--	--	--	--	--	--
23...	8.4	116	0.16	1000	0.23	250	<1	24	<0.5	20	<1	<1
JUN												
13...	7.5	108	0.15	595	0.09	--	--	--	--	--	--	--
SEP												
24...	4.1	377	0.51	225	0.03	10	<1	39	0.6	70	<1	<1

DATE	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
MAY											
21...	--	--	--	--	--	--	--	--	--	--	--
23...	<3	3	78	1	5	8	0.2	<1	<1	99	7
JUN											
13...	--	--	--	--	--	--	--	--	--	--	--
SEP											
24...	<3	2	4	<1	20	5	0.1	<1	<1	450	7

YELLOWSTONE RIVER BASIN

06307500 TONGUE RIVER AT TONGUE RIVER DAM, NEAR DECKER, MT

LOCATION.--Lat 45°08'29", long 106°46'15", in SW1/4SE1/4SE1/4 sec.12, T.8 S., R.40 E., Big Horn County, Hydrologic Unit 10090101, on left bank 0.5 mi downstream from Tongue River Dam, 4 mi upstream from Post Creek, 8 mi northeast of Decker, 16 mi southeast of Kirby, and at river mile 188.4.

DRAINAGE AREA.--1,770 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1939 to current year.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,344.40 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation). Prior to Aug. 5, 1975, at datum 10.00 ft lower.

REMARKS.--No estimated daily discharges this year. Water-discharge records good. Flow regulated by Tongue River Reservoir (station number 06307000) and many small reservoirs, combined capacity, about 15,000 acre-ft. Diversion for irrigation of about 64,800 acres upstream from station.

AVERAGE DISCHARGE.--52 years, 445 ft^3/s, 322,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,800 ft^3/s, May 20, 1978, gage height, 20.00 ft, from floodmark in gage well; no flow part of each day Nov. 12, 13, 1969, when gates at dam were closed.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,530 ft^3/s, May 24, gage height, 14.58 ft; minimum daily, 10 ft^3/s, Dec. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	356	259	248	148	148	151	151	843	1700	472	468	274
2	355	260	246	148	148	148	152	828	1670	514	468	273
3	355	262	246	148	148	148	153	813	1670	510	467	272
4	352	262	105	148	148	149	153	580	1680	509	486	273
5	349	261	10	148	147	151	153	360	1690	507	505	274
6	264	260	116	148	146	151	153	359	1700	503	508	271
7	86	262	187	148	146	151	153	358	1710	501	507	268
8	57	262	148	148	146	151	153	360	1720	500	506	267
9	57	260	148	148	146	151	153	360	1730	497	509	265
10	58	259	148	148	146	150	153	360	1740	493	508	265
11	58	259	148	148	146	148	155	365	1750	491	506	263
12	58	259	148	148	145	148	156	496	1760	490	509	261
13	58	259	148	148	145	148	342	832	1760	486	509	258
14	59	259	148	148	146	148	581	842	1770	486	509	255
15	60	256	148	148	146	149	577	855	1730	450	509	252
16	59	255	148	146	146	148	573	873	1560	505	511	252
17	113	256	148	146	147	149	571	830	608	504	514	249
18	252	255	148	146	146	150	568	734	459	503	520	247
19	252	255	148	146	147	150	566	751	459	497	523	245
20	252	255	148	146	148	151	567	925	462	495	525	243
21	253	255	148	146	147	151	565	2440	463	494	464	241
22	255	255	148	147	146	151	563	2480	463	491	468	242
23	255	255	148	147	148	151	562	2500	463	486	468	239
24	255	253	148	148	148	151	559	2510	465	486	472	237
25	256	252	148	148	148	151	637	2450	467	484	475	234
26	258	252	148	148	148	151	705	2240	468	481	476	232
27	259	250	148	147	149	151	699	2250	468	480	474	233
28	258	249	148	147	149	151	695	2260	468	479	473	230
29	257	249	148	148	---	151	689	2260	468	473	342	227
30	259	249	148	148	---	151	777	2120	464	472	275	217
31	259	---	148	148	---	151	---	1730	---	472	274	---
TOTAL	6334	7694	4710	4572	4114	4651	12634	37964	33985	15211	14728	7559
MEAN	204	256	152	147	147	150	421	1225	1133	491	475	252
MAX	356	262	248	148	149	151	777	2510	1770	514	525	274
MIN	57	249	10	146	145	148	151	358	459	450	274	217
AC-FT	12560	15260	9340	9070	8160	9230	25060	75300	67410	30170	29210	14990

CAL YR 1990 TOTAL 166265 MEAN 456 MAX 2000 MIN 10 AC-FT 329800
WTR YR 1991 TOTAL 154156 MEAN 422 MAX 2510 MIN 10 AC-FT 305800

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1951, 1976 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: November 1980 to December 1986.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1981-1987): Maximum daily (water years 1981-82, 1984-87), 932 microsiemens, Mar. 12, 14, 1981; minimum daily, 230 microsiemens, July 1, 1983.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRESSURE (MM OF HG) (00025)	OXYGEN, DISSOLVED (MG/L) (00300)
NOV										
08...	1115	261	10	1	645	8.8	8.0	6.5	668	12.1
DEC										
19...	1115	149	0	0	730	8.6	--	1.5	664	11.3
FEB										
12...	1430	146	100	2	730	8.3	9.5	2.5	669	12.9
MAR										
19...	1500	151	50	1	735	8.5	12.5	4.0	660	12.9
MAY										
07...	1400	360	100	2	720	8.4	14.0	9.5	674	10.5
24...	1100	2510	--	--	225	--	20.5	13.5	--	--
JUN										
13...	1330	1760	40	1	190	8.1	21.5	15.5	668	--
28...	1200	488	--	--	210	--	24.0	18.0	--	--
JUL										
30...	1300	472	--	0	315	8.1	29.5	22.0	675	7.0
AUG										
15...	1215	508	100	2	388	8.3	22.0	22.5	675	6.5
SEP										
24...	1400	235	0	0	610	8.5	18.0	15.5	690	10.4

DATE	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)
NOV										
08...	113	290	57	36	27	0.7	3.2	183	150	2.2
DEC										
19...	93	330	66	40	29	0.7	3.3	247	160	4.9
FEB										
12...	108	340	70	40	31	0.7	2.9	254	160	3.5
MAR										
19...	114	330	66	41	36	0.9	4.0	232	200	3.7
MAY										
07...	104	310	61	38	34	0.8	4.0	191	190	5.2
24...	--	--	--	--	--	--	--	--	--	--
JUN										
13...	--	86	21	8.1	6.3	0.3	1.2	77	23	0.30
28...	--	--	--	--	--	--	--	--	--	--
JUL										
30...	91	140	32	14	11	0.4	2.0	117	53	2.1
AUG										
15...	85	170	39	18	15	0.5	2.1	144	65	1.2
SEP										
24...	116	270	53	33	29	0.8	3.8	192	150	4.2

YELLOWSTONE RIVER BASIN

06307500 TONGUE RIVER AT TONGUE RIVER DAM, NEAR DECKER, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRATE TOTAL (MG/L AS N) (00620)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)
NOV										
08...	0.2	1.5	387	0.53	273	--	<0.01	<0.10	0.03	0.67
DEC										
19...	0.5	5.3	457	0.62	184	--	<0.01	<0.10	0.05	0.35
FEB										
12...	0.2	9.3	469	0.64	185	0.29	0.01	0.30	0.08	0.52
MAR										
19...	0.2	7.2	497	0.68	203	0.19	0.02	0.21	0.04	0.46
MAY										
07...	0.3	5.3	452	0.62	440	--	0.02	<0.05	0.03	0.97
JUN										
13...	0.1	7.8	114	0.16	542	--	0.02	<0.05	0.03	0.47
JUL										
30...	0.2	7.9	192	0.26	245	--	0.02	<0.05	0.16	0.34
AUG										
15...	0.2	8.0	235	0.32	322	--	<0.01	<0.05	0.09	0.31
SEP										
24...	0.30	8.9	397	0.54	252	--	0.01	<0.05	0.09	0.61

DATE	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	CARBON, ORGANIC DISSOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUSPENDED TOTAL (MG/L AS C) (00689)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV									
08...	0.01	0.03	--	--	80	8	23	16	92
DEC									
19...	0.02	<0.01	--	--	80	<3	19	7.6	88
FEB									
12...	0.04	0.02	--	--	80	12	23	9.1	92
MAR									
19...	0.05	0.03	3.9	0.3	70	10	59	24	67
MAY									
07...	0.03	0.02	5.0	0.6	70	8	24	23	88
JUN									
13...	0.04	0.03	5.5	0.4	20	61	32	152	58
JUL									
30...	0.06	0.02	--	--	30	15	8	10	93
AUG									
15...	0.04	0.02	--	--	50	23	5	6.9	87
SEP									
24...	0.03	0.02	5.0	1.0	90	5	22	14	93

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)
JUN												
13...	1330	<1	<1	<10	<0.5	<1	<1	4	<1	8	3	600
SEP												
24...	1400	--	1	--	<0.5	--	<1	--	<1	--	2	--

DATE	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	MERCURY DISSOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
JUN												
13...	7	1	20	3	0.2	0.3	6	<1	<1	<1	<10	10
SEP												
24...	--	<1	--	11	--	0.4	--	2	--	<1	--	5

YELLOWSTONE RIVER BASIN

06307600 HANGING WOMAN CREEK NEAR BIRNEY, MT

LOCATION.--Lat 45°17'57", long 106°30'28", in N1/2NW1/4SE1/4 sec.19, T.6 S., R.43 E., Rosebud County, Hydrologic Unit 10090101, on right bank 0.5 mi downstream from bridge on Birney-Otter road, 1.2 mi south of Birney, 1.2 mi downstream from East Fork, and at river mile 3.3.

DRAINAGE AREA.--470 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1973 to September 1984, October 1985 to current year.

REVISED RECORDS.--WDR MT-82-1: 1980 (M).

GAGE.--Water-stage recorder. Elevation of gage is 3,150 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 26 to Feb. 12, Feb. 15-18. Water-discharge records poor. Diversions for irrigation of about 1,240 acres upstream from station.

AVERAGE DISCHARGE.--17 years, 3.42 ft^3/s, 2,480 acre-ft/yr; median of yearly mean discharges, 2.2 ft^3/s, 1,590 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,060 ft^3/s, May 19, 1978, gage height, 11.56 ft, from rating curve extended above 360 ft^3/s on basis of slope-area measurement of peak flow; no flow many days 1981, 1983, 1988, 1989, 1990.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 100 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Aug. 13	0030	*623	*7.08	Aug. 15	2300	235	5.08

No flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.40	e.60	e.60	e.70	1.0	.65	1.1	.91	3.1	.04	.00
2	.00	.52	e.60	e.70	e.80	.99	.60	1.1	1.0	2.3	.06	.00
3	.00	.46	e.60	e.70	e.80	.92	.65	1.2	1.3	2.0	.09	.00
4	.00	.45	e.60	e.60	e.90	.94	.59	1.2	1.2	1.7	.08	.00
5	.00	.49	e.60	e.60	e.90	.96	.59	1.1	1.0	1.4	.07	.00
6	.00	.48	e.60	e.60	e.90	1.0	.54	1.1	1.5	1.3	.06	.00
7	.00	.46	e.70	e.60	e1.0	.95	.49	1.1	1.9	1.1	.04	.00
8	.10	.45	e.70	e.60	e1.0	.97	.54	1.0	1.8	1.0	.02	.00
9	.14	.45	e.80	e.60	e1.0	1.1	.54	1.0	11	.93	.00	.00
10	.15	.45	e.80	e.60	e1.0	1.1	.72	1.0	2.3	.82	.00	.00
11	.19	.44	e.80	e.70	e1.1	1.0	1.0	1.0	1.3	.70	.00	.00
12	.15	.44	e.80	e.80	e1.1	1.0	1.4	1.2	1.0	1.9	6.2	.00
13	.19	.45	e.80	e.90	1.2	.96	1.7	1.1	.95	9.6	170	.00
14	.20	.45	e.80	e.90	1.2	.79	1.5	1.1	.91	5.9	3.3	.00
15	.20	.45	e.80	e.90	e1.5	.91	1.4	1.2	.91	3.8	21	.00
16	.27	.45	e.80	e.90	e1.8	.92	1.6	1.0	.82	2.4	21	.00
17	.36	.49	e.70	e1.0	e2.0	.77	1.4	.98	.68	1.7	.25	.00
18	.33	.75	e.70	e1.0	e2.0	.73	1.6	.92	.70	1.1	.08	.00
19	.31	.73	e.60	e.90	1.9	.68	1.8	.85	.69	.99	.05	.00
20	.30	.63	e.50	e.90	1.9	.82	1.6	.91	.69	.91	.05	.00
21	.26	.60	e.40	e.90	1.8	.85	1.5	.78	1.1	.77	.04	.00
22	.27	.46	e.30	e.90	1.5	.85	1.4	.97	2.3	.54	.02	.00
23	.31	.67	e.30	e.90	1.4	.85	1.4	.99	1.7	.48	.01	.00
24	.33	.45	e.40	e.80	1.2	.85	1.3	.91	.99	.51	.01	.00
25	.35	.50	e.50	e.70	1.2	.78	1.2	.78	5.1	.40	.01	.00
26	.36	e.50	e.50	e.70	1.1	.85	1.2	.81	16	.34	.00	.00
27	.31	e.50	e.50	e.70	1.1	.85	1.2	1.0	7.8	.35	.00	.00
28	.31	e.50	e.50	e.80	1.1	.92	1.3	1.0	5.2	.27	.00	.00
29	.36	e.60	e.40	e.80	---	.72	1.2	1.0	3.9	.23	.00	.00
30	.35	e.60	e.40	e.70	---	.71	1.3	1.1	3.1	.16	.00	.00
31	.38	---	e.50	e.60	---	.65	---	.97	---	.10	.00	---
TOTAL	6.48	15.27	18.60	23.60	35.10	27.39	33.91	31.47	79.75	48.80	222.48	0.00
MEAN	.21	.51	.60	.76	1.25	.88	1.13	1.02	2.66	1.57	7.18	.000
MAX	.38	.75	.80	1.0	2.0	1.1	1.8	1.2	16	9.6	170	.00
MIN	.00	.40	.30	.60	.70	.65	.49	.78	.68	.10	.00	.00
AC-FT	13	30	37	47	70	54	67	62	158	97	441	.00

CAL YR 1990 TOTAL 1352.32 MEAN 3.70 MAX 299 MIN .00 AC-FT 2680
WTR YR 1991 TOTAL 542.85 MEAN 1.49 MAX 170 MIN .00 AC-FT 1080

e Estimated

YELLOWSTONE RIVER BASIN

06307600 HANGING WOMAN CREEK NEAR BIRNEY, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water year 1975 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: November 1980 to July 1983, October 1985 to September 1987.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1981-83, 1986-87): Maximum daily, 3,780 microsiemens, July 3, 1986; minimum daily, 263 microsiemens, Feb. 27, 1986.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
NOV										
07...	1130	0.52	20	1	2650	5.0	2.5	--	10.9	--
DEC										
18...	1415	0.67	--	--	3550	-5.0	0.0	--	--	--
FEB										
13...	1130	1.1	100	2	2430	6.0	0.5	677	11.0	87
MAR										
20...	1115	0.86	50	1	2580	13.0	7.0	664	10.4	99
MAY										
02...	1515	0.96	100	2	2890	11.0	10.5	678	9.7	99
JUN										
27...	1110	7.9	--	--	3600	23.0	20.0	--	--	--
AUG										
14...	1110	2.0	--	--	990	22.0	20.5	--	--	--

DATE	TIME	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)
NOV									
07...	1130	8.4	850	110	140	390	6	17	544
FEB									
13...	1130	8.1	730	93	120	320	5	14	343
MAR									
20...	1115	8.4	760	88	130	370	6	14	382
MAY									
02...	1515	8.5	870	100	150	420	6	17	393

DATE	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
NOV									
07...	1200	12	0.6	13	2210	3.00	3.10	<0.01	<0.10
FEB									
13...	1100	15	0.7	13	1880	2.56	5.59	0.01	<0.10
MAR									
20...	1100	16	0.8	11	1960	2.66	4.55	0.02	<0.05
MAY									
02...	1500	12	1.0	12	2450	3.33	6.35	0.03	<0.05

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 07...	<0.01	--	0.02	<0.01	310	30	63	0.09	89
FEB 13...	0.04	1.2	0.05	0.01	250	40	37	0.11	91
MAR 20...	0.01	0.29	0.04	0.02	270	20	134	0.31	72
MAY 02...	0.03	0.67	0.08	0.02	300	20	145	0.38	--

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)
MAR 20...	1115	--	<1	--	<10	--	<1	--	<1	--	1	--
MAY 02...	1515	1	1	<10	<10	<1	<1	2	<1	4	2	840

DATE	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	MERCURY DISSOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
MAR 20...	--	1	--	70	--	0.2	--	2	--	<1	--	<10
MAY 02...	2	<1	160	60	0.20	0.1	4	3	<1	<1	30	<10

YELLOWSTONE RIVER BASIN

06307616 TONGUE RIVER AT BIRNEY DAY SCHOOL BRIDGE, NEAR BIRNEY, MT

LOCATION.--Lat 45°24'42", long 106°27'26", in SE1/4SW1/4SW1/4 sec.8, T.5 S., R.43 E., Rosebud County, Hydrologic Unit 10090102, on left bank, 60 ft upstream from Bureau of Indian Affairs bridge, 0.2 mi east of Birney Day School, 5.5 mi downstream from Cook Creek, 6.5 mi northeast of Birney, and at river mile 144.3.

DRAINAGE AREA.--2,621 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1979 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,060 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 26 to Mar. 8. Water-discharge records good except those for estimated daily discharges, which are fair. Flow regulated by Tongue River Reservoir (station number 06307000), and many small reservoirs in Wyoming (combined capacity, about 15,000 acre-ft. Numerous diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--12 years, 372 ft^3/s, 269,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,520 ft^3/s, June 14, 1984, gage height, 6.43 ft, from rating curve extended above 2,700 ft^3/s; minimum daily, 28 ft^3/s, Apr. 6-11, 1987.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,400 ft^3/s, May 23, gage height, 5.00 ft; minimum daily, 40 ft^3/s, Dec. 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	370	270	e200	e160	e160	e160	162	816	1630	463	474	241
2	372	271	e200	e160	e160	e170	161	829	1580	483	484	243
3	370	267	e200	e160	e160	e180	162	825	1580	507	471	244
4	369	268	e170	e160	e160	e190	159	808	1590	509	465	241
5	365	274	e90	e160	e160	e210	158	497	1600	510	495	237
6	379	274	e40	e160	e155	e210	158	397	1660	509	498	237
7	300	270	e130	e160	e155	e200	158	389	1670	504	493	237
8	142	270	e190	e160	e155	e190	164	385	1640	506	505	238
9	91	270	e160	e160	e155	181	161	378	1740	509	499	237
10	79	270	e160	e160	e155	174	162	376	1670	516	491	238
11	78	270	e160	e160	e155	171	171	374	1690	519	491	238
12	74	270	e160	e170	e155	168	176	389	1690	501	495	236
13	75	270	e160	e170	e155	168	180	592	1700	499	713	234
14	74	270	e160	e180	e155	167	360	777	1690	500	513	237
15	70	270	e160	e180	e155	166	548	792	1650	513	526	249
16	70	267	e160	e180	e160	167	584	802	1580	483	534	237
17	74	268	e160	e170	e160	171	593	814	1130	531	492	239
18	82	267	e160	e155	e160	166	598	737	565	525	488	235
19	250	267	e130	e155	e160	166	605	707	499	523	489	235
20	258	268	e100	e155	e160	166	591	782	495	544	499	236
21	260	269	e100	e155	e160	167	591	1430	498	522	494	238
22	263	267	e100	e155	e160	170	587	2280	555	518	430	240
23	264	267	e120	e155	e160	168	585	2330	492	521	439	239
24	267	266	e160	e155	e160	166	582	2350	511	511	435	238
25	266	264	e160	e155	e160	164	582	2350	472	505	424	240
26	267	e230	e160	e160	e160	164	686	2210	476	496	421	241
27	266	e200	e160	e160	e160	164	711	2150	486	494	422	243
28	266	e220	e130	e160	e160	162	710	2120	464	488	421	246
29	267	e230	e120	e160	---	163	698	2120	460	487	414	250
30	270	e220	e130	e160	---	163	696	2130	459	484	283	251
31	270	---	e160	e160	---	162	---	1790	---	479	243	---
TOTAL	6868	7824	4550	5010	4430	5354	12439	35726	33922	15659	14541	7195
MEAN	222	261	147	162	158	173	415	1152	1131	505	469	240
MAX	379	274	200	180	160	210	711	2350	1740	544	713	251
MIN	70	200	40	155	155	160	158	374	459	463	243	234
AC-FT	13620	15520	9020	9940	8790	10620	24670	70860	67280	31060	28840	14270

CAL YR 1990 TOTAL 164451 MEAN 451 MAX 2000 MIN 40 AC-FT 326200
WTR YR 1991 TOTAL 153518 MEAN 421 MAX 2350 MIN 40 AC-FT 304500

e Estimated

WATER-QUALITY RECORD

PERIOD OF RECORD.--Water years 1980 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)
NOV										
07...	1405	264	--	--	630	3.0	2.0	--	--	--
MAR										
20...	1445	169	60	1	780	17.5	10.0	8.4	330	64
MAY										
08...	1245	385	--	--	760	19.0	14.0	--	--	--
24...	1430	2350	90	2	245	23.0	15.5	8.0	110	26
JUN										
27...	1315	491	--	--	310	23.0	19.5	--	--	--
AUG										
14...	1500	515	80	1	390	27.0	24.5	8.3	170	38
SEP										
25...	1330	242	--	--	625	23.0	16.0	--	--	--

DATE	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)
NOV										
07...	--	--	--	--	--	--	--	--	--	--
MAR										
20...	42	40	1	4.2	236	200	5.8	0.2	2.1	500
MAY										
08...	--	--	--	--	--	--	--	--	--	--
24...	11	7.4	0.3	2.0	97	34	0.50	0.1	7.7	148
JUN										
27...	--	--	--	--	--	--	--	--	--	--
AUG										
14...	18	18	0.6	2.5	141	71	1.3	0.2	7.9	242
SEP										
25...	--	--	--	--	--	--	--	--	--	--

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)
NOV									
07...	--	--	--	--	--	--	--	--	--
MAR									
20...	0.68	228	--	<0.01	<0.05	<0.01	<0.01	80	12
MAY									
08...	--	--	--	--	--	--	--	--	--
24...	0.20	939	0.20	0.02	0.22	0.08	<0.01	20	62
JUN									
27...	--	--	--	--	--	--	--	--	--
AUG									
14...	0.33	336	--	<0.01	<0.05	0.10	<0.01	50	12
SEP									
25...	--	--	--	--	--	--	--	--	--

YELLOWSTONE RIVER BASIN

06307740 OTTER CREEK AT ASHLAND, MT

LOCATION.--Lat 45°35'18", long 106°15'17", in NE1/4NE1/4SE1/4 sec. 11, T.3 S., R.44 E., Rosebud County, Hydrologic Unit 10090102, on left bank 200 ft downstream from bridge on U.S. Highway 212, 0.3 mi southeast of Ashland, and at river mile 2.7.

DRAINAGE AREA.--707 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1972 to November 1985, October 1987 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,916.57 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Dec. 15 to Jan. 31. Water-discharge records poor. Diversion for irrigation of about 4,200 acres upstream from station.

AVERAGE DISCHARGE.--17 years, 5.10 ft^3/s, 3,690 acre-ft/yr; median yearly mean discharges, 3.9 ft^3/s, 2,830 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 425 ft^3/s, Mar. 21, 1978, gage height, 8.65 ft, backwater from beaver dam; no flow in 1977, 1982, 1984, 1985, 1989-91.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 50 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 24	0100	*35	*a4.10

No peaks greater than base discharge this year.

a--backwater from beaver dam.

No flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.88	2.1	e.10	.71	1.9	.85	1.5	1.6	2.8	.00	.00
2	.00	1.0	1.8	e.10	.94	1.7	.81	1.3	2.2	3.2	.00	.00
3	.00	.93	1.9	e.05	1.1	1.5	.87	1.3	1.9	2.3	.00	.00
4	.00	.97	1.9	e.00	1.2	1.7	.54	1.2	2.0	1.4	.00	.00
5	.00	1.0	1.6	e.00	1.3	1.6	.53	1.1	2.5	2.3	.00	.00
6	.00	1.0	1.2	e.00	1.4	1.5	.64	.89	3.3	2.5	.00	.00
7	.00	2.6	1.1	e.00	1.6	1.5	.61	.79	4.2	1.7	.00	.00
8	.00	2.2	1.1	e.00	1.7	1.3	.66	.83	3.4	1.4	.00	.00
9	.00	1.5	1.0	e.00	1.6	1.4	.96	.87	5.2	1.1	.00	.00
10	.00	1.1	1.0	e.00	1.9	1.5	1.1	.87	5.2	1.4	.00	.00
11	.00	.98	.81	e.00	2.1	1.5	1.9	.93	3.5	2.0	.00	.00
12	.00	1.2	.89	e.00	2.0	1.4	2.1	1.7	3.7	2.1	.00	.00
13	.00	1.7	.77	e.05	2.2	1.4	2.7	2.1	3.8	1.8	.00	.00
14	.00	1.9	.79	e.10	2.2	1.3	2.4	1.9	3.4	1.6	.00	.00
15	.00	1.8	e.70	e.10	2.1	1.1	2.1	1.6	3.1	1.6	.00	.00
16	.00	1.7	e.50	e.20	2.2	1.2	1.9	1.2	3.0	1.7	.00	.00
17	.42	2.4	e.50	e.30	2.7	1.1	1.7	1.0	3.3	1.2	.00	.00
18	.50	2.2	e.50	e.30	2.6	1.4	1.9	1.1	3.3	.75	.00	.00
19	.57	2.3	e.30	e.20	2.5	1.5	2.0	1.1	3.5	.30	.00	.00
20	.54	2.3	e.10	e.10	2.7	1.2	1.8	1.1	4.2	.01	.43	.01
21	.41	2.7	e.00	e.10	2.4	1.1	1.5	1.0	4.4	.00	1.1	.24
22	.18	2.5	e.00	e.10	2.2	1.2	1.3	1.1	5.8	.00	1.1	.32
23	.33	2.3	e.05	e.10	2.2	1.4	1.2	1.6	6.6	.00	.64	.38
24	.67	2.3	e.05	e.05	2.1	1.4	1.1	1.3	9.3	.00	.27	.25
25	.75	2.2	e.05	e.05	2.0	1.2	1.2	.93	4.2	.00	.15	.21
26	.72	2.2	e.10	e.05	2.0	1.0	1.4	.87	4.2	.00	.12	.24
27	.60	2.0	e.10	e.10	1.9	.93	1.6	1.1	5.1	.00	.16	.16
28	.41	2.0	e.05	e.10	1.9	.92	2.0	1.3	4.5	.00	.18	.12
29	.48	2.1	e.00	e.05	---	.82	1.9	1.4	4.1	.00	.00	.29
30	.50	2.1	e.00	e.20	---	.82	1.7	1.5	3.4	.00	.00	.68
31	.35	---	e.05	e.50	---	.83	---	1.3	---	.00	.00	---
TOTAL	7.43	54.06	21.01	3.00	53.45	40.32	42.97	37.78	117.9	33.16	4.15	2.90
MEAN	.24	1.80	.68	.097	1.91	1.30	1.43	1.22	3.93	1.07	.13	.097
MAX	.75	2.7	2.1	.50	2.7	1.9	2.7	2.1	9.3	3.2	1.1	.68
MIN	.00	.88	.00	.00	.71	.82	.53	.79	1.6	.00	.00	.00
AC-FT	15	107	42	6.0	106	80	85	75	234	66	8.2	5.8

CAL YR 1990 TOTAL 485.64 MEAN 1.33 MAX 13 MIN .00 AC-FT 963
WTR YR 1991 TOTAL 418.13 MEAN 1.15 MAX 9.3 MIN .00 AC-FT 829

e Estimated

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1975-85, 1988 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: November 1980 to August 1985.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1981-85): Maximum daily, 3,850 microsiemens, Dec. 3, 1983; minimum daily, 942 microsiemens, Feb. 19, 1982.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRESSURE (MM OF HG) (00025)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)
OCT										
18...	1100	0.49	20	1	2650	5.0	4.0	682	10.1	87
DEC										
13...	1115	0.64	--	--	3080	-2.0	1.0	--	--	--
FEB										
01...	1030	0.86	--	--	2640	2.0	0.0	--	--	--
MAR										
21...	1400	1.2	100	1	2100	14.0	7.0	665	11.1	106
MAY										
02...	1300	1.3	--	--	2770	9.5	9.0	--	--	--
31...	1030	1.1	90	2	2640	18.0	16.5	680	5.0	58
JUL										
18...	1030	0.73	--	--	2450	22.5	23.0	--	--	--
SEP										
23...	1315	0.41	100	2	2700	14.0	14.0	690	10.0	108

DATE	TIME	PH (STANDARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)
OCT									
18...	1100	8.8	720	59	140	400	6	22	564
MAR									
21...	1400	8.7	620	65	110	300	5	15	362
MAY									
31...	1030	8.5	710	70	130	390	6	19	515
SEP									
23...	1315	8.8	700	50	140	410	7	21	583

DATE	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
OCT									
18...	1000	19	0.5	7.3	1990	2.70	2.63	0.01	<0.10
MAR									
21...	850	13	0.6	5.3	1580	2.14	5.11	<0.01	<0.05
MAY									
31...	1000	15	0.7	6.2	1940	2.64	5.76	0.02	<0.05
SEP									
23...	910	20	1.0	3.3	1910	2.59	2.11	<0.01	<0.05

YELLOWSTONE RIVER BASIN

06307740 OTTER CREEK AT ASHLAND, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT									
18...	0.02	0.88	0.02	<0.01	610	30	59	0.08	98
MAR									
21...	0.02	0.38	0.03	0.02	210	70	114	0.37	92
MAY									
31...	0.02	0.78	0.09	0.01	580	10	184	0.55	88
SEP									
23...	0.03	0.87	0.05	0.02	650	<10	54	0.06	89

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)
MAY												
31...	1030	2	2	<10	<10	<1	<1	1	2	6	1	1600
SEP												
23...	1315	--	1	--	<10	--	<1	--	<1	--	1	--

DATE	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	MERCURY DISSOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
MAY												
31...	1	<1	140	50	0.20	0.1	7	4	<1	<1	<10	<10
SEP												
23...	--	<1	--	<10	--	0.1	--	3	--	<1	--	<10

YELLOWSTONE RIVER BASIN

06308500 TONGUE RIVER AT MILES CITY, MT
(National stream quality accounting network station)

LOCATION.--Lat 46°20'44", long 105°48'10", in NE1/4NE1/4SE1/4 sec.23, T.7 N., R.47 E., Custer County, Hydrologic Unit 10090102, on right bank 4 mi south of Miles City and at river mile 8.1.

DRAINAGE AREA.--5,379 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1938 to April 1942, April 1946 to current year. Published as "near Miles City" April 1938 to April 1942. Not equivalent to records published as "near Miles City" May 1929 to October 1932. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,375.76 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). April 1938 to April 1942, nonrecording gage at site 8 mi upstream at different datum. April 1946 to Sept. 30, 1963, at datum 1.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 7, 8, Nov. 25 to Mar. 10, and June 6-11. Water-discharge records good except those for Mar. 23 to Apr. 20, which are fair, and those for estimated daily discharges, which are poor. Flow regulation by Tongue River Reservoir (station 06307000), and many small reservoirs in Wyoming (combined capacity about 15,000 acre-ft). Diversions for irrigation of about 100,800 acres upstream from station. U. S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--48 years (1938-41, 1946-91), 420 ft^3/s, 304,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,300 ft^3/s, June 15, 1962, gage height, 12.33 ft, present datum, from rating curve extended above 8,220 ft^3/s on basis of float measurement; maximum gage height, 13.27 ft, Mar. 19, 1960, Feb. 15, 1971, ice jam, present datum; no flow July 9-19, Aug. 13, 14, Sept. 28, 1940.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,610 ft^3/s, Sept. 15, gage height, 6.67 ft; minimum daily, 32 ft^3/s, Sept. 5, 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	195	216	e280	e120	e110	e220	130	806	2330	554	148	149
2	193	224	e270	e100	e120	e190	128	755	1860	540	149	81
3	171	315	e270	e95	e130	e210	139	822	1710	523	153	43
4	186	316	e270	e90	e150	e230	139	853	1680	516	175	33
5	184	324	e270	e95	e140	e280	141	845	1780	526	178	32
6	198	305	e280	e95	e140	e350	145	843	e1750	479	166	32
7	200	e250	e290	e100	e150	e420	144	705	e1700	445	178	37
8	218	e280	e320	e110	e170	e430	148	545	e1700	443	201	33
9	269	292	e350	e110	e180	e430	178	510	e1700	423	208	46
10	251	292	e320	e110	e150	e420	160	488	e1700	414	223	65
11	166	292	e300	e140	e160	384	189	482	e1650	399	241	83
12	131	292	e300	e170	e170	307	317	648	1650	392	227	86
13	107	291	e300	e180	e160	255	312	872	1630	375	428	89
14	90	282	e280	e170	e140	213	294	616	1630	341	243	81
15	84	275	e260	e160	e120	182	378	621	1640	309	343	1540
16	80	298	e200	e160	e140	178	571	877	1640	299	288	1780
17	85	299	e170	e170	e170	175	585	866	1630	289	241	463
18	86	300	e150	e170	e160	175	562	880	1550	227	262	267
19	80	301	e120	e180	e160	171	543	901	1190	209	232	196
20	76	302	e100	e170	e170	171	540	891	1120	213	211	183
21	77	316	e90	e170	e190	174	565	903	927	217	207	183
22	109	314	e100	e160	e190	172	563	1030	810	215	209	195
23	185	307	e110	e150	e180	168	565	1470	800	184	209	186
24	196	297	e120	e150	e170	171	574	2130	1460	155	192	187
25	205	e280	e100	e110	e160	166	570	2390	1530	161	176	184
26	209	e250	e110	e120	e150	160	624	2400	862	162	186	183
27	209	e270	e120	e130	e150	159	849	2430	669	174	168	206
28	213	e280	e130	e120	e200	156	1700	2300	621	164	145	244
29	220	e290	e120	e120	---	159	1610	2160	612	166	152	244
30	219	e300	e100	e100	---	155	924	2130	581	164	165	240
31	219	---	e140	e100	---	135	---	2280	---	159	165	---
TOTAL	5111	8650	6340	4125	4380	7166	14287	36449	42112	9837	6469	7371
MEAN	165	288	205	133	156	231	476	1176	1404	317	209	246
MAX	269	324	350	180	200	430	1700	2430	2330	554	428	1780
MIN	76	216	90	90	110	135	128	482	581	155	145	32
AC-FT	10140	17160	12580	8180	8690	14210	28340	72300	83530	19510	12830	14620

CAL YR 1990 TOTAL 136561 MEAN 374 MAX 1720 MIN 60 AC-FT 270900
WTR YR 1991 TOTAL 152297 MEAN 417 MAX 2430 MIN 32 AC-FT 302100

e Estimated

YELLOWSTONE RIVER BASIN

06308500 TONGUE RIVER AT MILES CITY, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1946 to current year. October 1977 to December 1985 samples collected at private ranch bridge 11 mi upstream from gaging station.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1965 to September 1981.
WATER TEMPERATURE: April 1949 to September 1983.
SUSPENDED-SEDIMENT DISCHARGE: April 1946 to September 1951. October 1977 to December 1985.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1965-81): Maximum daily, 1,520 microsiemens, May 24, 1981; minimum daily, 215 microsiemens, Feb. 16, 1971.
WATER TEMPERATURE (water years 1949-83): Maximum recorded, 31.0°C July 14, 1983; minimum 0.0°C on many days during winter periods.
SEDIMENT CONCENTRATION (water years 1946-51, 1977-85): Maximum daily mean, 18,900 mg/L, Aug. 13, 1946; minimum daily mean, 1 mg/L, Aug. 14, 15, 1947.
SEDIMENT LOAD (water years 1946-51, 1977-85): Maximum daily, 122,000 tons, June 5, 1948; minimum daily, <0.1 ton on many days in August and September 1949.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV												
13...	1145	292	90	2	793	9.5	4.0	697	11.4	95	K3	K26
JAN												
08...	0950	109	--	--	825	-22.0	0.0	--	--	--	--	--
FEB												
19...	1130	157	100	2	773	-2.0	0.0	698	13.4	100	25	1600
APR												
18...	0820	555	--	--	712	7.0	7.5	--	--	--	--	--
MAY												
28...	1400	2210	30	1	294	21.0	17.0	701	8.8	99	430	190
AUG												
12...	1200	229	10	1	529	27.5	23.5	703	7.3	94	270	440
SEP												
23...	1118	185	--	--	775	15.5	12.0	--	--	--	--	--

DATE	TIME	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)
NOV											
13...	1145	285	0	241	8.6	2.0	330	61	42	50	1
FEB											
19...	1130	270	0	218	8.4	48	290	56	36	56	1
MAY											
28...	1400	122	0	98	8.1	130	120	27	12	17	0.7
AUG											
12...	1200	200	8	177	8.5	15	210	47	23	34	1

DATE	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE TOTAL (MG/L AS N) (00620)
NOV											
13...	3.9	244	190	5.6	0.3	3.5	507	497	0.69	400	--
FEB											
19...	3.8	202	220	5.7	0.3	5.4	467	517	0.64	198	--
MAY											
28...	2.4	109	45	3.0	0.2	8.4	192	177	0.26	1150	0.08
AUG											
12...	3.0	182	100	1.8	0.3	8.1	315	324	0.43	195	--

YELLOWSTONE RIVER BASIN

06308500 TONGUE RIVER AT MILES CITY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC DISSOLVED (UG/L AS AS) (01000)
NOV											
13...	<0.01	<0.01	<0.10	<0.10	0.06	0.04	0.03	0.01	<0.01	10	<1
FEB											
19...	<0.01	<0.01	<0.10	<0.10	0.01	0.02	0.02	0.01	0.02	50	<1
MAY											
28...	0.17	<0.01	0.25	0.25	0.20	0.05	0.27	0.01	<0.01	20	<1
AUG											
12...	0.02	<0.01	<0.05	<0.05	<0.01	<0.01	0.06	<0.01	<0.01	<10	<1

DATE	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)
NOV											
13...	60	<0.5	<1.0	<1	<3	3	9	<1	24	6	0.1
FEB											
19...	48	<0.5	2.0	2	<3	2	53	11	17	14	0.1
MAY											
28...	33	<0.5	<1.0	<1	<3	6	30	2	7	2	0.4
AUG											
12...	60	<0.5	<1.0	<1	<3	3	4	<1	16	8	<0.1

DATE	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV										
13...	<10	1	<1	<1.0	590	<6	11	30	24	92
FEB										
19...	<10	2	<1	<1.0	540	<6	10	93	39	99
MAY										
28...	<10	2	<1	<1.0	220	<6	39	422	2520	97
AUG										
12...	<10	<1	<1	<1.0	380	<6	5	41	25	96

YELLOWSTONE RIVER BASIN

06309000 YELLOWSTONE RIVER AT MILES CITY, MT

LOCATION.--Lat 46°25'18", long 105°51'38", in NE1/4SW1/4NW1/4 sec.28, T.8 N., R.47 E., Custer County, Hydrologic Unit 10100001, on left bank at upstream side of bridge on State Highway 22 at Miles City, 0.8 mi downstream from Tongue River, and at river mile 184.2.

DRAINAGE AREA.--48,253 mi^2.

PERIOD OF RECORD.--September 1922 to September 1923, August 1928 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,333.3 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to May 6, 1929, nonrecording gages at pumping plant 1.2 mi downstream at different datums. May 6, 1929, to Sept. 30, 1931, nonrecording gage, and Oct. 1, 1931, to Nov. 10, 1937, water-stage recorder 300 ft upstream from present site at same datum. Nov. 11, 1937, to Sept. 30, 1946, water-stage recorder at pumping plant 1.2 mi downstream at different datum. Oct. 1, 1946, to Mar. 15, 1979, water-stage recorder at site 300 ft upstream at present datum. Mar. 16, 1979, to Sept. 21, 1979, nonrecording gage at present site and datum. Sept. 22, 1979, recording gage established at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 16 to Feb. 24. Records good except those for estimated daily discharges, which are poor. Some regulation by reservoirs on tributary streams. Diversions for irrigation of about 1,100,000 acres upstream from station (does not include flood irrigation). Several observations of water temperature and specific conductance were obtained during the year. U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--64 years (1922-23, 1928-91), 11,430 ft^3/s, 8,281,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 102,000 ft^3/s, May 22, 1978, gage height, 16.50 ft, result of discharge measurement; maximum gage height, 21.7 ft, Mar. 20, 1944 (ice jam, from floodmark, at site 300 ft upstream at present datum); minimum discharge, 996 ft^3/s, Dec. 14, 1932.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 56,600 ft^3/s, June 15, gage height, 11.76 ft; minimum daily, 2,500 ft^3/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5250	7080	6430	e6000	e7500	5670	5480	9090	28800	34800	7790	4850
2	5630	7120	6470	e5000	e7500	5640	5460	8530	27700	32400	7580	5040
3	5650	7170	6470	e5000	e7500	5340	5280	7970	27000	31300	7440	5020
4	6400	7130	6510	e5000	e7500	5530	5190	7810	30500	30000	7450	4990
5	6500	7220	6430	e4500	e7500	5530	5200	7830	36000	28400	7510	4860
6	6050	7100	6180	e4500	e7500	5940	5290	7720	40600	26600	7360	4810
7	6150	6990	6520	e4500	e8000	5980	5390	7560	45500	26000	7060	4840
8	6520	7230	6400	e4500	e8000	5840	5620	7250	50900	25400	6460	4830
9	6840	7180	6350	e4500	e8000	5740	6170	7170	54900	24200	6180	4990
10	6950	6940	6430	e5500	e7500	5670	6660	7460	55900	22300	6040	5350
11	6970	6840	6390	e6000	e7500	5660	6790	8760	55500	21800	5850	6000
12	6800	6970	6330	e7000	e7000	5630	6980	12200	52000	19700	5710	7250
13	6860	7050	6370	e7500	e7000	5600	7160	14500	51000	18800	5770	8380
14	7020	7030	6480	e7500	e7000	5600	7310	15400	53400	17500	5500	8520
15	7060	6920	6310	e7500	e7000	5640	7160	15900	55700	16200	5280	10500
16	7020	6850	e5500	e7500	e7000	5550	7090	15500	54100	15900	5360	11600
17	7090	6780	e5500	e7000	e7000	5590	7400	18200	45200	14800	5550	10700
18	7010	6830	e5500	e7000	e7000	5610	7760	19200	40000	14100	5700	10000
19	7100	6840	e5000	e7000	e7000	5650	7960	20300	39400	13400	6190	9630
20	7160	6820	e4000	e7000	e6500	5650	7920	25100	42000	12400	5570	9360
21	7200	6830	e3000	e7000	e6500	5650	8580	31400	44700	11900	5730	9250
22	7150	6940	e2500	e7000	e6500	5720	8680	33900	41900	11700	5300	9200
23	7230	6900	e3000	e7000	e6500	5810	8660	35500	47100	11400	5000	9590
24	7130	6790	e4500	e7000	e6500	5950	8770	38600	42400	10700	4910	9870
25	7010	6650	e4000	e7000	6350	5950	8940	41000	42400	9630	4910	9640
26	7070	6600	e5000	e6500	6140	5900	9590	42400	44400	9400	4950	9480
27	6980	6560	e7000	e7000	6030	5840	10700	43300	41700	9000	4950	9650
28	6920	6570	e6500	e7000	5770	5810	12200	45400	37900	9060	4770	9570
29	6930	6610	e5500	e7000	---	5810	11800	41500	35800	8990	4640	9510
30	7040	6410	e5000	e6000	---	5720	10100	33600	36000	8680	4730	9450
31	7110	---	e7000	e6500	---	5590	---	29700	---	8200	4830	---
TOTAL	209800	206950	174570	195000	196790	176810	227290	659750	1300400	554660	182070	236730
MEAN	6768	6898	5631	6290	7028	5704	7576	21280	43350	17890	5873	7891
MAX	7230	7230	7000	7500	8000	5980	12200	45400	55900	34800	7790	11600
MIN	5250	6410	2500	4500	5770	5340	5190	7170	27000	8200	4640	4810
AC-FT	416100	410500	346300	386800	390300	350700	450800	1309000	2579000	1100000	361100	469600

CAL YR 1990 TOTAL 3562830 MEAN 9761 MAX 33900 MIN 2500 AC-FT 7067000
WTR YR 1991 TOTAL 4320820 MEAN 11840 MAX 55900 MIN 2500 AC-FT 8570000

e Estimated

YELLOWSTONE RIVER BASIN

06324500 POWDER RIVER AT MOORHEAD, MT

LOCATION.--Lat 45°04'04", long 105°52'10", in NW1/4SE1/4NW1/4 sec.8, T.9 S., R.48 E., Powder River County, Hydrologic Unit 10090207, on left bank 500 ft downstream from discontinued post office at Moorhead, 6.2 mi upstream from Buffalo Creek, and at river mile 184.8.

DRAINAGE AREA.--8,088 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1929 to September 1972, October 1974 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1309: 1932(M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,334.6 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Aug. 28, 1931, nonrecording gage at site 0.3 mi upstream at different datum. Aug. 28, 1931, to Mar. 21, 1956, water-stage recorder at site 1.2 mi upstream at different datum. Mar. 22 to July 24, 1956, nonrecording gage at site 0.3 mi downstream at different datum. July 25 to Sept. 12, 1956, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Nov. 6-8, 16-18, Nov. 25 to Mar. 13. Water-discharge records good except those for period of estimated daily discharges, which are poor. Some regulation by three reservoirs in Wyoming with combined usable capacity of 36,800 acre-ft. Diversions for irrigation of about 66,300 acres upstream from station.

AVERAGE DISCHARGE.--60 years, 449 ft^3/s, 325,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 33,000 ft^3/s, May 20, 1978, gage height, 15.24 ft; maximum gage height, 17.7 ft, Mar. 21, 1956, site and datum then in use, ice jam; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Sept. 30, 1923, reached a stage of 19 ft, site and datum used 1931-56, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 22	0900	3,910	5.58	June 9	0900	4,240	5.77
June 4	unknown	*5,460	*6.41				

Minimum discharge, 8.0 ft^3/s, Sept. 1,2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	159	217	e170	e90	e160	e400	277	520	1460	603	201	8.3
2	150	219	e150	e80	e170	e350	271	455	1310	544	177	10
3	138	228	e160	e75	e170	e300	265	404	1930	488	170	17
4	141	236	e170	e70	e200	e350	270	366	3400	408	120	43
5	154	232	e180	e70	e230	e370	286	347	3110	337	95	30
6	147	e220	e180	e70	e250	e480	301	328	2730	284	87	21
7	131	e220	e190	e70	e270	e510	299	319	3020	253	80	20
8	127	e230	e210	e75	e300	e660	329	328	3310	213	66	18
9	132	233	e240	e75	e300	e660	360	333	3880	196	63	24
10	146	239	e260	e80	e300	e660	491	372	2790	209	59	24
11	159	253	e240	e90	e350	e620	506	635	2250	165	43	21
12	172	234	e220	e110	e400	e600	484	1000	2260	138	83	22
13	195	266	e190	e130	e400	e580	458	1690	2060	112	77	62
14	248	268	e160	e130	e350	404	406	1720	2000	99	50	80
15	252	254	e170	e130	e380	388	380	1760	2090	129	36	97
16	260	e250	e150	e130	e450	347	382	1720	2170	273	65	124
17	255	e250	e130	e140	e500	349	363	1980	1910	217	43	233
18	259	e240	e120	e150	e470	346	401	3060	1480	142	50	224
19	259	229	e90	e170	e500	344	578	2930	1300	95	33	218
20	247	239	e70	e150	e560	318	642	3240	1100	73	25	229
21	245	233	e45	e130	e600	331	855	3660	983	61	22	221
22	246	226	e45	e140	e560	335	771	3630	972	90	20	216
23	239	224	e60	e120	e520	332	703	3420	2130	94	19	210
24	232	212	e80	e100	e500	321	636	2800	1580	78	16	198
25	237	e210	e70	e90	e470	306	561	2570	1080	69	16	195
26	216	e190	e80	e100	e500	303	517	2380	1050	68	16	186
27	207	e160	e100	e110	e520	334	552	2150	964	93	13	174
28	214	e180	e80	e90	e500	309	532	2060	913	110	11	165
29	218	e200	e70	e75	---	282	635	2300	1160	116	11	157
30	214	e210	e60	e100	---	266	633	1990	747	339	11	149
31	217	---	e100	e120	---	271	---	1770	---	243	10	---
TOTAL	6216	6802	4240	3260	10880	12426	14144	52237	57139	6339	1788	3396.3
MEAN	201	227	137	105	389	401	471	1685	1905	204	57.7	113
MAX	260	268	260	170	600	660	855	3660	3880	603	201	233
MIN	127	160	45	70	160	266	265	319	747	61	10	8.3
AC-FT	12330	13490	8410	6470	21580	24650	28050	103600	113300	12570	3550	6740

CAL YR 1990 TOTAL 127887 MEAN 350 MAX 4160 MIN 29 AC-FT 253700
WTR YR 1991 TOTAL 178867.3 MEAN 490 MAX 3880 MIN 8.3 AC-FT 354800

e Estimated

YELLOWSTONE RIVER BASIN

06324500 POWDER RIVER AT MOORHEAD, MT--Continued

WATER-QUALITY RECORDS

LOCATION.--Samples collected at bridge on county road, 1.2 mi upstream from gaging station.

PERIOD OF RECORD.--Water years 1951-53, 1956-57, 1969-72, 1975 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: July 1986 to November 1989.
WATER TEMPERATURE: February 1951 to September 1953, October 1955 to September 1957, October 1974 to September 1977, March 1978 to September 1981 (seasonal records only).
SUSPENDED-SEDIMENT DISCHARGE: October 1974 to September 1977, March 1978 to current year (seasonal records only).

REMARKS.--Flow regulated by reservoirs and diversions for irrigation upstream from station. Unpublished records of once-daily water temperature are available in files of Montana District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1986-90): Maximum daily, 4,150 microsiemens, Jul. 17, 1988; minimum daily, 642 microsiemens, May 20, 1988.
WATER TEMPERATURE (water years 1951-53, 1955-57, 1975-81): Maximum daily, 33.0°C, July 13, 1981; minimum daily, 0.0°C on many days during winter.
SEDIMENT CONCENTRATION: Maximum daily mean, 53,500 mg/L, May 27, 1980; minimum daily mean, 5 mg/L, Sept. 15, 1975.
SEDIMENT LOAD: Maximum daily, 2,230,000 tons, May 20, 1978; minimum daily, 0.17 ton, Aug. 1, 1988.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATION: Maximum daily mean, 29,200 mg/L, July 30; minimum daily mean, 30 mg/L, Aug. 29.
SEDIMENT LOAD: Maximum daily, 238,000 tons, June 5; minimum daily, 0.89 ton, Aug. 29.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
17...	1545	253	--	--	1570	9.5	7.0	382	261	86
DEC										
12...	1535	216	--	--	1800	1.0	0.0	--	--	--
JAN										
31...	1540	120	--	--	2140	7.5	0.0	--	--	--
MAR										
07...	1130	487	--	--	1690	3.5	0.5	1100	1450	60
APR										
17...	1530	358	100	2	1460	8.0	7.0	881	852	81
MAY										
22...	1500	3630	100	2	480	22.0	16.5	7670	75200	70
29...	1545	2360	70	2	660	25.0	17.0	6440	41000	61
JUN										
12...	1100	2200	0	0	730	18.5	21.0	--	--	--
JUL										
17...	1545	210	0	0	2350	35.5	30.0	1160	658	99
SEP										
10...	1000	27	30	1	1650	21.5	16.5	59	4.3	99

DATE	TIME	DICAMBA (MED-IBEN) (BAN-VEL D) TOTAL (UG/L) (82052)	PICLO-RAM (TOR-DON) (AMDON) TOTAL (UG/L) (39720)	SILVEX, TOTAL (UG/L) (39760)	2,4-D, TOTAL (UG/L) (39730)	2, 4-DP TOTAL (UG/L) (82183)	2,4,5-T TOTAL (UG/L) (39740)
JUN							
12...	1100	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
SEP							
10...	1000	<0.01	0.13	<0.01	<0.01	<0.01	<0.01

YELLOWSTONE RIVER BASIN

06324500 POWDER RIVER AT MOORHEAD, MT--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1											275	297
2											248	234
3											406	329
4											460	435
5											800	799
6											1150	1490
7											900	1240
8											1320	2350
9											1520	2710
10											2600	4630
11											3570	5980
12											2830	4580
13											3560	5570
14											2650	2890
15											1760	1840
16											1500	1410
17											1250	1180
18											1180	1100
19											1070	994
20											840	721
21											720	643
22											735	665
23											745	668
24											720	624
25											645	533
26											640	524
27											995	897
28											925	772
29											930	708
30											1060	761
31											985	721
TOTAL											---	48295

DAY	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	750	561	2800	3930	6350	25000	6130	9980	23400	12700	67	1.5
2	670	490	2610	3210	4890	17300	3060	4490	20100	9610	39	1.1
3	620	444	2090	2280	10100	52600	1580	2080	14000	6430	43	2.0
4	620	452	1510	1490	22900	210000	1100	1210	7100	2300	101	12
5	645	498	1090	1020	28300	238000	835	760	3800	975	84	6.8
6	630	512	890	788	20900	154000	680	521	1600	376	72	4.1
7	610	492	680	586	16200	132000	555	379	558	121	73	3.9
8	710	631	620	549	13000	116000	480	276	297	53	80	3.9
9	770	748	680	611	16500	173000	700	370	233	40	75	4.9
10	1970	2610	720	723	17500	132000	1750	988	211	34	63	4.1
11	1720	2350	2300	3940	12000	72900	940	419	202	23	64	3.6
12	1580	2060	4400	11900	6630	40500	460	171	490	110	70	4.2
13	1430	1770	13400	61100	4600	25600	290	88	601	125	123	21
14	1170	1280	8060	37400	3540	19100	210	56	338	46	166	36
15	1150	1180	7470	35500	5020	28300	1520	529	136	13	173	45
16	1080	1110	7310	33900	6730	39400	3710	2730	248	44	280	94
17	930	911	6850	36600	9160	47200	1780	1040	289	34	5180	3260
18	860	931	14900	123000	8270	33000	580	222	266	36	5200	3140
19	2300	3590	23700	187000	8330	29200	760	195	129	11	4370	2570
20	3200	5550	15200	133000	6010	17800	1580	311	87	5.9	5100	3150
21	8250	19000	12900	127000	3730	9900	1390	229	108	6.4	3630	2170
22	9700	20200	7810	76500	2490	6530	1390	338	125	6.8	2150	1250
23	9800	18600	6080	56100	9910	57000	1260	320	110	5.6	1730	981
24	7610	13100	5080	38400	7150	30500	555	117	80	3.5	1500	802
25	5940	9000	6830	47400	3820	11100	250	47	56	2.4	1310	690
26	4810	6710	9980	64100	2970	8420	220	40	53	2.3	1120	562
27	4400	6560	9930	57600	2510	6530	320	80	81	2.8	881	414
28	3200	4600	8000	44500	3550	8750	355	105	53	1.6	741	330
29	3350	5740	6850	42500	11300	35400	700	219	30	.89	672	285
30	3880	6630	7100	38100	9100	18400	29200	26700	45	1.3	628	253
31	---	---	8670	41400	---	---	27000	17700	81	2.2	---	---
TOTAL	---	138310	---	1312127	---	1795430	---	72710	---	33122.69	---	20105.1

TOTAL LOAD FOR PERIOD: 3420099.79 TONS.

YELLOWSTONE RIVER BASIN

06324710 POWDER RIVER AT BROADUS, MT

LOCATION.--Lat 45°25'37", long 105°24'05", in NE1/4NE1/4SE1/4 sec.3, T.5 S., R.51 E., Powder River County, Hydrologic Unit 10090207, on the right bank, 40 ft downstream from bridge on U.S. Highway 212, 0.4 mi downstream from Doyle Creek, 1.0 mi south of Broadus, 7.0 mi upstream from Little Powder River, and at river mile 162.0.

DRAINAGE AREA.--8,748 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1975 to current year. Station operated seasonally March 1982 to current year.

REVISED RECORDS.--WDR MT-78-1: 1976(M), 1977(M).

GAGE.--Water-stage recorder. Datum of gage is 3,016.30 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1988, at datum 2.00 ft lower.

REMARKS.--Estimated daily discharges: Mar. 1-6. Water-discharge records fair except those for estimated daily discharges, which are poor. Some regulation by three reservoirs in Wyoming with combined usable capacity of 36,800 acre-feet. Diversions for irrigation of about 70,000 acres upstream from station.

AVERAGE DISCHARGE.--6 years (1976-1981), 488 ft^3/s, 353,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,000 ft^3/s, May 21, 1978, gage height, 12.96 ft; minimum discharge, 4.4 ft^3/s, Sept. 8, 9, 1988.

EXTREMES FOR CURRENT SEASON.--Peak discharges greater than base discharge of 4,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 21	2100	4,170	6.86	June 10	0330	4,700	6.84
June 5	0930	*5,320	*7.11				

Minimum discharge, 10 ft^3/s, Sept. 4,5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1						e250	263	578	1520	591	211	14
2						e220	265	484	1310	514	162	13
3						e380	259	449	1190	488	145	12
4						e430	248	405	2630	446	158	11
5						e540	253	376	4250	395	138	11
6						e360	262	368	3270	338	109	19
7						421	282	341	3090	283	94	24
8						467	292	311	3160	260	80	27
9						467	288	319	3930	233	73	23
10						473	343	305	3770	226	64	23
11						552	502	375	2480	301	59	19
12						511	527	855	2180	213	37	21
13						477	503	1410	2050	141	32	20
14						436	446	1640	1890	105	57	19
15						388	398	1700	1840	82	51	41
16						383	379	1730	2170	65	36	71
17						353	383	1840	2040	145	31	83
18						356	371	2540	1600	179	42	147
19						353	410	3380	1250	112	42	189
20						355	597	3280	1140	71	30	187
21						324	684	3780	921	71	23	202
22						342	861	3930	843	56	23	205
23						337	726	3550	1240	43	27	199
24						324	659	3070	2160	59	24	195
25						314	584	2330	1170	48	24	190
26						295	551	2680	878	39	22	189
27						289	517	2060	941	34	21	186
28						329	537	2010	790	45	18	177
29						307	521	2080	817	60	19	168
30						279	647	2190	923	77	17	160
31						261	---	1940	---	198	15	---
TOTAL						11573	13558	52306	57443	5918	1884	2845
MEAN						373	452	1687	1915	191	60.8	94.8
MAX						552	861	3930	4250	591	211	205
MIN						220	248	305	790	34	15	11
AC-FT						22960	26890	103700	113900	11740	3740	5640

e Estimated

06324710 POWDER RIVER AT BROADUS, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1976 to current year.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: March 1976 to September 1979.
SUSPENDED-SEDIMENT DISCHARGE: October 1975 to September 1978, March 1979 to current year (seasonal record only).

REMARKS.--Unpublished records of once-daily water temperature are available in files of District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE (water years 1976-79): Maximum daily observed, 34.0°C, July 12, 1976; minimum daily, 0.0°C, on many days during winter.
SEDIMENT CONCENTRATION: Maximum daily mean, 44,100 mg/L July 29, 1977; minimum daily mean, 16 mg/L Sept. 27, 1981.
SEDIMENT LOAD: Maximum daily, 1,570,000 tons May 21, 1978; minimum daily, 0.64 ton Aug. 7, 1988.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATION: Maximum daily mean, 32,100 mg/L, June 5; minimum daily mean, 74 mg/L Sept. 7.
SEDIMENT LOAD: Maximum daily, 368,000 tons, June 5; minimum daily, 2.5 ton Sept. 5.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
16...	1545	253	--	--	1740	7.0	8.5	615	420	79
MAR										
07...	1730	368	--	--	1790	3.5	2.0	1980	1970	53
APR										
16...	1100	372	100	2	1380	10.5	8.0	1630	1640	70
MAY										
23...	1100	3420	30	1	500	23.5	17.0	8490	78400	68
30...	1045	2270	100	2	675	21.0	16.5	6450	39500	66
JUL										
17...	0920	121	0	0	2360	25.5	22.5	399	130	91
SEP										
09...	1600	21	30	1	2340	18.0	20.5	562	32	99

YELLOWSTONE RIVER BASIN

06324710 POWDER RIVER AT BROADUS, MT--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1											630	425
2											1660	986
3											1350	1390
4											1270	1470
5											2250	3280
6											1860	1810
7											2270	2580
8											2090	2640
9											2300	2900
10											2850	3640
11											3500	5220
12											3560	4910
13											3080	3970
14											3520	4140
15											2600	2720
16											2330	2410
17											2060	1960
18											2180	2100
19											1700	1620
20											1600	1530
21											1420	1240
22											1630	1510
23											1210	1100
24											1090	954
25											1130	958
26											1140	908
27											1140	890
28											1140	1010
29											1330	1100
30											1100	829
31											1190	839
TOTAL											---	63039

DAY	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	1390	987	4310	6730	8170	33500	9740	15500	6700	3820	129	4.9
2	1270	909	3420	4470	6340	22400	6460	8970	8900	3890	119	4.2
3	1000	699	2960	3590	5370	17300	5150	6790	19100	7480	111	3.6
4	890	596	2920	3190	13800	98000	3750	4520	18100	7720	100	3.0
5	750	512	2390	2430	32100	368000	1910	2040	16200	6040	83	2.5
6	700	495	2320	2310	23200	205000	1320	1200	8800	2590	98	5.0
7	810	617	1510	1390	21500	179000	1180	902	3800	964	74	4.8
8	1200	946	1120	940	16200	138000	1100	772	1460	315	230	17
9	1180	918	1110	956	15900	169000	1040	654	1250	246	649	40
10	1170	1080	1220	1000	17900	182000	1050	641	865	149	185	11
11	2570	3480	1870	1890	19200	129000	3610	2930	490	78	104	5.3
12	3070	4370	6190	14300	11800	69500	2220	1280	300	30	104	5.9
13	2830	3840	7750	29500	6830	37800	1040	396	295	25	108	5.8
14	2460	2960	11000	48700	5430	27700	590	167	490	75	106	5.4
15	2280	2450	10900	50000	4510	22400	345	76	455	63	193	21
16	1670	1710	9680	45200	5800	34000	240	42	375	36	293	56
17	1370	1420	9990	49600	12800	70500	840	329	300	25	400	90
18	1450	1450	10800	74100	7990	34500	1290	623	297	34	1180	468
19	1610	1780	6830	62300	10600	35800	680	206	240	27	2830	1440
20	2370	3820	24600	218000	11300	34800	450	86	193	16	2780	1400
21	4800	8860	15800	161000	10000	24900	430	82	176	11	2540	1390
22	9250	21500	12100	128000	8660	19700	340	51	178	11	2300	1270
23	9800	19200	8610	82500	9150	30600	290	34	161	12	2910	1560
24	9000	16000	6370	52800	20600	120000	470	75	138	8.9	2120	1120
25	9800	15500	5710	35900	14400	45500	370	48	133	8.6	1780	913
26	7350	10900	8870	64200	5850	13900	345	36	135	8.0	1640	837
27	5530	7720	7800	43400	4430	11300	200	18	125	7.1	1450	728
28	5610	8130	11300	61300	4180	8920	198	24	115	5.6	1150	550
29	4080	5740	7560	42500	5330	11800	318	52	124	6.4	1050	476
30	4010	7010	6340	37500	10900	27200	400	83	133	6.1	1010	436
31	---	---	7930	41500	---	---	9500	5080	133	5.4	---	---
TOTAL	---	155599	---	1371196	---	2222020	---	53707	---	33713.1	---	12873.4

TOTAL LOAD FOR PERIOD: 3912147.5 TONS.

YELLOWSTONE RIVER BASIN

06324970 LITTLE POWDER RIVER ABOVE DRY CREEK, NEAR WESTON, WY

LOCATION.--Lat 44°55'37", long 105°21'10", in NW1/4SW1/4SW1/4 sec.13, T.57 N., R.71 W., Campbell County, Hydrologic Unit 10090208, on left bank 3.1 mi upstream from Dry Creek, 5.0 mi south of the Wyoming-Montana State line, and 20 mi north of Weston.

DRAINAGE AREA.--1,235 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1972 to current year.

REVISED RECORDS.--WDR WY-77-1: Drainage area. WDR WY-78-1: 1976(M).

GAGE.--Water-stage recorder. Elevation of gage is 3,410 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Dec. 1-3, 15, 16, 18, 19, and June 2-6. Records fair except those for estimated daily discharges, which are poor. Diversion upstream from station for irrigation of about 80 acres downstream from station. Flow occasionally affected by contributions from mine dewatering.

EXTREMES FOR PERIOD OR RECORD.--Maximum discharge, 5,300 ft3/s, May 19, 1978, gage height, 11.62 ft; maximum gage height, 11.63 ft, Mar. 20, 1978 (backwater from ice); no flow at times some years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 130 ft3/s and maximum (*):

Date	Time	Discharge (ft3/s)	Gage height (ft)	Date	Time	Discharge (ft3/s)	Gage height (ft)
May 13	2000	*311	*5.54	No other peak greater than base discharge.			

No flow for several days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.01	.02	.45	.12	.07	1.6	1.3	7.9	7.8	7.9	.00	.00
2	.01	.02	.48	.11	.09	1.5	1.6	6.5	5.4	4.0	.00	.00
3	.01	.03	.48	.09	.20	1.5	1.5	4.8	4.4	1.8	.00	.00
4	.01	.03	.45	.09	.32	2.0	1.6	4.0	3.8	2.1	.00	.00
5	.01	.03	.62	.07	.49	2.6	2.4	3.3	4.2	1.7	.00	.00
6	.01	.03	.69	.05	.60	2.0	2.3	3.3	15	.60	.00	.00
7	.01	.03	.72	.04	.70	2.2	3.3	5.5	27	.38	.00	.00
8	.01	.03	.79	.04	.87	2.0	3.7	4.9	35	.26	.00	.00
9	.01	.03	.82	.03	.81	1.8	4.2	4.2	29	.38	.00	.00
10	.01	.03	.84	.02	1.0	2.1	3.9	3.6	9.3	.56	.00	.00
11	.01	.03	.83	.02	1.1	2.6	4.3	3.9	4.0	.71	.00	.00
12	.01	.10	.72	.03	1.3	5.3	5.0	31	2.0	.38	.00	.00
13	.01	.28	.53	.04	1.5	3.4	5.6	185	1.4	.27	.00	.00
14	.01	.30	.50	.07	1.4	2.7	6.3	109	.94	.98	.00	.00
15	.01	.31	.50	.10	1.7	2.3	6.1	78	.83	1.5	.00	.00
16	.02	.31	.52	.12	1.9	1.9	6.2	49	.55	2.0	.00	.00
17	.02	.45	.50	.12	1.9	2.0	29	52	9.5	.94	.00	.01
18	.02	.31	.44	.12	1.9	2.0	27	45	4.1	.60	.00	.00
19	.02	.33	.38	.12	1.9	1.6	28	42	2.0	.38	.00	.00
20	.02	.61	.34	.12	2.1	1.4	50	36	.77	.22	.00	.00
21	.01	.39	.27	.12	2.2	1.4	41	23	1.2	.11	.00	.01
22	.01	.24	.12	.13	2.2	1.4	16	15	.69	.06	.00	.01
23	.01	.33	.09	.15	2.2	1.5	7.8	11	.69	.05	.00	.01
24	.01	.44	.09	.15	2.3	1.2	6.5	7.8	.28	.07	.00	.01
25	.01	.29	.10	.20	2.1	.93	4.2	6.3	.13	.04	.00	.01
26	.02	.29	.10	.16	2.0	.88	3.8	5.4	.22	.03	.00	.00
27	.02	.30	.12	.17	1.9	.85	4.3	5.9	.45	.01	.00	.00
28	.02	.25	.11	.17	1.7	.92	3.2	18	.45	.01	.00	.00
29	.02	.28	.12	.14	---	1.4	15	20	8.7	.00	.00	.00
30	.02	.38	.11	.11	---	1.3	14	15	12	.00	.00	.00
31	.02	---	.09	.07	---	1.3	---	8.8	---	.00	.00	---
TOTAL	0.42	6.50	12.92	3.09	38.45	57.58	309.1	815.1	191.80	28.04	0.00	0.06
MEAN	.014	.22	.42	.10	1.37	1.86	10.3	26.3	6.39	.90	.000	.002
MAX	.02	.61	.84	.20	2.3	5.3	50	185	35	7.9	.00	.01
MIN	.01	.02	.09	.02	.07	.85	1.3	3.3	.13	.00	.00	.00
AC-FT	.8	13	26	6.1	76	114	613	1620	380	56	.00	.1

CAL YR 1990 TOTAL 4959.20 MEAN 13.6 MAX 515 MIN .00 AC-FT 9840
WTR YR 1991 TOTAL 1463.06 MEAN 4.01 MAX 185 MIN .00 AC-FT 2900

YELLOWSTONE RIVER BASIN

06324970 LITTLE POWDER RIVER ABOVE DRY CREEK, NEAR WESTON, WY--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1975-82, 1985 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	TEMPER-ATURE WATER (DEG C)	HARD-NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY LAB (MG/L AS CACO3)
OCT											
31...	0845	E0.02	2680	7.0	550	96	76	400	7	15	390
FEB											
28...	1155	2.7	--	0.5	770	160	91	460	7	19	340
APR											
30...	1430	12	--	6.5	490	99	58	260	5	13	230
JUL											
18...	1400	0.50	2080	29.5	430	80	57	290	6	16	200

E-Estimate.

DATE	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)
OCT										
31...	960	15	1.1	8.9	1810	2.46	--	0.1	<0.03	<5
FEB										
28...	1300	93	0.5	10	2340	3.18	17.0	0.1	<0.03	<5
APR										
30...	730	21	0.4	7.8	1330	1.81	43.0	0.2	<0.03	<5
JUL										
18...	820	22	0.5	2.9	1410	1.92	1.9	0.3	<0.03	<5

YELLOWSTONE RIVER BASIN

06326500 POWDER RIVER NEAR LOCATE, MT
(National stream quality accounting network station)

LOCATION.--Lat 46°26'56", long 105°18'44", in NW1/4SW1/4 sec.14, T.8 N., R.51 E., Custer County, Hydrologic Unit 10090209, on left bank 1.5 mi downstream from bridge on old U.S. Highway 12 at present site of Locate, 1.5 mi upstream from Locate Creek, 5 mi west of former site of Locate, 25 mi east of Miles City, and at river mile 27.9.

DRAINAGE AREA.--13,194 mi^2. Drainage area of site 1.5 mi upstream, 13,189 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1938 to current year.

REVISED RECORDS.--WSP 926: 1939. WSP 1309: 1938-39 (M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,384.79 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to July 11, 1947, nonrecording gage at bridge 1.5 mi upstream, and July 11, 1947, to Sept. 30, 1965, water-stage recorder at site near upstream bridge at different datum. Oct. 1, 1965, to Oct. 4, 1966, nonrecording gage, and Oct. 5, 1966, to Mar. 21, 1978, water-stage recorder at present site and datum. Mar. 22, 1978, to Apr. 23, 1981, water-stage recorder 1.5 mi upstream at different datum, Apr. 24 to Aug. 20, 1981, water-stage recorder at present site and datum, and Aug. 21, 1981, to Sept. 30, 1981, water-stage recorder 1.5 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Nov. 4-9, Nov. 26 to Mar. 14, May 28-30. Water-discharge records fair except those for estimated daily discharges and the period May 31 to July 9, which are poor. Some regulation by three reservoirs in Wyoming with combined usable capacity of 36,800 acre-ft. Diversions for irrigation of about 101,800 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--53 years, 580 ft^3/s, 420,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 31,000 ft^3/s, Feb. 19, 1943; maximum gage height, 12.2 ft, Mar. 16, 1978, backwater from ice; no flow on many days in 1950, 1960-61, and 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 24	0815	*4,070	*5.70	No peaks greater than base discharge this year.			

Minimum discharge, 5.4 ft^3/s, Sept. 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	140	259	e170	e110	e150	e260	394	642	1210	574	25	8.3
2	144	254	e140	e100	e170	e250	372	712	1030	385	25	7.3
3	144	255	e130	e100	e180	e290	357	612	859	299	31	6.6
4	142	e250	e150	e100	e190	e350	352	548	925	272	101	6.5
5	136	e250	e180	e100	e200	e450	349	498	1500	282	111	6.5
6	123	e240	e200	e100	e200	e600	323	479	2310	281	114	6.4
7	118	e240	e230	e100	e200	e1200	321	436	2030	253	125	6.3
8	122	e250	e250	e100	e190	e1300	344	419	1980	217	112	5.9
9	130	e270	e260	e100	e190	e1200	391	399	2370	296	88	5.7
10	135	277	e260	e100	e200	e1100	391	349	2440	268	75	8.9
11	133	308	e250	e110	e190	e1000	402	364	2120	217	74	9.4
12	135	277	e240	e110	e190	e900	527	1080	1460	193	57	13
13	144	257	e230	e120	e190	e800	674	1060	1380	208	41	17
14	149	281	e240	e130	e180	e600	689	1110	1340	215	38	24
15	155	278	e240	e140	e180	570	667	1460	1280	166	34	712
16	170	281	e230	e130	e200	504	770	1590	1240	131	32	587
17	219	307	e220	e130	e210	500	544	1710	1350	101	33	158
18	240	312	e150	e130	e200	477	449	1670	1370	75	33	85
19	246	311	e120	e130	e190	431	446	1920	1150	56	35	67
20	252	306	e100	e120	e250	416	426	2830	1260	45	29	75
21	254	304	e90	e120	e280	398	466	2870	1020	78	28	91
22	254	306	e80	e120	e300	398	653	3140	951	78	30	145
23	256	305	e90	e120	e300	373	840	3380	1040	58	27	152
24	277	308	e110	e120	e280	384	845	3180	2100	49	26	169
25	286	293	e100	e120	e280	365	794	2740	1860	41	23	178
26	267	e200	e100	e130	e300	351	743	2290	909	40	17	182
27	264	e90	e110	e140	e300	371	784	2370	594	38	16	183
28	292	e100	e120	e130	e280	388	1530	e2300	567	35	15	181
29	294	e120	e110	e120	---	379	1470	e2000	547	34	14	183
30	278	e140	e110	e110	---	399	836	e1500	473	32	12	185
31	265	---	e120	e140	---	414	---	1400	---	29	10	---
TOTAL	6164	7629	5130	3630	6170	17418	18149	47058	40665	5046	1431	3464.8
MEAN	199	254	165	117	220	562	605	1518	1355	163	46.2	115
MAX	294	312	260	140	300	1300	1530	3380	2440	574	125	712
MIN	118	90	80	100	150	250	321	349	473	29	10	5.7
AC-FT	12230	15130	10180	7200	12240	34550	36000	93340	80660	10010	2840	6870

CAL YR 1990 TOTAL 127498 MEAN 349 MAX 1400 MIN 15 AC-FT 252900
WTR YR 1991 TOTAL 161954.8 MEAN 444 MAX 3380 MIN 5.7 AC-FT 321200

e Estimated

YELLOWSTONE RIVER BASIN

06326500 POWDER RIVER NEAR LOCATE, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1946, 1948-63, 1975 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1974 to September 1981, July 1988 to January 1990.
WATER TEMPERATURE: March 1951 to July 1963, October 1974 to September 1979.
SUSPENDED-SEDIMENT DISCHARGE: March 1950 to September 1953, October 1974 to September 1984.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1975-81, 1988-90): Maximum daily, 4,000 microsiemens, Aug. 1, 1977; minimum daily, 523 microsiemens, Mar. 11, 12, 1989.
WATER TEMPERATURE (water years 1951-63, 1975-79): Maximum, 30.0°C, July 26, 1959; minimum, 0.0°C, on many days during winter periods.
SEDIMENT CONCENTRATION (water years 1950-53, 1975-84): Maximum daily mean, 60,000 mg/L, Aug. 6, 1953; minimum daily mean, 17 mg/L, Dec, 3. 1974.
SEDIMENT LOAD (water years 1950-53, 1975-84): Maximum daily, 1,020,000 tons, May 26, 1952; minimum daily, less than 1 ton on several days during September 1950.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)
NOV							
14...	1100	--	256	90	2	1900	8.5
JAN							
07...	1200	--	104	--	--	2440	-25.0
FEB							
20...	0930	E250	--	100	62	1440	4.0
APR							
16...	1100	--	825	100	2	1200	10.0
MAY							
21...	1325	--	2740	--	--	1340	23.0
29...	0945	E2000	--	10	1	681	20.0
JUL							
09...	1130	--	317	0	0	1440	24.5
AUG							
13...	1000	--	45	10	1	2660	25.5
SEP							
24...	0903	--	168	--	--	2570	13.0

DATE	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV						
14...	3.5	693	11.6	97	K60	220
JAN						
07...	0.0	--	--	--	--	--
FEB						
20...	0.0	697	13.2	99	<1	4800
APR						
16...	7.0	700	9.6	86	930	K1200
MAY						
21...	21.5	--	--	--	--	--
29...	16.0	698	9.0	100	K130000	K180000
JUL						
09...	22.5	700	6.9	87	K200	K200
AUG						
13...	21.0	703	6.4	79	K330	230000
SEP						
24...	7.5	--	--	--	--	--

YELLOWSTONE RIVER BASIN

06326500 POWDER RIVER NEAR LOCATE, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	BICARBONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CARBONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STANDARD UNITS) (00400)	TURBIDITY (NTU) (00076)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)
NOV											
14...	1100	242	19	223	8.6	220	560	130	56	200	4
FEB											
20...	0930	207	11	187	8.6	100	420	100	41	150	3
APR											
16...	1100	179	0	145	8.7	4000	99	20	12	88	4
MAY											
29...	0945	110	6	98	8.6	15	190	51	15	65	2
JUL											
09...	1130	198	6	167	8.4	93	450	120	35	140	3
AUG											
13...	1000	207	9	183	8.4	580	660	150	69	330	6

DATE	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRATE TOTAL (MG/L AS N) (00620)
NOV											
14...	6.5	204	650	91	0.2	8.3	1290	1280	1.75	892	--
FEB											
20...	5.4	186	490	78	0.3	8.2	997	988	1.36	E673	--
APR											
16...	4.3	156	370	50	0.4	6.1	875	642	1.19	1950	0.77
MAY											
29...	3.6	100	190	19	0.3	8.9	440	415	0.60	E2380	0.08
JUL											
09...	6.0	165	510	50	0.4	9.9	996	977	1.35	852	--
AUG											
13...	10	185	1100	97	0.6	12	2000	1880	2.72	243	--

DATE	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC DISSOLVED (UG/L AS AS) (01000)
NOV											
14...	<0.01	<0.01	<0.10	<0.10	0.05	0.03	0.02	0.03	<0.01	20	<1
FEB											
20...	<0.01	<0.01	0.20	0.20	0.01	0.02	0.02	0.01	0.02	100	<1
APR											
16...	0.05	0.02	0.82	0.79	0.02	0.05	3.20	<0.01	<0.01	--	--
MAY											
29...	0.23	<0.01	0.31	0.31	0.15	0.03	2.00	0.01	<0.01	150	<1
JUL											
09...	--	--	0.09	0.16	--	--	0.02	<0.01	<0.01	10	<1
AUG											
13...	<0.01	<0.01	0.33	0.34	<0.01	<0.01	0.68	0.01	<0.01	<10	1

YELLOWSTONE RIVER BASIN

06326500 POWDER RIVER NEAR LOCATE, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)
NOV											
14...	40	<0.5	<1.0	2	<3	2	21	<1	63	4	0.2
FEB											
20...	37	<0.5	1.0	<1	<3	3	110	1	40	8	0.1
APR											
16...	--	--	--	--	--	--	--	--	--	--	--
MAY											
29...	28	<0.5	<1.0	3	<3	6	56	1	20	2	0.7
JUL											
09...	52	<0.5	<1.0	1	<3	5	7	<1	37	3	0.3
AUG											
13...	<100	<10	<1.0	<1	<1	3	20	<1	70	<10	<0.1

DATE	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV										
14...	<10	1	<1	<1.0	1400	<6	30	1260	871	97
FEB										
20...	<10	2	2	<1.0	1100	<6	8	141	E95	99
APR										
16...	--	--	--	--	--	--	--	8910	19800	98
MAY										
29...	<10	9	<1	<1.0	510	<6	12	5170	E27900	97
JUL										
09...	<10	4	<1	<1.0	1100	<6	14	1010	864	98
AUG										
13...	6	2	2	<1.0	1900	3	<10	1090	132	99

YELLOWSTONE RIVER BASIN

06326555 CHERRY CREEK NEAR TERRY, MT

LOCATION.--Lat 46°51'00", long 105°19'29", in NE1/4SE1/4SE1/4 sec.25, T.13 N., R.50 E., Prairie County, Hydrologic Unit 10100004, on right bank 200 ft upstream from State Highway 253 bridge, 0.4 mi upstream from Dry Creek, and 4.0 mi north of Terry.

DRAINAGE AREA.--358 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1977 to September 1979 (discharge measurements only), October 1979 to September 30, 1981, March 1990 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,300.91 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). October 1977 to September 1979, water-stage recorder at bridge 200 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Nov. 8, Nov. 19-22, Nov. 26 to Jan. 17, Feb. 3-22. Water-discharge records poor. No known diversions for irrigation upstream of station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,720 ft^3/s, June 25, 1991, gage height, 9.30 ft, from slope-area determination of peak flow; no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,720 ft^3/s, June 25, gage height, 9.30 ft, from rating curve extended above 360 ft^3/s on basis of slope-area measurement of peak flow; no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	e.00	e.00	.00	.00	.00	.11	.03	230	.35	.00
2	.00	.00	e.00	e.00	.00	.00	.00	.10	.02	64	.27	.00
3	.00	.00	e.00	e.00	e.00	.00	.00	.12	.02	18	.21	.00
4	.00	.00	e.00	e.00	e.00	.00	.00	.14	.01	10	.23	.00
5	.00	.00	e.00	e.00	e.00	.00	.00	.13	.01	6.9	.23	.00
6	.00	.00	e.00	e.00	e.00	.00	.00	.13	202	5.0	.21	.00
7	.00	.00	e.00	e.00	e.00	.00	.00	.16	7.5	3.6	.22	.00
8	.00	e.00	e.00	e.00	e.00	.00	.00	.17	4.5	3.0	.17	.00
9	.00	.00	e.00	e.00	e.00	.00	.02	.17	3.2	2.4	.17	.00
10	.00	.00	e.00	e.00	e.00	.00	.05	.17	.98	2.1	.16	.00
11	.00	.00	e.00	e.00	e.00	.00	.12	.18	.61	1.7	.14	.00
12	.00	.00	e.00	e.00	e.00	.00	.08	3.2	.49	1.4	.07	.00
13	.00	.00	e.00	e.00	e.00	.00	.23	.09	.34	1.4	.04	.00
14	.00	.00	e.00	e.00	e.00	.00	.42	.05	.24	1.2	.03	.00
15	.00	.00	e.00	e.00	e.00	.00	.90	.21	.14	4.2	.00	160
16	.00	.00	e.00	e.00	e.00	.00	.25	.06	.16	3.1	.00	33
17	.00	.00	e.00	e.00	e.00	.00	.07	.04	.08	1.8	.00	4.4
18	.00	.00	e.00	.00	e.00	.00	.07	.03	.07	1.2	.00	.96
19	.00	e.00	e.00	.00	e.00	.00	.06	.03	.05	.94	.00	.34
20	.00	e.00	e.00	.00	e.00	.00	.07	.05	13	.91	.00	.19
21	.00	e.00	e.00	.00	e.00	.00	.08	.13	2.0	.82	.00	.77
22	.00	e.00	e.00	.00	e.00	.00	.08	.43	1.1	.62	.00	1.3
23	.00	.00	e.00	.00	.00	.00	.09	.05	.57	.49	.00	.33
24	.00	.00	e.00	.00	.00	.00	.09	.03	.41	.46	.00	.23
25	.00	.00	e.00	.00	.00	.00	.10	.04	1150	.42	.00	.14
26	.00	e.00	e.00	.00	.00	.00	.19	.04	119	.36	.00	.08
27	.00	e.00	e.00	.00	.00	.00	.92	.05	50	.32	.00	.07
28	.00	e.00	e.00	.00	.00	.00	.96	2.0	12	.37	.00	.07
29	.00	e.00	e.00	.00	---	.00	.17	.08	6.0	.40	.00	.06
30	.00	e.00	e.00	.00	---	.00	.13	.04	281	.38	.00	.00
31	.00	---	e.00	.00	---	.00	---	.03	---	.33	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	5.15	8.26	1855.53	367.82	2.50	201.94
MEAN	.000	.000	.000	.000	.000	.000	.17	.27	61.9	11.9	.081	6.73
MAX	.00	.00	.00	.00	.00	.00	.96	3.2	1150	230	.35	160
MIN	.00	.00	.00	.00	.00	.00	.00	.03	.01	.32	.00	.00
AC-FT	.00	.00	.00	.00	.00	.00	10	16	3680	730	5.0	401

WTR YR 1991 TOTAL 2441.20 MEAN 6.69 MAX 1150 MIN .00 AC-FT 4840

e Estimated

YELLOWSTONE RIVER BASIN

06326555 CHERRY CREEK NEAR TERRY, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1978-81, 1990 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: March to June 1990.
SUSPENDED-SEDIMENT DISCHARGE: March 1990 to current year (seasonal).

REMARKS.--No records available for many days of no flow.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water year 1990): Maximum daily, 3,400 microsiemens, June 11, 1990; minimum daily, 1,370 microsiemens, June 11, 1990.
SEDIMENT CONCENTRATION: Maximum daily mean, 6,800 mg/L, April 28, 1991; minimum daily mean, 12 mg/L, several days in Aug. 1991.
SEDIMENT LOAD: Maximum daily, 8,290 tons, June 25, 1991; minimum daily, 0 tons, on many days during periods of no flow.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATION: Maximum daily mean, 6,800 mg/L, April 28; minimum daily mean, 12 mg/L, Aug 7-12.
SEDIMENT LOAD: Maximum daily, 8,290 tons, June 25; minimum daily, 0 tons, on many days during no flow.

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	---	---	77	.02	67	.01	830	515	23	.02	---	---
2	---	---	67	.02	93	.01	310	54	21	.02	---	---
3	---	---	64	.02	107	.01	113	5.5	20	.01	---	---
4	---	---	60	.02	104	.00	83	2.2	18	.01	---	---
5	---	---	52	.02	100	.00	68	1.3	16	.01	---	---
6	---	---	51	.02	3300	1800	72	.97	13	.01	---	---
7	---	---	60	.03	350	7.1	78	.76	12	.01	---	---
8	---	---	73	.03	1030	13	80	.65	12	.01	---	---
9	---	---	84	.04	785	6.8	76	.49	12	.01	---	---
10	76	.01	90	.04	160	.42	69	.39	12	.01	---	---
11	96	.03	90	.04	136	.22	63	.29	12	<.01	---	---
12	84	.02	6750	58	127	.17	59	.22	12	<.01	---	---
13	104	.06	90	.02	111	.10	58	.22	14	<.01	---	---
14	104	.12	70	.01	99	.06	58	.19	17	<.01	---	---
15	340	.83	1000	.57	100	.04	80	.91	---	---	4750	2050
16	180	.12	125	.02	111	.05	55	.46	---	---	2480	221
17	23	<.01	125	.01	117	.03	45	.22	---	---	600	7.1
18	20	<.01	125	.01	109	.02	44	.14	---	---	20	.05
19	25	<.01	125	.01	110	.01	42	.11	---	---	20	.02
20	43	.01	105	.01	1950	68	38	.09	---	---	20	.01
21	77	.02	550	.19	175	.95	36	.08	---	---	29	.06
22	113	.02	3900	4.5	165	.49	35	.06	---	---	88	.31
23	133	.03	450	.06	70	.11	36	.05	---	---	58	.05
24	124	.03	80	.01	48	.05	40	.05	---	---	47	.03
25	109	.03	170	.02	2670	8290	58	.07	---	---	48	.02
26	900	.46	160	.02	1490	479	66	.06	---	---	48	.01
27	5200	13	100	.01	640	86	54	.05	---	---	52	.01
28	6800	18	3000	16	220	7.1	39	.04	---	---	76	.01
29	112	.05	175	.04	100	1.6	29	.03	---	---	114	.02
30	85	.03	76	.01	1750	1330	26	.03	---	---	---	---
31	---	---	49	.00	---	---	24	.02	---	---	---	---
TOTAL	---	32.87	---	79.82	---	12091.35	---	584.65	---	0.12	---	2278.70

TOTAL LOAD FOR PERIOD: 15067.51 TONS.

YELLOWSTONE RIVER BASIN

06326555 CHERRY CREEK NEAR TERRY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR										
12...	1400	0.04	--	--	3870	0.0	--	--	--	--
13...	1530	0.24	--	--	3150	0.0	--	--	--	--
14...	1100	0.20	--	--	2780	-1.0	9.0	--	--	--
15...	1035	0.26	100	51	2400	4.0	4.5	166	0.12	95
19...	1400	0.05	--	--	3660	12.0	7.0	--	--	--
23...	1630	0.10	--	--	3860	23.0	--	--	--	--
26...	1130	0.08	--	--	3820	8.0	7.0	--	--	--
26...	1500	0.15	--	--	3420	5.0	8.0	--	--	--
27...	0900	0.20	--	--	2530	6.0	5.0	--	--	--
28...	0900	0.86	--	--	1390	5.0	2.0	--	--	--
29...	0930	0.17	--	--	3040	5.0	4.0	--	--	--
MAY										
03...	1600	0.12	--	--	3750	3.0	10.0	--	--	--
06...	1000	0.12	--	--	3810	7.0	9.0	--	--	--
10...	1130	0.17	--	--	3900	17.0	12.0	--	--	--
12...	0930	4.4	--	--	894	17.0	15.0	--	--	--
12...	1630	0.48	--	--	1990	13.0	16.0	--	--	--
14...	1630	0.04	--	--	3800	22.0	22.0	--	--	--
17...	1030	0.04	--	--	3720	19.0	19.0	--	--	--
20...	0830	0.04	--	--	3390	18.0	15.0	--	--	--
22...	0820	2.1	100	3	1100	20.0	16.0	8360	47	99
24...	0930	0.03	--	--	3340	15.0	17.0	--	--	--
26...	2000	0.03	--	--	3340	15.0	17.0	--	--	--
27...	0830	0.04	--	--	3260	11.0	14.0	--	--	--
31...	1200	0.03	--	--	3570	21.0	25.0	--	--	--
JUN										
03...	1800	0.02	--	--	3660	27.0	24.0	--	--	--
06...	1100	455	--	--	541	24.0	24.0	--	--	--
06...	1800	68	--	--	817	24.0	23.0	--	--	--
07...	1800	3.7	--	--	1550	23.0	20.0	--	--	--
09...	0850	4.5	--	--	1470	17.0	19.0	--	--	--
10...	1130	1.0	--	--	2390	24.0	24.0	--	--	--
11...	1330	0.57	10	1	2910	31.0	29.5	137	0.21	97
14...	1515	0.27	--	--	3180	20.0	21.0	--	--	--
17...	1630	0.07	--	--	3310	23.0	24.0	--	--	--
20...	1000	36	--	--	1530	17.0	18.0	--	--	--
21...	1100	1.7	--	--	1540	16.0	17.0	--	--	--
24...	1900	0.33	--	--	2650	20.0	27.0	--	--	--
25...	0900	2680	--	--	381	24.0	14.0	--	--	--
26...	0830	113	20	2	674	19.5	15.0	1370	418	100
26...	1330	121	--	--	694	26.0	20.0	--	--	--
27...	0945	64	--	--	608	26.0	18.0	--	--	--
28...	1030	12	--	--	939	18.0	19.0	--	--	--
30...	1030	2.1	--	--	1920	24.0	23.0	--	--	--
30...	1200	289	--	--	1110	24.0	23.0	--	--	--
30...	1800	629	--	--	418	22.0	21.0	--	--	--
JUL										
01...	1200	210	--	--	418	21.0	19.0	--	--	--
02...	1250	60	80	1	652	25.5	20.5	287	46	99
03...	1100	17	30	1	920	27.0	22.0	112	5.1	99
05...	0930	7.2	--	--	1450	20.0	22.0	--	--	--
08...	0930	2.9	--	--	1990	21.0	20.0	--	--	--
12...	1130	1.4	--	--	2240	22.0	24.0	--	--	--
15...	1130	7.9	--	--	2510	26.0	28.0	--	--	--
19...	1030	0.91	--	--	2480	24.0	24.0	--	--	--
22...	1000	0.59	--	--	2560	23.0	24.0	--	--	--
26...	0930	0.40	--	--	2650	22.0	20.0	--	--	--
29...	1630	0.40	--	--	2710	--	24.0	--	--	--
AUG										
05...	1130	0.20	--	--	2830	--	25.0	--	--	--
12...	1700	0.07	--	--	2970	--	27.0	--	--	--
14...	0820	0.01	0	0	3100	26.0	21.5	20	0.00	93
SEP										
15...	1000	371	--	--	662	--	10.0	--	--	--
15...	1600	228	--	--	730	--	12.0	--	--	--
16...	1600	20	--	--	734	--	13.0	--	--	--
22...	1030	0.59	--	--	1650	--	10.0	--	--	--
24...	1245	0.27	80	2	2370	11.5	15.0	47	0.03	95

YELLOWSTONE RIVER BASIN

06326600 O'FALLON CREEK NEAR ISMAY, MT

LOCATION.--Lat 46°25'17", long 104°45'40", in NE1/4SE1/4 sec. 30, T.8 N., R.56 E., Fallon County, Hydrologic Unit 10100005, on left bank, about 350 ft upstream of U.S. Highway 12, 1 mi east of road to Ismay, 6.5 mi southeast of Ismay, 11.5 mi west of Plevna, and at river mile 58.3.

DRAINAGE AREA.--669 mi^2.

PERIOD OF RECORD.--October 1977 to current year. Crest-stage partial-record data collected July 1962 to September 1977.

GAGE.--Water-stage recorder. Elevation of gage is 2,590 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Jan. 19 to Feb. 21. Records poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--14 years, 15.2 ft^3/s, 11,000 acre-ft/yr; median of yearly mean discharges, 5.6 ft^3/s, 4,060 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,100 ft^3/s, Mar. 22, 1978, gage height, 9.35 ft; maximum gage height, 9.60 ft, Feb. 26, 1986, backwater from ice; no flow on many days most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge 1963-77, 4,700 ft^3/s, July 3, 1976, extension of crest-stage gage rating above 3,860 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage Height (ft)	Date	Time	Discharge (ft^3/s)	Gage Height (ft)
June 24	0600	*245	*3.93	No other peak greater than base discharge.			

No flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	e.00	.00	.00	41	3.4	16	.00	.00
2	.00	.00	.00	.00	e.00	.00	.00	25	.92	11	.00	.00
3	.00	.00	.00	.00	e.00	.00	.00	17	.45	8.7	.00	.00
4	.00	.00	.00	.00	e.00	.00	.00	9.1	.92	6.8	.00	.00
5	.00	.00	.00	.00	e.00	.00	.00	7.5	.49	5.5	.00	.00
6	.00	.00	.00	.00	e.00	.00	.00	5.4	.38	4.4	.00	.00
7	.00	.00	.00	.00	e.00	.00	.00	4.1	.13	3.9	.00	.00
8	.00	.00	.00	.00	e.00	.00	.00	3.2	.03	3.0	.00	.00
9	.00	.00	.00	.00	e.00	.00	.00	2.9	93	2.2	.00	.00
10	.00	.00	.00	.00	e.00	.00	.00	2.0	80	1.8	.00	.00
11	.00	.00	.00	.00	e.00	.00	.00	1.9	27	1.3	.00	.00
12	.00	.00	.00	.00	e.00	.00	.00	5.4	17	1.0	.00	.00
13	.00	.00	.00	.00	e.00	.00	.00	10	8.2	.94	.00	.00
14	.00	.00	.00	.00	e.00	.00	.00	5.3	4.5	.73	.00	.00
15	.00	.00	.00	.00	e.00	.00	.00	7.5	3.4	.67	.00	.00
16	.00	.00	.00	.00	e.00	.00	.00	7.4	2.2	.42	.00	.00
17	.00	.00	.00	.00	e.00	.00	3.1	4.4	1.6	.38	.00	.00
18	.00	.00	.00	.00	e.00	.00	1.4	2.9	1.1	.34	.00	.00
19	.00	.00	.00	e.00	e.00	.00	.74	1.8	.86	.25	.00	.00
20	.00	.00	.00	e.00	e.00	.00	.53	1.2	31	.22	.00	.00
21	.00	.00	.00	e.00	e.00	.00	.54	.97	122	.15	.00	.00
22	.00	.00	.00	e.00	.00	.00	.36	.70	129	.06	.00	.00
23	.00	.00	.00	e.00	.00	.00	.23	.58	102	.02	.00	.00
24	.00	.00	.00	e.00	.00	.00	.08	.78	181	.01	.00	.00
25	.00	.00	.00	e.00	.00	.00	.01	13	205	.00	.00	.00
26	.00	.00	.00	e.00	.00	.00	.18	41	149	.00	.00	.00
27	.00	.00	.00	e.00	.00	.00	.94	22	99	.00	.00	.00
28	.00	.00	.00	e.00	.00	.00	29	11	67	.00	.00	.00
29	.00	.00	.00	e.00	---	.00	70	11	44	.00	.00	.00
30	.00	.00	.00	e.00	---	.00	80	5.9	26	.00	.00	.00
31	.00	---	.00	e.00	---	.00	---	7.2	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	187.11	279.13	1400.58	69.79	0.00	0.00
MEAN	.000	.000	.000	.000	.000	.000	6.24	9.00	46.7	2.25	.000	.000
MAX	.00	.00	.00	.00	.00	.00	80	41	205	16	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.58	.03	.00	.00	.00
AC-FT	.00	.00	.00	.00	.00	.00	371	554	2780	138	.00	.00

CAL YR 1990 TOTAL 2570.43 MEAN 7.04 MAX 300 MIN .00 AC-FT 5100
WTR YR 1991 TOTAL 1936.61 MEAN 5.31 MAX 205 MIN .00 AC-FT 3840

e Estimated

YELLOWSTONE RIVER BASIN

06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT
(National stream quality accounting network station)

LOCATION.--Lat 47°40'42", long 104°09'22", in SW1/4NE1/4SW1/4 sec.9, T.22 N., R.59 E., Richland County, Hydrologic Unit 10100004, on left bank at Montana-Dakota Utilities Company powerplant, 0.2 mi downstream from bridge on State Highway 23, 2.5 mi south of Sidney, 3.0 mi downstream from Fox Creek, and at river mile 29.2.

DRAINAGE AREA.--69,103 mi^2. Area at site 4.5 mi upstream, 68,812 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1910 to September 1931 (published as "at Intake"), October 1933 to current year. If monthly figures of diversions to Lower Yellowstone Canal at Intake are added to records at this site, records equivalent to those published as Yellowstone River at Glendive (1898-1910, 1931-34) can be obtained. Monthly discharge only for some periods, published in WSP 1309. Monthly figures of diversions into Lower Yellowstone Canal prior to 1951 published in WSP 1309, 1951-60 published in WSP 1729, 1961-65 published in WSP 1916, 1966-70 published in WSP 2116, and 1971 to current year are published in annual reports.

GAGE.--Water-stage recorder. Datum of gage is 1,881.3 ft National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Jan. 1, 1911, to Sept. 30, 1931, nonrecording gage at site 32 miles upstream at different datum. Apr. 9, 1934, water-stage recorder at two sites within 500 ft of highway bridge 0.2 mi upstream and May 17, 1945, to Apr. 3, 1952, nonrecording gage on same bridge at datum 1.36 ft higher. Apr. 4, 1952, to Nov. 19, 1967, water-stage recorder at site 4.5 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Nov. 27 to Mar. 20. Water-discharge records good except those for estimated daily discharges, which are poor. Some regulation on tributary streams. Diversion for irrigation of about 1,250,000 acres upstream from station. Lower Yellowstone Project Main Canal diverts from left bank in NW1/4 sec.36, T.18 N., R.56 E., at Lower Yellowstone diversion dam at Intake about 36.6 mi upstream for irrigation of about 52,000 acres of which about one-third lies upstream from station. U. S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--79 years, 12,790 ft^3/s, 9,266,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 159,000 ft^3/s, June 2, 1921, gage height, 12.6 ft, site and datum then in use; maximum gage height observed, 21.85 ft, Mar. 22, 1947, site and datum then in use (backwater from ice); minimum discharge, 470 ft^3/s, May 17, 1961, gage height, 2.73 ft, site and datum then in use.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 62,700 ft^3/s, June 12, gage height, 15.72 ft; mininum daily, 1,800 ft^3/s, Dec. 26, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5090	6850	e6000	e6000	e6500	e7000	5880	11400	34300	45700	7340	3630
2	5060	6850	e5500	e6000	e7000	e6500	5760	9700	32500	42600	7140	3700
3	5240	6840	e4500	e6000	e7500	e6000	5660	8890	30900	36900	6690	3700
4	5530	6870	e4000	e6000	e7500	e5500	5550	8420	29500	34200	6540	3900
5	5570	6840	e5000	e5500	e7500	e6000	5470	8000	31600	32400	6600	3970
6	6340	6870	e6000	e5500	e7500	e6500	5400	7790	37400	30500	6600	3960
7	6150	6890	e6500	e5500	e7500	e6800	5380	7730	44400	28200	7050	3890
8	5960	6720	e7000	e5500	e8000	e7000	5420	7580	49000	27200	6520	4940
9	6070	6710	e7500	e5000	e8000	e7000	5550	7410	54600	26300	6140	5660
10	6370	6900	e7500	e5000	e8500	e7000	5850	7140	60200	25400	5570	4650
11	6570	6810	e7000	e5000	e8500	e7000	6360	7060	61800	23400	5290	4690
12	6630	6590	e6800	e5500	e8500	e7200	6920	8110	62200	22100	5100	5220
13	6620	6560	e6800	e6500	e8000	e7400	7900	12100	58900	20100	4890	5870
14	6490	6680	e6800	e7000	e7500	e7200	8040	14500	56600	18700	4780	7200
15	6560	6720	e6500	e7000	e7500	e7000	7970	15300	58000	17700	4830	11100
16	6730	6710	e6500	e7000	e7500	e6800	8090	16900	61300	16300	4680	21700
17	6940	6590	e6500	e7000	e7500	e6600	8570	16200	61300	15700	4520	16400
18	6990	6540	e6000	e7000	e7500	e6400	8100	17500	53100	14500	4530	11800
19	6870	6500	e5500	e7500	e7500	e6300	7590	19700	45700	13600	4720	10500
20	6830	6550	e5000	e7500	e7500	e6200	7830	20400	46100	12900	4820	9860
21	6890	6580	e4000	e7000	e7500	6150	7810	25200	48600	11900	4750	9540
22	6950	6550	e3500	e7000	e7500	6060	7750	32700	51800	11100	4660	9760
23	6980	6550	e3000	e7000	e8000	6030	8150	37400	46000	10700	4650	9980
24	6940	6670	e2500	e7000	e7500	6030	8200	39300	52500	10500	4310	9620
25	6990	6580	e2000	e7000	e7500	6070	8380	42400	55900	10000	4100	9980
26	6870	6420	e1800	e7000	e7500	6130	8490	45600	58900	9170	3990	9940
27	6780	e6000	e2500	e6500	e7000	6030	9160	47200	56600	8920	3940	9610
28	6810	e5500	e4000	e6000	e7000	6010	11100	48000	49500	8490	3950	9640
29	6770	e6000	e5000	e6000	---	5940	13700	50000	44300	8020	3900	9650
30	6720	e6000	e6000	e5500	---	5940	14300	47800	43800	7970	3740	9550
31	6740	---	e6000	e6000	---	5960	---	39400	---	7730	3590	---
TOTAL	200050	197440	163200	195000	212500	199750	230330	686830	1477300	608900	159930	243610
MEAN	6453	6581	5265	6290	7589	6444	7678	22160	49240	19640	5159	8120
MAX	6990	6900	7500	7500	8500	7400	14300	50000	62200	45700	7340	21700
MIN	5060	5500	1800	5000	6500	5500	5380	7060	29500	7730	3590	3630
AC-FT	396800	391600	323700	386800	421500	396200	456900	1362000	2930000	1208000	317200	483200

CAL YR 1990 TOTAL 3402060 MEAN 9321 MAX 36600 MIN 1800 AC-FT 6748000
WTR YR 1991 TOTAL 4574840 MEAN 12530 MAX 62200 MIN 1800 AC-FT 9074000

e Estimated

06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1948 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1964 to September 1981.
WATER TEMPERATURE: January 1951 to September 1985.
SUSPENDED-SEDIMENT DISCHARGE: October 1971 to September 1981, October 1982 to current year.

REMARKS.--Unpublished records of once-daily water temperature are available in files of District office. Prior to July 1972, sediment sampling and record computation under supervision of U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1965-81): Maximum daily, 1,220 microsiemens, Apr. 6, 1979; minimum daily, 261 microsiemens, June 4, 1966.
WATER TEMPERATURE (water years 1951-85): Maximum, 29.0°C July 23, 1960; minimum, 0.0°C on many days during winter.
SEDIMENT CONCENTRATION: Maximum daily mean, 26,800 mg/L May 8, 1975; minimum daily mean, 8 mg/L Jan. 9, 1973.
SEDIMENT LOAD: Maximum daily, 3,030,000 tons May 8, 1975; minimum daily, 63 tons Jan. 2, 1989.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATION: Maximum daily mean, 11,300 mg/L, Sept. 17; minimum daily mean, 17 mg/L, Jan. 28, 29.
SEDIMENT LOAD: Maximum daily, 700,000 tons, June 26; minimum daily, 167 tons, Dec. 25.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT												
18...	1100	7100	10	1	613	5.0	5.0	716	10.8	90	<1	<1
DEC												
04...	1200	3560	100	1	740	-9.0	0.0	713	12.6	92	K4	K20
JAN												
22...	1345	6870	100	75	645	-4.0	0.0	--	--	--	--	--
FEB												
25...	1130	7300	100	2	698	-3.0	0.0	720	12.4	90	K11	240
APR												
03...	1400	5640	--	1	850	15.0	12.5	--	--	--	--	--
25...	0945	8330	80	1	852	18.0	14.0	709	9.0	94	K36	120
MAY												
24...	1130	39100	100	51	--	14.0	17.0	--	--	--	--	--
JUN												
13...	1130	57000	--	--	396	20.0	19.0	--	--	--	--	--
26...	0700	61200	--	--	557	--	18.0	--	--	--	--	--
JUL												
11...	0930	23600	20	1	422	22.0	21.0	714	7.6	91	170	140
AUG												
06...	1505	6440	--	--	555	27.5	24.5	--	--	--	--	--
SEP												
20...	1325	9920	--	--	628	15.5	13.5	--	--	--	--	--
24...	1030	9500	0	0	628	13.0	11.0	720	10.2	98	350	340

DATE	TIME	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)
OCT											
18...	1100	160	12	153	8.8	68	190	46	18	57	2
DEC											
04...	1200	225	0	185	7.9	8.6	260	64	25	65	2
FEB											
25...	1130	188	0	154	8.2	23	240	59	22	60	2
APR											
25...	0945	195	0	158	8.3	180	280	68	27	80	2
JUL											
11...	0930	116	3	99	8.4	85	140	37	12	35	1
SEP											
24...	1030	174	0	138	8.0	250	190	47	17	59	2

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRATE TOTAL (MG/L AS N) (00620)
OCT											
18...	3.5	157	140	8.6	0.2	7.6	404	374	0.55	7740	0.13
DEC											
04...	3.8	182	230	13	0.5	10	493	523	0.67	4740	0.28
FEB											
25...	4.0	157	210	13	0.4	9.3	473	473	0.64	9320	0.37
APR											
25...	4.2	171	290	16	0.5	9.4	562	593	0.76	12600	0.37
JUL											
11...	2.7	105	110	8.3	0.3	8.8	268	275	0.36	17100	--
SEP											
24...	3.8	152	160	9.2	0.4	12	379	397	0.52	9720	0.43

DATE	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)
OCT										
18...	0.17	<0.01	0.30	0.30	0.23	<0.01	0.23	0.02	0.11	<0.01
DEC										
04...	0.02	<0.01	0.30	0.30	0.02	0.02	0.18	<0.01	0.01	<0.01
FEB										
25...	0.01	<0.01	0.38	0.41	0.03	0.05	0.03	0.01	<0.01	<0.01
APR										
25...	0.04	0.02	0.41	0.33	0.08	0.07	0.02	0.01	<0.01	<0.01
JUL										
11...	<0.01	<0.01	0.11	0.10	0.01	0.02	0.17	<0.01	<0.01	<0.01
SEP										
24...	0.01	0.01	0.44	0.48	0.03	0.05	0.32	0.02	0.02	0.03

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)
OCT											
18...	1100	110	5	45	<0.5	<1	1	<3	3	57	1
FEB											
25...	1130	<10	12	44	0.6	<1	<1	<3	2	8	1
JUL											
11...	0930	20	7	38	<0.5	<1	<1	<3	2	10	<1
SEP											
24...	1030	10	4	45	<0.5	<1	<1	<3	7	42	<1

DATE	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
OCT										
18...	35	3	0.5	<10	1	<1	<1	500	<6	8
FEB										
25...	40	4	<0.1	<10	7	<1	<1	600	<6	8
JUL										
11...	21	3	<0.1	<10	<1	<1	<1	350	<6	<3
SEP										
24...	34	1	<0.1	<10	2	<1	<1	500	<6	<3

YELLOWSTONE RIVER BASIN

06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	TEMPERATURE WATER (DEG C) (00010)	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)
OCT							
18...	1100	5.0	7100	702	13500	--	--
JAN							
22...	1345	0.0	6870	49	909	--	--
FEB							
25...	1130	0.0	7300	102	2010	--	--
APR							
03...	1400	12.5	5640	60	914	--	--
25...	0945	14.0	8330	446	10000	--	--
MAY							
24...	1130	17.0	39100	2460	260000	--	--
JUN							
13...	1130	19.0	57000	1290	199000	--	--
26...	0700	18.0	61200	5260	869000	52	63
JUL							
11...	0930	21.0	23600	412	26300	--	--
SEP							
20...	1325	13.5	9920	1320	35400	--	--
24...	1030	11.0	9500	700	18000	--	--

DATE	SED. SUSP. FALL DIAM. % FINER THAN .008 MM (70339)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT						
18...	--	--	--	--	--	98
JAN						
22...	--	--	--	--	--	74
FEB						
25...	--	--	--	--	--	39
APR						
03...	--	--	--	--	--	90
25...	--	--	--	--	--	92
MAY						
24...	--	--	--	--	--	89
JUN						
13...	--	--	--	--	--	80
26...	70	82	95	97	100	--
JUL						
11...	--	--	--	--	--	64
SEP						
20...	--	--	--	--	--	97
24...	--	--	--	--	--	95

DATE	TIME	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)	BED MAT. SIEVE DIAM. % FINER THAN 32.0 MM (80173)
APR											
03...	1400	0.3	4.7	32	46	52	58	63	72	94	100
25...	0945	0.1	3.8	52	98	100	--	--	--	--	--
JUL											
11...	0930	0.2	0.5	4.2	8.2	9.1	11	14	24	52	100
SEP											
20...	1325	0.4	2.4	40	82	84	84	84	88	100	--
24...	1030	0	0.5	58	99	100	--	--	--	--	--

YELLOWSTONE RIVER BASIN

06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	34	467	80	1480	44	713	45	729	53	930	67	1270
2	34	465	69	1280	210	3120	45	729	45	850	43	755
3	34	481	55	1020	702	8530	45	729	41	830	43	697
4	35	523	52	965	328	3540	45	729	54	1090	72	1070
5	35	526	52	960	113	1530	45	668	68	1380	89	1440
6	62	1060	50	927	100	1620	45	668	74	1500	72	1260
7	53	880	45	837	126	2210	45	668	76	1540	85	1560
8	36	579	42	762	124	2340	45	668	76	1640	110	2080
9	36	590	42	761	116	2350	45	607	77	1660	140	2650
10	38	654	42	782	136	2750	45	607	80	1840	178	3360
11	42	745	42	772	171	3230	45	607	82	1880	224	4230
12	48	859	42	747	108	1980	45	668	84	1930	260	5050
13	44	786	43	762	62	1140	45	790	78	1680	290	5790
14	35	613	53	956	62	1140	45	850	64	1300	324	6300
15	32	567	71	1290	65	1140	45	850	52	1050	350	6610
16	40	727	59	1070	66	1160	45	850	49	992	382	7010
17	178	3340	47	836	69	1210	45	850	47	952	745	13300
18	692	13100	46	812	107	1730	45	850	44	891	805	13900
19	638	11800	47	825	163	2420	45	911	46	931	1000	17000
20	345	6360	54	955	98	1320	45	911	170	3440	310	5190
21	174	3240	64	1140	46	497	45	850	391	7920	195	3240
22	85	1600	64	1130	48	454	45	850	289	5850	135	2210
23	69	1300	64	1130	63	510	42	794	126	2720	123	2000
24	61	1140	68	1220	46	310	37	699	104	2110	110	1790
25	65	1230	74	1310	31	167	30	567	105	2130	87	1430
26	74	1370	64	1110	37	180	24	454	110	2230	88	1460
27	76	1390	55	891	50	337	19	333	110	2080	70	1140
28	79	1450	57	846	45	486	17	275	92	1740	53	860
29	81	1480	58	940	45	607	17	275	---	---	57	914
30	83	1510	51	826	45	729	25	371	---	---	60	962
31	83	1510	---	---	45	729	53	859	---	---	55	885
TOTAL	---	62342	---	29342	---	50179	---	21266	---	55086	---	117413
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	50	794	4060	125000	870	80600	2740	338000	94	1860	60	588
2	47	731	2140	56000	855	75000	1960	225000	116	2240	59	589
3	52	795	1110	26600	770	64200	1080	108000	123	2220	56	559
4	48	719	750	17100	740	58900	690	63700	112	1980	55	579
5	40	591	560	12100	775	66100	695	60800	122	2170	55	590
6	38	554	430	9040	875	88400	655	53900	225	4010	54	577
7	39	567	350	7300	1770	212000	520	39600	520	9900	52	546
8	40	585	315	6450	2380	315000	425	31200	491	8640	1390	18500
9	50	749	250	5000	2180	321000	375	26600	245	4060	4370	66800
10	61	963	225	4340	2530	411000	390	26700	115	1730	2520	31600
11	86	1480	210	4000	1790	299000	410	25900	149	2130	810	10300
12	137	2560	880	19300	1320	222000	424	25300	192	2640	310	4370
13	500	10700	2970	97000	1280	204000	412	22400	176	2320	250	3960
14	2270	49300	4240	166000	1300	199000	391	19700	145	1870	700	13600
15	1820	39200	2320	95800	1220	191000	382	18300	117	1530	2000	59900
16	1600	34900	2100	95800	1000	166000	354	15600	102	1290	8130	476000
17	1870	43300	1930	84400	840	139000	295	12500	113	1380	11300	500000
18	2680	58600	1820	86000	625	89600	248	9710	130	1590	7400	236000
19	2540	52100	1790	95200	790	97500	230	8450	111	1410	3370	95500
20	1470	31100	1590	87600	930	116000	210	7310	81	1050	1540	41000
21	880	18600	2110	144000	1840	241000	178	5720	71	911	740	19100
22	535	11200	2550	225000	2170	303000	156	4680	75	944	570	15000
23	475	10500	3920	396000	1480	184000	140	4040	74	929	630	17000
24	470	10400	2540	270000	1610	228000	131	3710	67	780	680	17700
25	470	10600	1920	220000	3370	509000	129	3480	60	664	450	12100
26	650	14900	1680	207000	4400	700000	156	3860	56	603	275	7380
27	1100	27200	1340	171000	2850	436000	220	5300	55	585	255	6620
28	2840	85100	1170	152000	1780	238000	198	4540	55	587	280	7290
29	4380	162000	1200	162000	1050	126000	165	3570	55	579	300	7820
30	5450	210000	940	121000	1530	181000	131	2820	55	555	300	7740
31	---	---	860	91500	---	---	98	2050	57	553	---	---
TOTAL	---	890788	---	3259530	---	6561300	---	1182440	---	63710	---	1679308

TOTAL LOAD FOR YEAR: 13972704 TONS.

MISSOURI RIVER BASIN

Smaller Reservoirs in Missouri River Basin in Montana

060122000 LIMA RESERVOIR.--Lat 44°39'16", long 112°21'54", in SW1/4 sec.32, T.13 S., R.6 W., Beaverhead County, Hydrologic Unit 10020001, at Lima Dam on Red Rock River, 7 mi northwest of Monida, and at river mile 2,542.2. DRAINAGE AREA, 570 mi^2. PERIOD OF RECORD, April 1940 to current year. Records prior to October 1950, published only in WSP 1309, and those for April 1955, published only in WSP 1729. Records of daily elevations available in files of Helena district office. Nonrecording gage read twice daily. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

Reservoir is formed by earthfill dam with concrete spillway completed in 1902. Usable capacity, 84,050 acre- ft between elevation 6,537.30 ft, bottom of tunnel, and 6,582.7 ft, spillway crest. No dead storage. Figures given herein represent usable contents. Water is used for irrigation, flood control, and recreation. Records furnished by Water Users Irrigation Co.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 85,870 acre-ft, May 27, 28, June 14, 15, 1984, elevation, 6,582.98 ft; no usable storage Sept. 20-26, 1979, Sept. 13-30, 1987, October 1987.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 47,320 acre-ft, May 31, elevation, 6,575.38 ft; minimum contents, 4,320 acre-ft, Aug. 30, 31, elevation, 6,553.03 ft.

06020500 RUBY RIVER RESERVOIR.--Lat 45°14'21", long 112°06'35", in NE1/4NE1/4SE1/4 sec.8, T.7 S., R.4 W., Madison County Hydrologic Unit 10020003, at dam on Ruby River, 6 mi south of Alder, and at river mile 47.9. DRAINAGE AREA, 596 mi^2 (1,544 km^2). PERIOD OF RECORD, July 1938 to April 1950, September 1954, May 19, September to November 1955, and February to September 1960 (total contents), October 1960 to current year (usable contents). Records prior to October 1939, published only in WSP 1309, and those for September 1954, published only in WSP 1729. Elevations are determined by measuring from reference points in the middle and at or near the end of the month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

Reservoir is formed by earthfill dam with concrete spillway, completed in 1938. Usable capacity, 39,740 acre-ft between elevation 5,300.0 ft, bottom of tunnel, and 5,392.0 ft, spillway crest. Dead storage, 100 acre- ft below elevation 5,300.0 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Department of Natural Resources and Conservation. REVISED RECORDS, WSP 1729: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 46,040 acre-ft, Aug. 25, 1975, elevation, 5,399.0 ft; no storage at times in 1938, 1955, 1961.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 40,430 acre-ft, June 3, elevation, 5,393.6 ft; minimum contents observed, 6,870 acre-ft, Oct. 1, elevation, 5,342.2 ft.

06036000 WILLOW CREEK RESERVOIR.--Lat 45°42'51", long 111°41'57", in NW1/4NW1/4NW1/4 sec.35, T.1 S., R.1 W., Madison County, Hydrologic Unit 10020005, at dam on Willow Creek, 4 mi east of Harrison, and at river mile 11.5. DRAINAGE AREA, 153 mi^2. PERIOD OF RECORD, February 1938 to March 1958 (total contents), April 1958 to current year (usable contents). Records prior to October 1939, published only in WSP 1309 and November, December 1951, published only in WSP 1729. Prior to October 1949, published as Harrison Lake near Harrison. Elevations determined by measuring from reference marks in the middle and at or near the end of the month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation). Reservoir is formed by earth and rockfill dam with concrete spillway completed in 1938. Usable capacity, 17,730 acre-ft between elevation 4,666.5 ft, tunnel inlet, and 4,736.0 ft, spillway crest. Dead storage, 270 acre-ft below elevation 4,666.5 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Department of Natural Resources and Conservation. REVISED RECORDS, WSP 1629: 1958. WSP 1729: 1948(M), 1951-52, 1956-57.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 19,230 acre-ft, June 30, 1963, elevation, 4,736.7 ft; minimum observed, 2,270 acre-ft, Nov. 15, 1970, elevation, 4,705.0 ft.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 17,730 acre-ft, May 1, 15, June 1, 15, July 1, elevation, 4,736.0 ft; minimum observed, 7,240 acre-ft, Sept. 30, interpolated.

06038000 HEBGEN LAKE.--Lat 44°51'51", long 111°20'09", in SW1/4NW1/4 sec.23, T.11 S., R.3 E., Gallatin County, Hydrologic Unit 10020007, at Hebgen Dam on Madison River, 18 mi northwest of West Yellowstone, and at river mile 103. DRAINAGE AREA, 904 mi^2. PERIOD OF RECORD, January 1936 to current year. Records prior to October 1939, published only in WSP 1309. Figures of contents published in WSP 1629, 1709, and 1729 have been found to be in error and should not be used. Prior to Oct. 1, 1949, published as Hebgen Reservoir near West Yellowstone. Records of daily elevations since October 1955 on file in Helena district office. Nonrecording gage read about twice daily. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by The Montana Power Co.). Prior to earthquake of Aug. 17, 1959, datum of gage was 9.74 ft higher, also at National Geodetic Vertical Datum of 1929. Reservoir is formed by earthfill dam with concrete core and spillway completed in 1915, repaired in 1960 following severe earthquake of Aug. 17, 1959, which lowered dam 9.74 ft and deformed reservoir area. Subsequent usable capacity, 377,500 acre-ft between elevation 6,473.00 ft, bottom of outlet tower, and 6,534.87 ft, spillway crest. Dead storage, 7,340 acre-ft below elevation 6,473.00 ft. Prior to Aug. 17, 1959, usable capacity, 344,700 acre-ft between 6,483.11 ft, bottom of outlet tower, and 6,544.61 ft, spillway crest. Dead storage, 7,340 acre-ft below elevation 6,473.00 ft. Observations of reservoir level prior and subsequent to earthquake indicate smaller increases in capacity than indicated by new capacity table. Figures given herein represent usable contents. Water is used for power and recreation. Records furnished by The Montana Power Co. REVISED RECORDS, WSP 1916: 1959-60.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 380,500 acre-ft, July 21, 1987, elevation, 6,535.0 ft; minimum monthend, 670 acre-ft, Dec. 31, 1936, by capacity table used prior to August 1959.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 378,800 acre-ft, July 1-5, elevation, 6,534.87 ft; minimum observed, 256,100 acre-ft, Dec. 25, 28, 29, elevation, 6,524.32 ft.

Smaller reservoirs in Missouri River basin in Montana--Continued

06040500 ENNIS LAKE.--Lat 45°28'12", long 111°38'15", in NW1/4SW1/4 sec.20, T.4 S., R.1 E., Madison County, Hydrologic Unit 10020007, at Madison Dam on Madison River, 5 mi northeast of McAllister, and at river mile 40.3. DRAINAGE AREA, 2,181 mi². PERIOD OF RECORD, January 1936 to September 1975 (total contents), October 1975 to current year (usable contents). Records prior to October 1939, published only in WSP 1309. Prior to 1949, published as Madison Reservoir near McAllister. Records of daily elevations since October 1955 on file in Helena district office. Nonrecording gage read about twice daily. Datum of gage is at Montana Power Company datum (levels by The Montana Power Co.).

Reservoir is formed by timber crib dam completed in 1900. Usable capacity, 41,020 acre-ft between elevation 4,826.5 ft, bottom of penstock, and 4,841.5 ft, top of flashboards. Dead storage, 1,040 acre-ft below elevation 4,826.5 ft. Not normally drawn below 4,831.0 ft, 6,810 acre-ft. Figures given herein represent usable contents Water is used for power and recreation. Records furnished by The Montana Power Co.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 40,830 acre-ft, June 20, 1968, elevation, 4,841.45 ft; minimum observed, 2,600 acre-ft, Mar. 31, 1937, elevation, 4,828.8 ft.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 38,000 acre-ft, June 29, 30, elevation, 4,840.98 ft; minimum observed, 26,740 acre-ft, Dec. 25, elevation, 4,837.90 ft.

06049500 MIDDLE CREEK RESERVOIR.--Lat 45°29'18", long 110°58'42", in NW1/4SW1/4 sec.15, T.4 S., R.6 E., Gallatin County, Hydrologic Unit 10020008, at dam on Hyalite Creek, 14 mi south of Bozeman, and at river mile 28.9. DRAINAGE AREA, 27.4 mi². PERIOD OF RECORD, April 1951 to current year. Nonrecording gage read in the middle and at or near the end of month. Elevation of lake at full pond is about 6,700 ft, from topographic map.

Reservoir is formed by earthfill dam with conduit control works completed in 1951. Storage began in March 1951. Usable capacity, 8,030 acre-ft between gage height 125 ft, bottom of outlet, and 200.75 ft, spillway crest. Dead storage, 209 acre-ft below gage height 125 ft. Figures given herein represent usable contents. Water is used for irrigation and municipal purposes. Records furnished by Montana Department of Natural Resources and Conservation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 8,480 acre-ft, July 10, 1983, gage height, 202.8 ft, from capacity table then in use; minimum observed, 120 acre-ft, Oct. 18, 1965, gage height, 129.0 ft.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 8,100 acre-ft, June 30, elevation, 6,712.00 ft; minimum observed, 2,700 acre-ft, Aug. 31, elevation, 6,676.00 ft.

06058600 HELENA VALLEY RESERVOIR.--Lat 46°38'17", long 111°52'56", in NW1/4NW1/4SE1/4 sec.8, T.10 N., R.2 W., Lewis and Clark County, Hydrologic Unit 10030101, at dam 5.8 mi east of Helena. PERIOD OF RECORD, September 1960 to current year. Nonrecording gage read one or more times per month. U.S. Geological Survey began publishing data October 1983. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

This is an offstream reservoir formed by an earthfill dam and dike completed in 1958. Closure and first fill of reservoir in March 1959. Stored water is diverted from Missouri River at Canyon Ferry Dam in W1/2SE1/41/4SE1/4 sec.4, T.10 N., R.1 W., 17 mi east of Helena. Usable capacity, 5,900 acre-ft between elevation 3,805.0 ft, invert of City of Helena municipal outlet, and 3,820.07 ft, top of active conservation pool (maximum normal water-surface elevation). Dead storage, 1,260 acre-ft, below elevation 3,787.75 ft, and inactive storage, 3,290 acre-ft, below elevation 3,805.0 ft. Figures given herein represent usable contents. Water is used for irrigation and municipal use by the City of Helena. Records furnished by U.S. Bureau of Reclamation. Capacity table effective Jan. 1, 1961.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 9,470 acre-ft, June 2, 1975, elevation, 3,820.60 ft; no usable contents observed October and November 1977, result of construction work.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 8,350 acre-ft, June 22, elevation, 3,819.38 ft; minimum observed, 4,150 acre-ft, Feb. 28, elevation, 3,807.82 ft.

06064500 LAKE HELENA.--Lat 46°45'58", long 111°53'10", in SE1/4SW1/4 sec. 29, T.12 N., R.2 W., Lewis and Clark County, Hydrologic Unit 10030101, at Hauser Dam on Missouri River, 13 mi northeast of Helena, and at river mile 2,239.1. DRAINAGE AREA, 610 mi² above dam and control works on Prickly Pear Creek. PERIOD OF RECORD, May 1945 to current year. April to July 1953 scattered daily elevation and contents, published in WSP 1320-B. May to June 1964 daily elevations and contents, published in WSP 1840-B. Records of daily elevations since October 1955 on file in Helena district office. Nonrecording gage at Hauser Dam read hourly. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by The Montana Power Co.).

Gage heights collected at Hauser Dam are effective on Lake Helena at control dam. Prior to April 1945, contents of Lake Helena included with records of Hauser Lake. Since that date, a dam and control works has separated the two lakes to allow independent regulation of Lake Helena, if needed. Usable capacity, 10,450 acre- ft between elevation 3,624.00 ft, bottom of control works, and 3,635.00 ft, top of flashboards. No dead storage. Figures given herein represent usable contents. Water is used for recreation, wildlife, and power production through Hauser Dam. Records furnished by The Montana Power Co.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 11,810 acre-ft (revised), Aug. 2, 1960, Dec. 10, 1962, July 19, 20, Sept. 4, 1963, Aug. 15, 1968, Apr. 6, 1973, June 26, 1980, May 14-16, 1991, elevation, 3,635.60 ft; no storage Mar. 29 to Apr. 7, 1958, Feb. 12, 20, 1962, May 4-10, 1979.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 11,810 acre-ft, May 14-16, elevation, 3,635.60 ft; minimum observed, 10,240 acre-ft, June 12, elevation, 3,634.90 ft.

Smaller reservoirs in Missouri River basin in Montana--Continued

06065000 HAUSER LAKE.--Lat 46°45'58", long 111°53'10", in SE1/4SW1/4 sec.29, T.12 N., R.2 W., Lewis and Clark County, Hydrologic Unit 10030101, at Hauser Dam on Missouri River, 1.6 mi downstream from Prickly Pear Creek, 13 mi northeast of Helena, and at river mile 2,226.4. DRAINAGE AREA, 16,876 mi². PERIOD OF RECORD, January 1936 to current year. Records prior to October 1939, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. May to June 1964 daily elevations and contents, published in WSP 1840-B. Monthend contents prior to May 1945 include contents of Lake Helena, excluded thereafter. Records of daily elevations since October 1955 on file in Helena district office. Nonrecording gage read hourly. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by The Montana Power Co.).

Reservoir is formed by concrete dam completed in 1907; separated from Lake Helena in April 1945. Usable contents, 51,420 acre-ft between elevation 3,617.00 ft, bottom of tunnel, and 3,635.00 ft top of flashboards. Dead storage, 46,810 acre-ft below elevation 3,617.00 ft. Prior to Nov. 28, 1949, usable capacity, 52,090 acre-ft at elevation 3,635.00 ft, decrease caused by construction of Canyon Ferry Dam in backwater of Hauser Dam. Not normally drawn below 3,621.00 ft, 8,870 acre-ft. Figures given herein represent usable contents. Water is used for power and recreation. Records furnished by The Montana Power Co. REVISED RECORDS, WSP 1729: 1949-57.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed since May 1945, 53,630 acre-ft, Aug. 2, 1960, Dec. 10, 1961, July 19, 20, Sept. 4, 1963, Aug. 15, 1968, Apr. 6, 1973, June 26, 1980, May 14-16, 1991, elevation, 3,635.60 ft; no storage Jan. 31, Feb. 29, 1936.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 53,630 acre-ft, May 14-16, elevation, 3,635.60 ft; minimum observed, 51,050 acre-ft, June 12, elevation, 3,634.90 ft.

06066000 HOLTER LAKE.--Lat 46°59'28", long 112°00'17", on line between SE1/4 sec.5 and NE1/4 sec.8, T.14 N., R.3 W., Lewis and Clark County, Hydrologic Unit 10030101, at Holter Dam on Missouri River, 3.3 mi east of Wolf Creek, and at river mile 2,211.1. DRAINAGE AREA, 17,149 mi². PERIOD OF RECORD, January 1936 to current year. Records prior to October 1939, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. May to June 1964 daily elevations and contents, published in WSP 1840-B. Records of daily elevations since October 1955 on file in Helena district office. Prior to 1950, published as Holter Reservoir near Wolf Creek. Nonrecording gage read three times daily. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by The Montana Power Co.).

Reservoir is formed by concrete dam completed in 1918. Usable capacity, 81,920 acre-ft between elevation 3,543.00 ft, bottom of tunnel, and 3,564.00 ft, top of flashboards. Dead storage, 158,500 acre-ft below elevation 3,543.00 ft. Not normally drawn below 3,548.00 ft, 16,660 acre-ft. Figures given herein represent usable contents. Water is used for power and recreation. Records furnished by The Montana Power Co.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 85,250 acre-ft, June 19, 1970, elevation, 3,564.70 ft; no storage Feb. 29, Dec. 31, 1936.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 82,250 acre-ft, June 11, elevation, 3,564.07 ft; minimum observed, 78,610 acre-ft, Jan. 5, elevation, 3,563.30 ft.

06075000 SMITH RIVER RESERVOIR.--Lat 46°37'27", long 110°44'48", near center of south line of sec.17, T.10 N., R.8 W., Meagher County, Hydrologic Unit 10030103, at dam on Smith River, 9 mi northeast of White Sulphur Springs, and at river mile 22.8. DRAINAGE AREA, 72.3 mi². PERIOD OF RECORD, April 1938 to September 1950 (scattered records 1947-50) and April to October 1959 (total contents), November 1959 to current year (usable contents). Records for some periods published only in WSP 1309 and for April 1959, published only in WSP 1729. Elevations determined by measuring from reference marks at or near middle and end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

Reservoir is formed by earthfill dam with concrete spillway completed in 1936. Usable capacity, 10,650 acre-ft between elevation, 5,415.0 ft, bottom of outlet, and 5,486.0 ft, spillway crest. Dead storage, 52 acre-ft below elevation 5,415.0 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Department of Natural Resources and Conservation. REVISED RECORDS, WSP 1729: 1960.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 11,650 acre-ft, June 1, 1978, elevation, 5,489.1 ft; no usable storage September through October 1987.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 11,560 acre-ft, June 1, elevation, 5,488.8 ft; minimum contents, 2,720 acre-ft, Sept. 30, interpolated.

06079500 GIBSON RESERVOIR.--Lat 47°36'09", long 112°45'39", in NE1/4NW1/4SE1/4 sec.4, T.21 N., R.9 W., Teton County, Hydrologic Unit 10030104, at Gibson Dam on Sun River, 19 mi northwest of Augusta, and at river mile 100.8. DRAINAGE AREA, 575 mi². PERIOD OF RECORD, January 1930 to current year. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. May to June 1964 daily elevations and contents, published in WSP 1840-B. Nonrecording gage read daily. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

Reservoir is formed by concrete dam with glory-hole spillway completed in 1929. Usable capacity, 99,050 acre-ft, between elevation 4,557.5 ft, bottom of outlet, and 4,724.0 ft, top of glory-hole, by capacity table effective Aug. 1, 1975; see previous reports for superseded figures. Dead storage, 11 acre-ft, below elevation 4,557.5 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by U.S. Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents, 116,300 acre-ft, June 8, 1964, elevation, 4,732.23 ft, from floodmark, of which 11,600 acre-ft was uncontrolled storage, by capacity table used Oct. 1, 1965, to July 30, 1975; minimum observed, 11 acre-ft, Oct. 13, 1936, elevation, 4,560.9 ft, by capacity table used prior to 1939.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 98,660 acre-ft, June 22, elevation, 4,723.7 ft; minimum observed, 26,700 acre-ft, Sept. 24, elevation, 4,650.7 ft.

Smaller reservoirs in Missouri River basin in Montana--Continued

06080500 PISHKUN RESERVOIR.--Lat 47°40'36", long 112°29'48", in W1/2 sec.10, T.22 N., R.7 W., Teton County, Hydrologic Unit 10030104, at dam 14 mi northwest of Augusta, and at river mile 97.3. PERIOD OF RECORD, January 1936 to current year. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. Nonrecording gage read one or more times a month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation). This is an off- stream reservoir formed by two earthfill dams completed in 1919. Stored water is diverted from Sun River in sec.36, T.22 N., R.9 W., 18 mi northwest of Augusta. Usable capacity, 30,420 acre-ft, between elevation 4,342.0 ft, bottom of outlet, and 4,370.0 ft, maximum pool. Dead storage, 16,250 acre-ft, below elevation 4,342.0 ft. Prior to 1940, usable capacity varied from 3,600 to 21,750 acre-ft. Figures given herein represent usable contents. Water is used for irrigation, recreation, and wildlife. Records furnished by U.S. Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 32,700 acre-ft, July 4-6, 1953, elevation 4,371.4 ft; no storage October 1939 to March 1940, Oct. 31, 1967.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 30,910 acre-ft, June 1, elevation, 4,370.3 ft; minimum observed, 17,870 acre-ft, Apr. 30, elevation, 4,361.0 ft.

06082000 WILLOW CREEK RESERVOIR.--Lat 47°32'48", long 112°25'45", in SW1/4NW1/4 sec.30, T.21 N., R.6 W., Lewis and Clark County, Hydrologic Unit 10030104, at dam on Willow Creek, 4 mi northwest of Augusta, and at river mile 2.8. PERIOD OF RECORD, January 1936 to September 1960 (total contents), October 1960 to current year (usable contents. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. Nonrecording gage read one or more times a month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

Reservoir is formed by earthfill dam completed in 1911. Usable capacity, 32,230 acre-ft between elevation 4,085.28 ft, bottom of outlet, and 4,142.0 ft, maximum pool. Dead storage, 67 acre-ft below elevation 4,085.28 ft. Prior to 1941, total capacity was 16,700 acre-ft. Supplemental water diverted from Sun River in sec.36, T.22 N., R.9 W., 18 mi northwest of Augusta. Figures given herein represent usable contents. Water is used for irrigation, recreation, and wildlife. Records furnished by U.S. Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 35,230 acre-ft, June 22, 1975, elevation, 4,144.0 ft; no storage July 31, Aug. 31, 1940.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 32,090 acre-ft, June 23, elevation, 4,141.9 ft; minimum observed, 27,570 acre-ft, Oct. 30, Nov 30, elevation, 4,138.7 ft.

06083000 NILAN RESERVOIR.--Lat 47°29'06", long 112°32'24", in S1/2NE1/4 sec.18, T.20 N., R.7 W., Lewis and Clark County, Hydrologic Unit 10030104, at north dam, lat 47°28'18", long 112°30'54", in SE1/4NE1/4 sec. 20, T.20 N., R.7 W., at east dam, 6 mi west of Augusta. PERIOD OF RECORD, December 1951 to current year. April to July 1953 scattered daily contents, published in WSP 1320-B. Records for November 1958 to March 1959, published only in WSP 1729. Nonrecording gage read at middle and end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

This is an offstream reservoir formed by two earthfill dams completed in 1951. Usable capacity, 10,090 acre- ft between elevation 4,402.0 ft, bottom of outlet, and 4,442.5 ft, spillway crest. Dead storage, 900 acre-ft below elevation 4,402.0 ft, not including contents of old lake. Stored water is diverted from Smith Creek in NE1/4 sec.4, T.19 N., R.8 W., and from Ford Creek in SW1/4 sec.26, T.20 N., R.8 W., at points 12 mi and 10 mi, respectively, southwest of Augusta. Figures given herein represent total contents. Water is used for irrigation and recreation. Records furnished by Montana Department of Natural Resources and Conservation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 13,520 acre-ft, May 31, 1963, elevation, 4,448.5 ft; no contents observed Sept. 8, 1984.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 10,210 acre-ft, June 5, 24, elevation, 4,442.7 ft; minimum, 5,020 acre-ft, Oct. 10, elevation, 4,431.0 ft.

06090900 LOWER TWO MEDICINE LAKE.--Lat 48°29'39", long 113°15'49", in NE1/4 sec.34, T.32 N., R.13 W., Glacier County, Hydrologic Unit 10030201, at dam on Two Medicine River, 4 mi northwest of East Glacier. DRAINAGE AREA, 50.2 mi^2. PERIOD OF RECORD, September 1938 to June 1964 (dam destroyed), December 1967 to current year. Figures of no storage prior to April 1961 may be in error and should be used with caution. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. May to June 1964 occasional elevations and contents, published in WSP 1840-B. Prior to 1942, published as Two Medicine Lake near East Glacier. Nonrecording gage read at or near end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation) and is 8.22 ft higher than datum for destroyed dam (levels by Bureau of Indian Affairs).

Reservoir is formed by earthfill dam with concrete spillway and control works; construction began in September 1965, completed in November 1967. Storage began Dec. 1, 1967. Former dam 250 ft upstream completed in 1913 and destroyed by flood of June 8, 1964. Usable capacity at new dam, 11,880 acre-ft between elevation 4,861.0 ft, bottom of outlet, and 4,882.0 ft, spillway crest. Dead storage, about 2,000 acre-ft near upper end of reservoir below elevation 4,861.0 ft. Prior to June 8, 1964, at site and datum then in use, usable capacity was 16,620 acre-ft between elevation 4,848.00 ft elevation of natural outlet, and 4,878.0 ft, spillway crest. Dead storage was unknown. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Bureau of Indian Affairs. REVISED RECORDS, WSP 1729: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 20,930 acre-ft, June 8, 1964, elevation, 4,883.8 ft, datum and capacity table then in use, dam overtopped; no storage at times in some years.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 12,720 acre-ft, July 1, elevation, 4,883.3 ft; minimum contents observed, 4,430 acre-ft, Sept. 6, elevation, 4,870.8 ft.

Smaller reservoirs in Missouri River basin in Montana--Continued

06093000 FOUR HORNS LAKE.--Lat 48°20'33", long 112°41'48", in SW1/4NW1/4SE1/4 sec.19, T.30 N., R.8 W., Glacier County, Hydrologic Unit 10030201, at dam 7 mi northeast of Heart Butte. PERIOD OF RECORD, September 1938 to current year. Records prior to October 1940, published only in WSP 1309 and those for December 1958 to August 1959, published only in WSP 1729. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. Prior to 1950, published as Four Horns Reservoir near Heart Butte. Nonrecording gage read at or near end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Bureau of Indian Affairs). This is an offstream reservoir formed by earthfill dam completed in 1932.

Stored water is diverted from Badger Creek in NE1/4 sec.24, T.30 N., R.10 W., 5 mi north of Heart Butte. Usable capacity, 19,250 acre-ft between elevation 4,081.0 ft, gage sill, and 4,115.0 ft, maximum design level. No dead storage. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Bureau of Indian Affairs.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 16,320 acre-ft, Aug. 5, 1958, elevation, 4,111.6 ft, from capacity table then in use; minimum observed, 2,840 acre-ft, July 31, 1949, elevation, 4,090.0 ft.

EXTREMES FOR CURRENT YEAR: Maximum contents, 12,890 acre-ft, July 1, elevation, 4,109.5 ft; minimum, 8,930 acre-ft, Oct. 1, elevation, 4,103.3 ft.

06094000 SWIFT RESERVOIR.--Lat 48°09'53", long 112°52'20", in NE1/4 sec.27, T.28 N., R.10 W., Pondera County, Hydro- Hydrologic Unit 10030201, at Swift Dam on Birch Creek, 17 mi west of Dupuyer, and at river mile 60.5. DRAINAGE AREA, 75.3 mi^2. PERIOD OF RECORD, January 1936 to June 1964 (dam destroyed), June 1967 to current year. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. April to June 1964 scattered daily elevations and contents, published in WSP 1840-B. Prior to 1950, published as Birch Creek Reservoir near Dupuyer. Nonrecording gage read monthly. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation) and is 63.7 ft lower than datum for destroyed dam (levels by Pondera County Canal and Reservoir Co.).

Reservoir is formed by concrete arch dam; construction began in 1965; completed in 1967. Storage began June 22, 1967. Former dam, in same location, was built about 1915 and destroyed by flood of June 8, 1964. Usable capacity at new dam, 29,980 acre-ft between elevation 4,748.0 ft, bottom of outlet, and 4,883.5 ft, spillway crest. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Pondera County Canal and Reservoir Co. REVISED RECORDS, WSP 1729: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 34,300 acre-ft, June 8, 1964, elevation, 4,956.3 ft, datum then in use; minimum observed, 20 acre-ft, Sept. 30, 1952, elevation, 4,810.0 ft, datum then in use.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 30,200 acre-ft, June 30, elevation, 4,884.0 ft; minimum, 8,100 acre-ft, Apr. 30, elevation, 4,822.7 ft.

06095500 LAKE FRANCES.--Lat 48°15'48", long 112°12'24", in NE1/4NE1/4 sec.23, T.29 N., R.5 W., Pondera County, Hydrologic Unit 10030203, at dam 3 mi southeast of Valier. PERIOD OF RECORD, January 1936 to current year. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. Nonrecording gage read at or near end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Pondera County Canal and Reservoir Co.).

This is an offstream reservoir formed by earthfill dam completed about 1931. Stored water is diverted from Birch Creek in sec.28, T.29 N., R.8 W., and Dupuyer Creek in sec.28, T.29 N., R.6 W., at points 20 mi and 6 mi, respectively, west of dam. Usable capacity, 111,900 acre-ft between elevation 3,787.40 ft, outlet sill, and 3,816.00 ft, maximum design level. Dead storage is estimated at 5,000 acre-ft below elevation 3,787.40 ft. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Pondera County Canal and Reservoir Co.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 111,400 acre-ft, June 4, 1953, elevation, 3,815.92 ft; minimum observed, 4,560 acre-ft, Jan. 31, 1938, elevation, 3,789.36 ft.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 104,300 acre-ft, June 30, elevation, 3,814.60 ft; minimum, 68,190 acre-ft, Feb. 28, elevation, 3,807.27 ft.

06110500 ACKLEY LAKE.--Lat 46°57'19", long 109°55'55", in SE1/4 sec.22, T.14 N., R.14 E., Judith Basin County, Hydrologic Unit 10040103, at dam 4 mi southwest of Hobson. PERIOD OF RECORD, June 1938 to September 1960 (total contents), October 1960 to current year (usable contents). Records prior to October 1939, published only in WSP 1309. Nonrecording gage read usually at or near middle and end of month.

This is an offstream reservoir formed by earthfill dam with concrete conduits completed in 1938. Water is diverted from Judith River near center of east line of sec.14, T.14 N., R.13 E., 7.5 mi west of Hobson. Usable capacity, 5,820 acre-ft between gage height 45.0 ft, bottom of outlet, and 82.67 ft, spillway crest. Dead storage, 325 acre-ft below gage height 45.0 ft. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Department of Natural Resources and Conservation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 6,180 acre-ft, May 30, June 30, 1989, June 23, 1991, elevation, 2,984.1 ft; minimum observed, 784 acre-ft, Aug. 25, 1984, elevation, 2,954.0 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents observed, 6,180 acre-ft, June 23, elevation, 2,984.1 ft; minimum, 3,050 acre-ft, Oct. 24, elevation, 2,970.2 ft.

Smaller reservoirs in Missouri River Basin in Montana--Continued

06116500 BAIR RESERVOIR.--Lat 46°34'47", long 110°33'24", in SE1/4SE1/4SW1/4 sec.35, T.10 N., R.9 E., Meagher County, Hydrologic Unit 10040201, at dam on North Fork Musselshell River, 1 mi northwest of Delpine, 14 mi northwest of Martinsdale, and at river mile 24.7. DRAINAGE AREA, 48.6 mi^2. PERIOD OF RECORD, November 1939 to September 1960 (total contents), winter records incomplete some years during 1951-59, October 1960 to current year (usable contents). Records for November 1939, published only WSP 1309. Prior to October 1969, published as "Durand Reservoir." Nonrecording gage read at or near middle and end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

Reservoir is formed by earthfill dam with concrete spillway completed in 1939. Usable capacity, 7,000 acre-ft between elevation 5,253.2 ft, bottom of inlet, and 5,325.0 ft, spillway crest. Dead storage, 24 acre-ft below elevation 5,253.2 ft. Supplemental water can be diverted from Checkerboard Creek in S1/2 sec.5, T.9 N., R.9 E., but seldom used. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Department of Natural Resources and Conservation. REVISED RECORDS, WSP 1729: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 7,390 acre-ft, July 1, 1979, elevation, 5,326.3 ft; no storage July 31, 1961, September, October 1984, July to October 1985, and July through October 1988.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 7,210 acre-ft, June 1, elevation, 5,325.7 ft; minimum observed, 2,580 acre-ft, Nov. 1, elevation, 5,302.0 ft.

06119000 MARTINSDALE RESERVOIR.--Lat 46°27'17", long 110°16'02", in NE1/4NW1/4SE1/4 sec.18, T.8 N., R.12 E., Wheatland County, Hydrologic Unit 10040201, at north dam 2 mi east of Martinsdale, lat 46°26'33", long 110°15'30", in NE1/4 sec.20, T.8 N., R.12 E., at south dam 3 mi southeast of Martinsdale. PERIOD OF RECORD, November 1939 to September 1960 (total contents), winter records incomplete for some years during 1951-59, October 1960 to current year (usable contents). Records for November 1939, published only in WSP 1309. Nonrecording gage read at or near middle and end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

This is an offstream reservoir formed by two earthfill dams with concrete conduit and spillway completed in 1939. Stored water is diverted from South Fork Musselshell River in N1/2 sec.15, T.8 N., R.11 E., at a point 1 mi west of Martinsdale. Usable capacity, 23,110 acre-ft between elevation 4,714.67 ft, bottom of outlet, and 4,779.0 ft, spillway crest. Dead storage, 73 acre-ft below elevation 4,714.67 ft. South Fork Musselshell River flow above diversion is supplemented at times with return flow from lands irrigated by water diverted from North Fork Musselshell River. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Department of Natural Resources and Conservation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 23,690 acre-ft, June 15, 1991, elevation, 4,779.9 ft; no storage July 31, Aug. 31, Sept. 30, Oct. 31, 1961.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 23,690 acre-ft, June 15, elevation, 4,779.9 ft; minimum observed, 7,360 acre-ft, Mar. 1, elevation, 4,757.6 ft.

06122500 DEADMAN'S BASIN RESERVOIR.--Lat 46°20'24", long 109°24'35", in NE1/4 sec.25, T.7 N., R.18 E., Wheatland County, Hydrologic Unit 10040201, at dam 6 mi east of Shawmut. PERIOD OF RECORD, June 1941 to June 1955 (some contents may be total), July 1955 to current year (usable contents), incomplete 1942, 1951-59. Nonrecording gage read at or near middle and end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

This is an offstream reservoir formed by earthfill dam completed in 1941. Stored water is diverted from Musselshell River in NW1/4 sec.8, T.7 N., R.17 E., 6 mi northwest of Shawmut. Usable capacity, 72,220 acre-ft between elevation 3,872.0 ft, bottom of outlet, and 3,921.0 ft, maximum design level. Prior to 1958, usable capacity was 52,500 acre-ft at elevation 3,911.0 ft. Dead storage, 4,600 acre-ft below elevation 3,872.0 ft. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Department of Natural Resources and Conservation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 73,240 acre-ft, June 7, 1978, elevation, 3,921.5 ft; minimum observed, 3,290 acre-ft, Oct. 31, 1961, elevation, 3,867.3 ft.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 73,040 acre-ft, June 27, elevation, 3,921.4 ft; minimum observed, 22,640 acre-ft, Oct. 1, elevation, 3,893.1 ft.

06136500 FRESNO RESERVOIR.--Lat 48°36'04", long 109°56'45", in SE1/4 sec.19, T.33 N., R.14 E., Hill County, Hydrologic Unit 10050002, at dam on Milk River, 13 mi west of Havre and at river mile 437.3. DRAINAGE AREA, 3,766 mi^2 of which 670 mi^2 is probably noncontributing. PERIOD OF RECORD, January 1,1940 to current year. Records prior to September 1940, published only in WSP 1309. March to May, 1952 daily elevations and contents, published in WSP 1260-B. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. Records of daily contents in files of Helena district office. Nonrecording gage read daily. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

Reservoir is formed by earthfill dam with concrete spillway completed in 1939. Usable capacity, 103,000 acre-ft, between elevation 2,530.00 ft, invert of tunnel inlet, and 2,575.00 ft, spillway crest, from revised capacity table effective Feb. 1, 1983. Elevation of maximum water surface is 2,592.93 ft, 224,700 acre-ft. Crest of dam is 2,596.10 ft. There are no gates in the spillway. Dead storage, 544 acre-ft, below elevation 2,530.00 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by U.S. Bureau of Reclamation. REVISED RECORDS, WSP 1729: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 154,000 acre-ft, Apr. 3, 1952, elevation, 2,579.3 ft, of which 26,800 acre-ft was uncontrolled storage, capacity table then in use; no storage Feb. 18 to Mar. 6, 1950.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 106,000 acre-ft, July 1, elevation, 2,575.76 ft; minimum observed, 42,960 acre-ft, Oct. 1, elevation, 2,557.95 ft.

Smaller reservoirs in Missouri River Basin in Montana--Continued

06155000 NELSON RESERVOIR.--Lat 48°31'42", long 107°31'00", in SE1/4 sec.14, T.32 N., R.32 E., Phillips County, Hydrologic Unit 10050004, at dam 10 mi northwest of Saco. PERIOD OF RECORD, March 1928 to current year. Records prior to October 1940, published only in WSP 1309. Nonrecording gage read on first and last day of month and more often during high stages. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

This is an offstream reservoir formed by earthfill dam completed in 1922. Stored water is diverted from Milk River at Dodson Dam in SE1/4 sec.26, T.31 N., R.26 E., 6 mi west of Dodson. Usable capacity, 60,570 acre-ft, between elevation 2,200 ft, gage sill, and 2,221.6 ft, top of active conservation pool. Dead storage, 18,650 acre-ft below elevation 2,200.0 ft. Reservoir has never been operated to maximum capacity which is 66,800 acre- ft at elevation 2,223.0 ft, maximum design level. Figures given herein represent usable contents. Water is used for irrigation, recreation, and wildlife. Records furnished by U.S. Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 60,570 acre-ft, July 12-14, 1965, elevation, 2,221. ft; minimum observed, 842 acre-ft, Aug. 31, 1984, elevation, 2,200.5 ft.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 43,270 acre-ft, Oct. 31, elevation, 2,217.30 ft; minimum observed, 33,870 acre-ft, Apr. 1, elevation, 2,214.70 ft.

06204000 MYSTIC LAKE.--Lat 45°13'30", long 109°45'36", in sec.9, T.7 S., R.16 E., (unsurveyed), Stillwater County, Hydrologic Unit 10070005, at dam on West Rosebud Creek, 15 mi southwest of Roscoe, 25 mi southwest of Absarokee and at river mile 28.8. DRAINAGE AREA, 46.9 mi^2. PERIOD OF RECORD, January 1936 to current year. Records prior to September 1939, published only in WSP 1309. Record of daily elevations since October 1965 available in files of Helena district office. Water-stage recorder. Prior to October 1965, only monthend figures furnished. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by The Montana Power Co.).

Reservoir is formed by thin-section reinforced concrete arch dam completed in 1925. Usable capacity, 21,000 acre-ft between elevation 7,612.00 ft, minimum operating level, and 7,673.50 ft, top of 3.5 ft stop logs. No dead storage. Figures given herein represent usable contents. Water is used for power development and recreation. Records furnished by The Montana Power Co. REVISED RECORDS, WSP 1916: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 21,130 acre-ft, July 10, 1983, elevation, 7,673.8 ft; no storage most days Mar. 23 to May 5, 1981, Apr. 10 to May 19, 1982, May 4,5, 1983, May 14, 1984, Mar. 23, 26,27, 1986, and Apr. 8-11, 1988.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 20,850 acre-ft, July 28-30, elevation, 7,673.16 ft; minimum monthend, 640 acre-ft, Apr. 30, elevation, 7,614.27 ft.

06212000 COONEY RESERVOIR.--Lat 45°26'47", long 109°11'57", in N1/2NE1/4 sec.36, T.4 S., R.20 E., Carbon County, Hydrologic Unit 10070006, at dam on Red Lodge Creek, 1 mi upstream from Cottonwood Creek, 6.6 mi west of Boyd, and at river mile 12.0. DRAINAGE AREA, 206 mi^2. PERIOD OF RECORD, May 1937 to September 1960 (total contents), incomplete 1954-60, October 1960 to current year (usable contents). Records prior to October 1939, published only in WSP 1309. Nonrecording gage read at or near middle and end of month. Datum of gage is at National Geodetic Vertical Datum of 1929.

Reservoir is formed by earthfill dam with concrete spillway completed in 1936. Usable capacity, 27,400 acre- ft between elevation 4,175.0 ft, bottom of tunnel, and 4,250.0 ft, top of 4 ft flashboards. Dead storage, 90 acre-ft below elevation 4,175.0 ft. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Department of Natural Resources and Conservation. REVISED RECORDS, WSP 1729: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 28,140 acre-ft, May 31, 1987, elevation, 4,251.0 ft; no contents observed Sept. 30, 1960, Oct. 31, 1981 through Feb. 28, 1982.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 23,490 acre-ft, July 1, elevation, 4,245.48 ft; minimum, 7,970 acre-ft, Sept. 1, elevation, 4,218.61 ft.

06307000 TONGUE RIVER RESERVOIR.--Lat 45°07'48", long 106°46'13", in SE1/4SE1/4NE1/4 sec.13, T.8 W., R.40 E., Big Horn County, Hydrologic Unit 10090101, at dam on Tongue River, 4 mi upstream from Post Creek, 7 mi northeast of Decker, and at river mile 189.1. DRAINAGE AREA, 1,770 mi^2. PERIOD OF RECORD, December 1938 to current year. Record prior to September 1939, published only in WSP 1309 and those for January, February 1956, published only in WSP 1729. Nonrecording gage read daily but only weekly readings supplied. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

Reservoir is formed by earthfill dam with concrete spillway completed in May 1939. Usable capacity, 68,040 acre-ft between elevation 3,374.4 ft, bottom of outlet, and 3,424.4 ft, spillway crest. Prior to October 1947, usable contents was 73,950 acre-ft at same elevations, due to sedimentation study. Dead storage, 1,400 acre-ft below elevation, 3,374.4 ft. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Department of Natural Resources and Conservation. REVISED RECORDS, WSP 1309: 1947- 50. WSP 1729: 1951, drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 77,040 acre-ft, May 26, 1978, elevation, 3,426.8 ft, from extension of rating curve; no storage October 1939 to February 1940.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 64,620 acre-ft, June 30, elevation, 3,423,4 ft; minimum observed, 13,300 acre-ft, May 1, elevation, 3,397.4 ft.

MISSOURI RIVER BASIN

Smaller reservoirs in Missouri River basin in Montana--Continued

Monthend contents, in acre-feet, water year October 1990 to September 1991

Date	Lima Reservoir	Ruby River Reservoir	Willow Creek Reservoir	Hebgen Lake	Ennis Lake	Middle Creek Reservoir	Helena Valley Reservoir
Sept. 30	5,340	b6,870	b6,080	361,400	37,240	4,380	5,690
Oct. 31	8,080	a7,890	**	318,400	36,170	4,270	4,990
Nov. 30	12,040	b12,680	**	277,100	32,830	4,310	4,640
Dec. 31	11,400	16,000	b10,080	256,400	29,930	4,730	4,600
Jan. 31	12,040	a20,300	b11,230	257,500	30,660	4,890	4,400
Feb. 28	12,520	b24,810	b12,950	259,900	31,020	4,980	4,150
Mar. 31	13,450	29,920	b15,340	271,400	30,480	5,130	4,660
Apr. 30	28,360	b34,280	b17,730	291,000	32,460	5,680	7,630
May 31	47,320	a39,710	b17,730	360,500	36,400	7,820	8,170
June 30	31,380	a38,190	b17,730	378,600	38,000	8,100	8,840
July 31	8,390	b24,010	b11,800	378,100	36,780	3,650	6,770
Aug. 31	4,320	a12,100	b7,790	369,500	37,310	2,700	6,780
Sept. 30	5,940	a7,360	b7,220	347,400	37,310	c2,800	5,600

Date	Lake Helena	Hauser Lake	Holter Lake	Smith River Reservoir	Gibson Reservoir	Pishkun Reservoir	Willow Creek Reservoir
Sept. 30	10,910	52,150	81,490	b4,100	29,050	20,460	28,240
Oct. 31	10,910	52,150	81,200	b4,030	45,900	20,200	27,700
Nov. 30	10,910	52,150	79,650	b4,530	51,460	19,940	27,570
Dec. 31	10,910	52,150	81,060	b4,480	48,630	19,810	27,700
Jan. 31	10,910	52,150	81,160	b5,000	47,990	19,550	27,700
Feb. 28	10,910	52,150	80,640	b5,450	50,230	19,290	27,840
Mar. 31	10,910	52,150	81,540	b5,940	46,890	18,390	27,840
Apr. 30	11,130	52,520	80,730	b6,880	62,240	17,870	28,520
May 31	10,680	51,790	80,730	b11,560	85,030	30,750	31,650
June 30	10,910	52,150	81,020	b11,500	95,700	30,580	30,640
July 31	10,450	51,420	81,020	b8,470	81,860	23,780	30,060
Aug. 31	11,130	52,520	81,020	b4,120	51,750	19,550	28,790
Sept. 30	10,680	51,790	80,830	a2,670	27,800	22,260	28,520

Date	Nilan Reservoir	Lower Two Medicine Lake	Four Horns Lake	Swift Reservoir	Lake Frances	Ackley Lake	Bair Reservoir
Sept. 30	c5,020	b7,650	b8,930	10,550	68,420	a3,480	b2,760
Oct. 31	**	a11,600	b11,310	8,730	69,890	---	b2,580
Nov. 30	**	c11,600	--	12,590	69,060	---	b2,780
Dec. 31	**	--	--	16,120	68,790	---	b2,770
Jan. 31	**	--	--	18,970	68,330	---	b2,720
Feb. 28	**	--	--	21,190	68,190	---	b3,160
Mar. 31	**	--	--	22,860	69,020	---	b3,530
Apr. 30	a8,050	a12,250	a9,720	8,100	94,550	a3,780	b4,060
May 31	a9,910	a12,550	a12,230	25,140	101,000	a5,720	b7,210
June 30	a9,980	b12,720	b12,890	30,200	104,300	a6,060	b6,830
July 31	a8,780	12,880	9,390	24,250	94,140	a5,110	b5,480
Aug. 31	a8,230	a5,800	a11,390	18,530	92,170	3,560	b3,500
Sept. 30	a7,420	6,760	12,120	12,300	87,860	a3,150	b3,640

Date	Martinsdale Reservoir	Deadman's Basin Reservoir	Fresno Reservoir	Nelson Reservoir	Mystic Lake	Cooney Reservoir	Tongue River Reservoir
Sept. 30	b8,620	b22,640	b42,960	b42,520	20,510	b14,620	**
Oct. 31	b8,260	b25,700	56,070	43,270	17,020	a16,940	b27,400
Nov. 30	b7,910	b26,760	56,070	39,920	11,040	17,430	**
Dec. 31	b7,960	a29,850	53,880	38,830	6,840	a17,500	**
Jan. 31	b7,910	b32,640	50,720	37,740	3,600	17,920	**
Feb. 28	b7,360	a34,920	54,120	35,610	1,700	18,810	**
Mar. 31	b7,760	b39,600	b57,030	33,870	790	a21,340	b19,150
Apr. 30	b9,420	b46,570	80,020	37,030	640	a16,980	b13,300
May 31	b21,600	b60,210	100,200	37,030	5,560	a21,750	36,000
June 30	b22,360	b72,430	b106,600	40,660	20,260	a23,490	64,620
July 31	b18,840	b65,170	90,320	39,190	20,840	a21,060	b41,100
Aug. 31	b10,660	b49,280	72,040	42,520	18,470	b7,970	b20,220
Sept. 30	b8,060	b44,410	62,340	43,650	18,960	10,130	b20,080

a Interpolated.
b Figure of contents for first day of following month.
c Estimate.
** Data not supplied by observer.

LITTLE MISSOURI RIVER BASIN

06334500 LITTLE MISSOURI RIVER AT CAMP CROOK, SD

LOCATION.--Lat 45°32'49", long 103°58'23", in SW1/4 sec.2, T.18 N., R.1 E., Harding County, Hydrologic Unit 10110201, on left bank 15 ft upstream from bridge on State Highway 20 at east edge of Camp Crook.

DRAINAGE AREA.--1,970 mi², approximately.

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

REVISED RECORDS.--WSP 1309: 1904. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,108.98 ft above National Geodetic Vertical Datum of 1929. Sept. 2, 1903, to Nov. 30, 1906, nonrecording gage at site 0.5 mi upstream at different datum. May 1956 to Oct. 8, 1957, nonrecording gage at site 15 ft downstream, and Oct. 9, 1957, to Sept. 30, 1976, water-stage recorder at present site both at datum 2.00 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Small diversions upstream from station for irrigation. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--38 years, 123 ft3/s, 89,110 acre-ft/yr; median of yearly mean discharges, 103 ft3/s, 74,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,420 ft3/s, Mar. 24, 1978, gage height, 16.90 ft, present datum; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of 1952 reached a stage of about 18 ft, present datum, from local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft3/s and maximum (*):

Date	Time	Discharge (ft3/s)	Gage height (ft)	Date	Time	Discharge (ft3/s)	Gage height (ft)
May 18	0730	*307	*4.37				

Minimum daily discharge, 0.13 ft3/s, Aug. 26.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.5	e2.1	e2.5	e1.4	e3.0	e2.4	5.7	185	168	6.7	.47	.27
2	1.1	e2.0	e2.4	e1.2	e5.5	e2.2	5.4	149	134	5.2	2.6	.26
3	1.0	e2.0	e2.4	e1.0	5.9	3.1	5.6	103	121	4.3	6.7	.30
4	1.2	e1.9	e2.5	e1.0	5.7	3.6	5.6	73	91	3.1	3.6	.31
5	1.3	e2.0	e2.6	e1.0	5.3	4.1	5.7	58	66	1.8	2.1	.31
6	1.3	e2.0	e2.6	e1.0	5.1	4.1	5.8	44	49	1.7	8.8	.32
7	1.1	e1.9	e2.9	e1.0	5.1	3.8	5.9	33	40	.80	13	.34
8	1.3	e2.0	e3.2	e1.0	4.9	3.4	6.4	27	33	.90	8.5	.29
9	1.3	e2.0	e3.0	e1.0	4.8	3.6	7.2	22	27	.84	3.1	.35
10	1.4	e2.1	e2.8	e1.1	4.8	4.7	8.3	19	24	.67	1.6	2.3
11	1.3	e2.2	2.7	e1.3	4.9	4.8	9.1	17	20	.81	1.3	2.6
12	1.3	e2.2	2.5	e1.6	5.2	5.1	8.9	36	60	.73	.84	1.2
13	1.4	e2.2	2.6	e1.9	5.1	5.0	9.3	32	84	.64	.65	.66
14	1.4	e2.3	2.6	e1.8	5.2	5.2	7.9	21	50	.67	.53	.59
15	1.5	e2.4	2.6	e1.7	4.9	5.2	8.5	109	38	.53	.34	.47
16	1.5	e2.3	2.6	e1.6	4.9	5.5	20	197	31	.58	.35	18
17	1.5	e2.2	2.6	e1.8	4.5	5.8	9.2	199	27	.65	.34	8.3
18	1.4	e2.0	2.6	e2.0	4.3	5.6	15	276	23	.57	.29	4.9
19	1.6	e2.0	e2.2	e2.0	e4.0	5.8	36	199	17	.57	.24	3.8
20	1.6	e2.1	e1.6	e1.8	3.7	5.7	45	139	13	.61	.19	2.1
21	1.8	e2.0	e1.0	e1.9	4.0	6.2	23	102	9.9	.65	.19	1.0
22	1.7	e2.0	e1.0	e2.0	3.7	6.4	7.4	96	9.3	.64	.18	.83
23	1.7	e2.1	e1.1	e1.9	e3.6	6.4	7.5	73	8.3	.57	.15	.83
24	1.8	e2.1	e1.2	e1.8	e3.6	6.8	5.6	49	5.8	.51	.16	1.0
25	2.5	e1.8	e1.2	e1.8	3.5	6.6	5.0	38	5.1	.47	.18	.66
26	2.1	e1.6	e1.1	e1.9	3.7	6.5	4.1	34	4.2	.55	.13	.59
27	2.1	e1.5	e1.3	e2.0	2.6	6.5	15	47	13	.71	.17	.59
28	3.0	e1.6	e1.3	e1.9	2.6	6.4	64	54	16	.62	.30	.53
29	2.1	e1.8	e1.1	e1.8	---	6.3	117	51	15	.48	.22	.47
30	2.2	e2.6	e1.2	e1.9	---	6.1	230	121	9.4	.41	.25	.42
31	2.2	---	e1.3	e2.2	---	5.9	---	211	---	.42	.23	---
TOTAL	50.2	61.0	64.3	49.3	124.1	158.8	709.1	2814	1212.0	38.40	57.70	54.59
MEAN	1.62	2.03	2.07	1.59	4.43	5.12	23.6	90.8	40.4	1.24	1.86	1.82
MAX	3.0	2.6	3.2	2.2	5.9	6.8	230	276	168	6.7	13	18
MIN	1.0	1.5	1.0	1.0	2.6	2.2	4.1	17	4.2	.41	.13	.26
AC-FT	100	121	128	98	246	315	1410	5580	2400	76	114	108

CAL YR 1990 TOTAL 23536.38 MEAN 64.5 MAX 1620 MIN .37 AC-FT 46680
WTR YR 1991 TOTAL 5393.49 MEAN 14.8 MAX 276 MIN .13 AC-FT 10700

e Estimated

LITTLE MISSOURI RIVER BASIN

06336600 BEAVER CREEK NEAR TROTTERS, ND

LOCATION.--Lat 47°09'47", long 103°59'32", in SW1/4SW1/4NE1/4 sec.33, T.143 N., R.105 W., Golden Valley County Hydrologic Unit 10110204, on left bank 100 ft upstream from bridge on county road, 2.4 mi east of Montana-North Dakota State line, 13 mi southwest of Trotters, 17 mi north of Beach, 20 mi upstream from Elk Creek, and at mile 27.

DRAINAGE AREA.--616 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORDS.--October 1977 to current year (seasonal records only since 1984).

REVISED RECORDS.--1977: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,370 ft, from topographic map.

REMARKS.--Water-discharge records fair except those for period of estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--6 years (water years 1978-83), 33.3 ft^3/s, 24,130 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,720 ft^3/s, Mar. 29, 1978, gage height, 18.61 ft; maximum gage height, 19.27 ft, Mar. 22, 1978, ice jam; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 194 ft^3/s, July 10, gage height, 5.85 ft; no flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					e.00	e.00	.95	4.6	2.3	112	.00	.00
2					e.00	e.02	.66	4.0	2.8	75	.00	.00
3					e.01	e.09	.47	3.6	4.2	45	.00	.00
4					e.01	e2.4	.29	3.6	6.4	27	.00	.00
5					e.02	e2.7	.22	3.6	4.6	17	.00	.00
6					e.02	e2.5	.12	3.5	3.2	11	.00	.00
7					e.02	e1.5	.06	2.8	2.5	7.0	.00	.00
8					e.03	e2.2	.05	2.4	1.9	5.0	.00	.75
9					e.02	e2.4	.06	1.9	2.0	3.7	.00	.00
10					e.02	e3.1	.04	1.3	1.9	26	.00	.00
11					e.02	e2.8	.05	1.2	1.5	12	.00	.00
12					e.02	e2.1	.17	2.1	.89	7.6	.00	.00
13					e.03	e1.5	.60	3.2	.68	8.6	.00	.00
14					e.01	e1.4	.82	4.2	.52	5.3	.00	.00
15					e.00	e1.1	1.3	4.5	1.5	3.3	.00	3.8
16					e.03	e1.0	2.0	4.0	1.2	2.3	.00	6.3
17					e.00	e.81	1.9	3.7	27	1.2	.00	1.2
18					e.00	e.52	1.7	3.3	27	1.0	.00	.21
19					e.01	e.45	1.7	2.4	16	.59	.00	.00
20					e.02	e.64	1.4	1.9	13	.47	.00	.00
21					e.03	e.64	1.0	1.6	11	.28	.00	.00
22					e.03	e.54	.91	3.6	14	.09	.00	.00
23					e.02	e.58	.89	4.7	13	.05	.00	.00
24					e.00	e.45	.67	4.1	17	.02	.00	.00
25					e.00	e.36	.55	3.7	19	.00	.00	.00
26					e.00	e.25	.81	4.1	19	.00	.00	.00
27					e.00	e.50	1.4	5.8	13	.00	.00	.00
28					e.00	1.3	3.4	5.1	9.1	.00	.00	.00
29					---	1.4	4.4	4.0	6.9	.00	.00	.00
30					---	1.3	4.6	3.2	12	.00	.00	.00
31					---	1.1	---	2.5	---	.00	.00	---
TOTAL					0.37	37.65	33.19	104.2	255.09	371.50	0.00	12.26
MEAN					.013	1.21	1.11	3.36	8.50	12.0	.000	.41
MAX					.03	3.1	4.6	5.8	27	112	.00	6.3
MIN					.00	.00	.04	1.2	.52	.00	.00	.00
AC-FT					.7	75	66	207	506	737	.00	24

e Estimated.

LITTLE MISSOURI RIVER BASIN

06336600 BEAVER CREEK NEAR TROTTERS, ND--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1978 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM AD-SORP-TION RATIO (00931)
MAR												
20...	1020	0.64	2180	--	11.5	1.0	--	--	--	--	--	--
APR												
01...	1035	1.0	1800	8.4	13.0	4.5	400	61	59	300	62	7
MAY												
06...	1000	3.9	2180	--	5.5	9.0	--	--	--	--	--	--
JUN												
10...	1010	2.3	2450	--	22.0	20.5	--	--	--	--	--	--
JUL												
19...	1045	0.66	2130	8.6	26.5	22.0	410	45	72	350	64	8

DATE	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	BICAR-BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR-BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
APR											
01...	8.0	400	0	330	740	7.5	0.2	3.6	1400	1380	1.90
JUL											
19...	12	330	24	310	840	11	0.2	0.7	1520	1520	2.07

DATE	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)
APR											
01...	3.93	2	360	20	1	40	50	<0.1	<1	1	890
JUL											
19...	2.71	3	680	30	<1	50	10	<0.1	2	<1	1100

KOOTENAI RIVER BASIN

12300110 LAKE KOOCANUSA AT INTERNATIONAL BOUNDARY

LOCATION.--Lat 48°59'44", long 115°10'43", in NE1/4SW1/4SE1/4 sec.1, T.37 N., R.28 W., Lincoln County, Hydrologic Unit 17010101, 0.3 mi south of international boundary, in middle of old channel 1.9 mi upstream from Young Creek, and 6.4 mi north of Rexford.

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	SAMPLING DEPTH (FEET) (00003)	WEATHER (WMO CODE NUMBER) (00041)	TEMPERATURE AIR (DEG C) (00020)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, TOTAL (MG/L AS N) (00600)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
OCT												
16...	0930	10.0	3	6.0	3.5	<0.01	<0.10	<0.01	--	0.004	0.002	1.1
16...	1030	130	3	--	5.7	<0.01	0.20	<0.01	--	<0.001	0.003	2.0
JUN												
12...	1000	10.0	--	15.0	4.8	<0.01	0.12	0.01	0.52	0.022	0.006	2.2
12...	1100	73.0	--	--	4.3	0.01	0.13	0.02	0.33	0.030	0.001	1.8
JUL												
17...	0930	10.0	3	17.0	4.0	0.01	<0.05	0.03	--	0.011	<0.001	1.9
17...	1030	136	3	--	4.7	0.01	0.16	0.03	0.76	0.010	<0.001	1.4
AUG												
14...	1100	10.0	--	18.0	3.5	<0.01	<0.05	0.01	--	0.001	<0.001	1.9
14...	1200	132	--	--	4.5	<0.01	0.16	<0.01	--	0.001	<0.001	1.5
SEP												
18...	1100	10.0	1	13.0	3.2	<0.01	<0.05	<0.01	--	0.002	<0.001	1.6
18...	1200	143	1	--	4.6	<0.01	0.20	<0.01	0.50	0.005	<0.001	1.8

DATE	TIME	SAMPLING DEPTH (FEET) (00003)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)
JUN							
12...	1000	10.0	110	30	7.8	1.7	0.1
12...	1100	73.0	99	28	7.0	1.4	0.1
AUG							
14...	1100	10.0	100	29	7.2	1.6	0.1
14...	1200	132	110	31	7.4	1.5	0.1

DATE	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)
JUN							
12...	0.40	93	11	0.20	0.2	112	0.15
12...	0.30	86	12	0.40	0.1	105	0.14
AUG							
14...	0.40	94	9.4	0.60	0.1	108	0.15
14...	0.30	95	10	0.50	0.1	112	0.15

KOOTENAI RIVER BASIN

12300110 LAKE KOOCANUSA AT INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN, DISSOLVED (MG/L) (00300)	LIGHT INCIDENT PERCENT REMAINING AT DEPTH (00031)	LIGHT TRANSMISSION 1 METER PATHLENGTH (%) (00074)
OCT							
16...	0.0	229	8.2	13.2	8.8	100	25
16...	0.50	--	--	--	--	90	--
16...	2.00	228	8.2	13.2	8.8	--	25
16...	4.30	--	--	--	--	60	--
16...	5.00	227	8.2	13.1	8.8	--	25
16...	10.0	226	8.2	13.1	8.8	--	25
16...	13.5	--	--	--	--	30	--
16...	15.0	226	8.2	13.1	8.8	--	25
16...	20.0	224	8.2	13.1	8.8	--	25
16...	20.5	--	--	--	--	15	--
16...	25.0	222	8.2	13.1	8.7	--	25
16...	30.0	220	8.2	13.1	8.7	--	25
16...	31.5	--	--	--	--	5.0	--
16...	36.5	--	--	--	--	1.0	--
16...	40.0	216	8.1	13.1	8.7	--	25
16...	50.0	213	8.1	13.1	8.7	--	23
16...	60.0	212	8.1	13.1	8.7	--	21
16...	70.0	210	8.1	13.1	8.7	--	18
16...	75.0	--	--	--	--	0.1	--
16...	80.0	209	8.1	13.1	8.7	--	18
16...	90.0	214	8.1	12.7	8.7	--	16
16...	100	224	8.1	12.1	8.7	--	6.8
16...	110	226	8.0	11.9	8.7	--	6.3
16...	120	225	7.9	9.7	6.5	--	2.6
16...	130	203	7.8	8.5	6.5	--	3.8
16...	140	196	7.8	8.4	6.5	--	3.8
JUN							
12...	0.0	192	8.5	13.2	10.4	100	0.01
12...	0.50	--	--	--	--	90	--
12...	1.60	--	--	--	--	60	--
12...	2.00	191	8.5	13.2	10.4	--	<0.01
12...	3.60	--	--	--	--	30	--
12...	4.90	--	--	--	--	15	--
12...	5.00	191	8.5	13.2	10.4	--	<0.01
12...	8.50	--	--	--	--	5.0	--
12...	10.0	192	8.4	13.1	10.4	--	<0.01
12...	15.0	189	8.4	12.7	10.4	--	<0.01
12...	20.0	186	8.3	11.5	10.5	--	0.0
12...	25.0	186	8.2	10.6	10.6	--	0.0
12...	30.0	185	8.2	10.4	10.6	--	0.0
12...	35.0	180	8.2	10.2	10.6	--	0.0
12...	40.0	182	8.2	9.9	10.6	--	0.0
12...	45.0	184	8.2	9.6	10.6	--	0.0
12...	50.0	184	8.2	9.6	10.6	--	0.0
12...	55.0	184	8.2	9.6	10.6	--	0.0
12...	60.0	185	8.2	9.5	10.6	--	0.0
12...	65.0	185	8.2	9.5	10.6	--	0.0
12...	70.0	185	8.2	9.5	10.6	--	0.0
12...	73.0	185	8.2	9.5	10.6	--	0.0
12...	75.0	185	8.2	9.5	10.6	--	0.0
12...	80.0	185	8.2	9.5	10.6	--	0.0
JUL							
17...	0.0	--	--	17.8	9.4	100	13
17...	0.50	--	--	--	--	90	--
17...	2.00	--	--	17.8	9.4	--	13
17...	3.60	--	--	--	--	60	--
17...	5.00	--	--	17.7	9.5	--	11
17...	8.90	--	--	--	--	30	--
17...	10.0	198	8.2	16.7	9.4	--	11
17...	14.8	--	--	--	--	15	--
17...	15.0	--	--	16.3	9.4	--	0.46
17...	20.0	198	8.2	16.2	9.4	--	0.92
17...	25.0	--	--	15.5	9.4	--	2.1
17...	30.0	--	--	14.8	9.5	--	2.1
17...	40.0	194	8.2	14.0	9.6	--	1.2
17...	50.0	--	--	13.4	9.5	--	0.71
17...	60.0	--	--	12.6	9.4	--	0.04
17...	70.0	183	8.1	12.2	9.4	--	<0.01
17...	80.0	--	--	11.8	9.3	--	<0.01
17...	90.0	--	--	11.6	9.3	--	<0.01
17...	100	185	8.1	11.2	9.3	--	<0.01
17...	110	--	--	10.2	9.3	--	<0.01
17...	120	--	--	9.4	9.3	--	0.08
17...	125	--	--	9.2	9.0	--	0.05
17...	130	--	--	9.0	8.9	--	<0.01
17...	135	205	8.0	9.0	9.0	--	<0.01
17...	136	205	8.0	9.0	9.0	--	<0.01
17...	140	--	--	9.0	9.0	--	<0.01
17...	146	--	--	9.0	9.0	--	<0.01

12300110 LAKE KOOCANUSA AT INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN, DISSOLVED (MG/L) (00300)	LIGHT INCIDENT PERCENT REMAINING AT DEPTH (00031)	LIGHT TRANSMISSION 1 METER PATHLENGTH (%) (00074)
AUG							
14...	0.0	206	8.7	20.7	9.1	100	32
14...	0.50	--	--	--	--	90	--
14...	2.00	207	8.6	20.7	9.1	--	30
14...	4.30	--	--	--	--	60	--
14...	5.00	206	8.6	20.7	9.1	--	28
14...	10.0	208	8.6	20.7	9.1	--	30
14...	15.0	209	8.6	20.7	9.1	--	28
14...	15.4	--	--	--	--	30	--
14...	18.0	209	8.6	20.6	9.2	--	28
14...	20.0	206	8.6	19.0	10.6	--	24
14...	23.0	205	8.5	17.9	10.0	--	23
14...	25.0	207	8.4	17.5	9.8	--	23
14...	25.6	--	--	--	--	15	--
14...	30.0	206	8.3	17.0	9.5	--	25
14...	40.0	225	8.2	15.8	9.1	--	18
14...	43.0	--	--	--	--	5.0	--
14...	50.0	228	8.1	14.9	9.0	--	9.2
14...	60.0	220	8.1	14.3	9.0	--	6.3
14...	70.0	220	8.0	14.0	9.0	--	6.8
14...	80.0	205	8.0	12.2	9.1	--	14
14...	90.0	200	8.0	11.7	9.4	--	14
14...	100	205	8.0	11.4	9.4	--	11
14...	115	205	8.0	10.9	9.2	--	4.9
14...	120	209	8.0	10.6	8.9	--	4.9
14...	130	214	7.9	10.1	8.6	--	2.6
14...	132	220	7.9	9.6	8.3	--	--
14...	135	220	7.9	9.6	8.3	--	0.0
14...	140	220	7.9	9.6	8.2	--	--
14...	142	220	7.9	9.5	8.2	--	--
SEP							
18...	0.0	193	8.6	17.6	8.3	100	35
18...	0.50	--	--	--	--	90	--
18...	1.60	--	--	--	--	60	--
18...	2.00	194	8.5	17.7	8.3	--	33
18...	5.00	194	8.5	17.7	8.3	--	33
18...	10.0	194	8.5	17.7	8.3	--	32
18...	12.8	--	--	--	--	30	--
18...	15.0	194	8.5	17.7	8.3	--	32
18...	20.0	194	8.5	17.7	8.3	--	32
18...	25.0	192	8.5	17.7	8.3	--	32
18...	25.6	--	--	--	--	15	--
18...	30.0	194	8.5	17.7	8.3	--	32
18...	35.0	194	8.5	17.7	8.3	--	32
18...	40.0	198	8.4	17.5	8.0	--	33
18...	45.0	218	8.2	16.5	7.8	--	35
18...	50.0	220	8.2	16.3	7.8	--	35
18...	55.0	220	8.2	16.2	7.8	--	33
18...	60.0	220	8.1	15.4	7.4	--	25
18...	65.0	205	8.0	14.6	7.3	--	25
18...	68.9	--	--	--	--	5.0	--
18...	70.0	215	8.0	14.3	7.3	--	19
18...	75.0	210	8.0	14.0	7.3	--	27
18...	80.0	185	7.9	12.9	7.5	--	23
18...	85.0	185	7.9	12.2	7.6	--	21
18...	90.0	180	7.9	11.5	7.8	--	19
18...	95.0	185	7.9	11.1	7.6	--	17
18...	100	190	7.8	11.0	7.2	--	15
18...	105	190	7.8	10.8	7.0	--	15
18...	110	180	7.8	10.7	7.0	--	15
18...	115	185	7.8	10.6	7.0	--	14
18...	120	185	7.8	10.4	7.0	--	13
18...	125	185	7.8	10.2	7.0	--	5.3
18...	130	195	7.8	9.7	6.7	--	4.5
18...	135	195	7.8	9.6	6.7	--	4.5
18...	140	195	7.8	9.6	6.7	--	3.4
18...	143	195	7.8	9.6	6.7	--	3.4
18...	153	195	7.8	9.6	6.7	--	0.0

KOOTENAI RIVER BASIN

12301300 TOBACCO RIVER NEAR EUREKA, MT

LOCATION.--Lat 48°53'37", long 115°05'13", in NW1/4SE1/4SE1/4 sec.9, T.36 N., R.27 W., Lincoln County, Hydrologic Unit 17010101, on right bank 0.2 mi upstream from Indian Creek, 1.8 mi northwest of Eureka, and 2.8 mi upstream from Lake Koocanusa flow line.

DRAINAGE AREA.--440 mi^2.

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

GAGE.--Water-stage recorder. Datum of gage is 2,518.85 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Dec. 19 to Jan. 15, Jan. 20 to Feb. 1. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 4,500 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--33 years, 269 ft^3/s, 8.30 in/yr, 194,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,180 ft^3/s, May 13, 1991, gage height, 7.16 ft; minimum daily, 20 ft^3/s, Jan. 11, 1963.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of about May 22, 1948, reached a discharge of 2,810 ft^3/s, from slope-area measurement of peak flow at site 1.5 mi downstream.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,180 ft^3/s, May 13, gage height, 7.16 ft; minimum, 75 ft^3/s, Sept. 20,21, gage height, 2.19 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	116	213	291	e160	e130	168	240	605	948	820	231	96
2	116	192	277	e150	135	161	311	591	1060	807	237	96
3	116	173	254	e140	146	217	364	558	1170	829	219	96
4	123	167	254	e145	165	241	398	531	1170	857	207	96
5	135	162	252	e150	180	241	630	505	1040	835	198	94
6	140	157	230	e150	191	218	998	536	990	754	204	92
7	130	152	207	e160	181	201	927	643	1090	683	204	90
8	123	144	197	e160	194	192	668	797	1190	624	204	92
9	123	176	219	e160	195	184	545	1090	1090	600	195	96
10	142	318	269	e165	185	201	488	960	1060	653	192	94
11	140	383	309	e170	180	187	446	818	1210	624	192	90
12	135	335	290	e170	180	181	434	908	1300	563	187	88
13	135	290	254	e180	184	181	430	2510	1080	531	178	86
14	135	274	227	e175	187	176	471	2330	919	509	157	94
15	132	258	226	e175	191	176	531	1660	813	488	149	96
16	144	237	211	181	204	173	536	1390	759	454	147	88
17	140	222	205	176	219	167	545	1290	728	442	144	84
18	135	213	199	174	219	167	549	1610	693	438	147	82
19	136	198	e150	167	219	173	586	1890	678	410	137	80
20	130	195	e110	e160	252	176	663	1900	728	383	130	77
21	130	184	e80	e150	260	181	765	1640	813	364	123	81
22	130	184	e85	e140	255	189	863	1490	807	349	116	84
23	132	210	e100	e135	237	192	990	1420	786	332	112	84
24	130	282	e120	e130	232	192	935	1250	765	321	112	82
25	128	804	e130	e125	217	201	1280	1150	863	311	110	86
26	132	1150	e150	e125	216	189	1040	1040	891	307	108	80
27	135	625	e170	e125	222	176	818	948	868	261	106	78
28	135	424	e140	e120	211	184	713	902	879	249	102	80
29	132	380	e120	e110	---	176	648	914	868	240	106	92
30	132	341	e140	e120	---	181	619	931	868	228	102	92
31	184	---	e160	e125	---	201	---	943	---	216	100	---
TOTAL	4126	9043	6026	4673	5587	5843	19431	35750	28124	15482	4856	2646
MEAN	133	301	194	151	200	188	648	1153	937	499	157	88.2
MAX	184	1150	309	181	260	241	1280	2510	1300	857	237	96
MIN	116	144	80	110	130	161	240	505	678	216	100	77
AC-FT	8180	17940	11950	9270	11080	11590	38540	70910	55780	30710	9630	5250
CFSM	.30	.69	.44	.34	.45	.43	1.47	2.62	2.13	1.14	.36	.20
IN.	.35	.76	.51	.40	.47	.49	1.64	3.02	2.38	1.31	.41	.22

CAL YR 1990 TOTAL 151067 MEAN 414 MAX 2070 MIN 80 AC-FT 299600 CFSM .94 IN. 12.77
WTR YR 1991 TOTAL 141587 MEAN 388 MAX 2510 MIN 77 AC-FT 280800 CFSM .88 IN. 11.97

e Estimated

KOOTENAI RIVER BASIN

12301830 LAKE KOOCANUSA AT TENMILE CREEK, NEAR LIBBY, MT

LOCATION.--Lat 48°35'06", long 115°13'52", in NW1/4NE1/4NW1/4 sec.33, T.33 N., R.28 W., Lincoln County, Hydrologic Unit 17010101, in middle of old channel at Tenmile Creek, and 20.1 mi northeast of Libby.

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	SAMPLING DEPTH (FEET) (00003)	WEATHER (WMO CODE NUMBER) (00041)	TEMPERATURE AIR (DEG C) (00020)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, TOTAL (MG/L AS N) (00600)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
OCT												
15...	1500	10.0	60	8.0	7.0	<0.01	<0.10	<0.01	--	0.001	0.003	1.3
15...	1600	252	60	--	3.0	<0.01	0.20	<0.01	0.50	0.005	0.002	1.4
APR												
18...	1500	10.0	1	9.0	6.4	<0.01	0.15	<0.01	--	0.003	0.001	2.3
18...	1600	110	1	--	6.2	<0.01	0.15	0.01	--	0.001	0.003	1.3
MAY												
13...	1400	10.0	2	15.0	6.9	<0.01	0.20	0.03	1.0	0.029	<0.001	2.8
13...	1500	134	2	--	6.8	<0.01	0.14	0.03	--	0.006	<0.001	2.9
JUN												
11...	1500	10.0	--	21.0	6.0	0.01	0.13	0.02	0.33	0.014	0.004	2.7
11...	1600	193	--	--	6.9	<0.01	0.19	0.01	0.49	0.013	0.004	1.6
JUL												
16...	1230	10.0	--	22.0	4.6	0.01	<0.05	0.04	--	0.006	<0.001	2.0
16...	1332	266	--	--	7.3	0.01	0.21	0.03	0.41	0.014	<0.001	1.9
AUG												
13...	1430	10.0	1	25.0	4.0	<0.01	<0.05	0.01	--	0.001	0.001	1.8
13...	1530	277	1	--	7.1	<0.01	0.19	<0.01	0.49	0.005	0.004	1.7
SEP												
17...	1100	10.0	--	14.0	3.5	<0.01	<0.05	<0.01	--	0.002	<0.001	1.6
17...	1200	272	--	--	7.5	<0.01	0.22	<0.01	--	0.012	0.006	1.8

DATE	TIME	SAMPLING DEPTH (FEET) (00003)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)
APR										
18...	1500	10.0	150	40	12	5.1	0.2	0.70	131	25
18...	1600	110	160	42	13	5.0	0.2	0.70	133	26
AUG										
13...	1430	10.0	100	29	7.1	1.6	0.1	0.40	93	9.0
13...	1530	277	150	41	12	4.2	0.1	0.60	128	26

DATE	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	ARSENIC TOTAL (UG/L AS AS) (01002)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)
APR									
18...	4.6	<0.10	172	0.23	<1	190	1	60	<10
18...	5.2	0.10	178	0.24	<1	310	2	80	<10
AUG									
13...	0.50	0.10	107	0.15	<1	<10	2	<10	10
13...	5.9	0.10	174	0.24	<1	110	2	10	<10

KOOTENAI RIVER BASIN

12301830 LAKE KOOCANUSA AT TENMILE CREEK, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	SAMPLING DEPTH (FEET) (00003)	CHLOR-A PHYTOPLANKTON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTOPLANKTON CHROMO FLUOROM (UG/L) (70954)
OCT			
15...	0.50	0.803	<0.057
15...	13.1	0.609	<0.057
15...	55.8	0.692	<0.057
APR			
18...	0.50	1.47	<0.046
18...	5.00	5.25	<0.093
18...	25.0	3.59	<0.046
MAY			
13...	0.50	0.757	<0.125
13...	3.00	0.757	<0.125
13...	13.0	1.08	<0.125
JUN			
11...	0.50	1.73	<0.113
11...	5.30	3.46	<0.113
11...	25.9	1.13	<0.105
JUL			
16...	0.50	0.747	<0.089
16...	10.0	0.805	<0.089
16...	65.0	0.345	<0.089
AUG			
13...	0.50	0.353	<0.082
13...	16.0	0.762	<0.100
13...	75.0	0.234	<0.100
SEP			
17...	0.50	0.557	<0.100
17...	23.0	0.442	<0.100
17...	80.0	0.298	<0.100

DATE	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN, DISSOLVED (MG/L) (00300)	LIGHT INCIDENT PERCENT REMAINING AT DEPTH (00031)	LIGHT TRANSMISSION 1 METER PATHLENGTH (%) (00074)
OCT							
15...	0.0	206	8.3	12.4	9.0	100	41
15...	0.50	--	--	--	--	90	--
15...	2.00	206	8.3	12.4	9.0	--	39
15...	3.90	--	--	--	--	60	--
15...	5.00	203	8.3	12.4	9.0	--	39
15...	10.0	201	8.3	12.5	9.0	--	38
15...	13.1	--	--	--	--	30	--
15...	15.0	199	8.3	12.6	9.0	--	39
15...	20.0	197	8.3	12.7	9.0	--	38
15...	23.3	--	--	--	--	15	--
15...	30.0	193	8.3	12.7	9.0	--	37
15...	37.7	--	--	--	--	5.0	--
15...	40.0	190	8.3	12.7	9.0	--	37
15...	50.0	188	8.3	12.7	8.9	--	37
15...	55.8	--	--	--	--	1.0	--
15...	60.0	187	8.3	12.7	8.9	--	45
15...	70.0	186	8.3	12.7	8.9	--	43
15...	74.2	--	--	--	--	0.1	--
15...	80.0	182	8.0	11.3	8.4	--	52
15...	90.0	180	8.1	10.7	8.3	--	50
15...	100	179	8.1	10.0	8.2	--	50
15...	110	181	8.1	9.6	8.2	--	43
15...	120	183	8.1	9.0	8.3	--	24
15...	130	186	8.2	8.8	8.3	--	24
15...	140	186	8.2	8.5	8.3	--	24
15...	150	191	8.2	8.2	8.3	--	18
15...	160	192	8.2	7.9	8.3	--	18
15...	170	196	8.2	7.6	8.3	--	11
15...	180	199	8.2	7.1	8.3	--	9.8
15...	190	200	8.2	6.9	8.3	--	6.3
15...	200	206	8.2	6.3	8.3	--	4.9
15...	210	214	8.2	5.6	8.2	--	2.6
15...	220	222	8.2	5.0	8.2	--	3.1
15...	230	228	8.2	4.8	8.1	--	2.3
15...	240	229	8.2	4.5	8.0	--	4.1
15...	250	233	8.3	4.4	8.0	--	2.1
15...	252	233	8.2	4.4	7.8	--	2.1
15...	260	234	8.2	4.4	7.7	--	--

KOOTENAI RIVER BASIN

12301830 LAKE KOOCANUSA AT TENMILE CREEK, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN, DISSOLVED (MG/L) (00300)	LIGHT INCIDENT PERCENT REMAINING AT DEPTH (00031)	LIGHT TRANSMISSION 1 METER PATHLENGTH (%) (00074)
APR							
18...	0.0	--	--	--	--	100	--
18...	0.50	--	--	--	--	90	--
18...	2.00	--	--	--	12.0	60	1.2
18...	5.00	320	--	5.1	12.0	30	0.92
18...	9.00	--	--	--	--	15	--
18...	10.0	320	8.1	5.0	12.1	--	0.81
18...	15.0	323	--	5.0	12.1	--	1.1
18...	15.5	--	--	--	--	5.0	--
18...	20.0	323	--	4.9	12.1	--	0.92
18...	25.0	322	--	4.8	12.1	1.0	1.1
18...	30.0	321	--	4.7	12.1	--	0.92
18...	40.0	321	--	4.7	12.1	--	1.7
18...	50.0	322	--	4.5	12.0	--	1.9
18...	60.0	318	--	4.1	12.0	--	3.8
18...	70.0	318	--	4.1	12.0	--	3.8
18...	80.0	319	--	4.0	12.0	--	2.3
18...	90.0	320	--	3.8	11.9	--	1.7
18...	100	322	--	3.8	11.8	--	1.2
18...	110	322	8.0	3.7	11.6	--	0.46
18...	120	322	--	3.7	11.6	--	--
MAY							
13...	0.0	264	8.1	9.3	10.2	100	0.28
13...	0.50	--	--	--	--	90	--
13...	1.30	--	--	--	--	60	--
13...	2.00	263	--	9.1	10.1	--	<0.01
13...	3.00	--	--	--	--	30	--
13...	4.90	--	--	--	--	15	--
13...	5.00	260	--	8.8	10.1	--	<0.01
13...	7.20	--	--	--	--	5.0	--
13...	10.0	255	8.1	8.7	10.1	--	<0.01
13...	13.0	--	--	--	--	1.0	--
13...	15.0	253	--	8.5	10.1	--	<0.01
13...	20.0	254	--	8.5	10.1	--	<0.01
13...	25.0	255	--	8.4	10.2	--	<0.01
13...	30.0	256	8.1	8.0	10.2	--	0.02
13...	40.0	266	--	7.4	10.2	--	0.04
13...	50.0	266	--	7.0	10.2	--	<0.01
13...	60.0	273	8.1	6.7	10.4	--	0.46
13...	70.0	275	--	6.2	10.5	--	7.9
13...	80.0	276	--	5.9	10.6	--	9.2
13...	90.0	280	8.1	5.6	10.7	--	9.8
13...	100	282	--	5.3	10.6	--	7.9
13...	110	284	--	5.2	10.6	--	1.5
13...	120	286	--	5.0	10.6	--	0.23
13...	130	288	--	5.0	10.7	--	<0.01
13...	134	290	8.0	5.0	10.7	--	<0.01
13...	144	290	--	5.0	10.7	--	--
JUN							
11...	0.0	204	8.6	15.0	10.6	100	1.7
11...	0.50	--	--	--	--	90	--
11...	2.00	205	8.6	15.0	10.6	60	1.7
11...	5.00	206	8.6	14.9	10.7	--	1.5
11...	5.30	--	--	--	--	30	--
11...	8.50	--	--	--	--	15	--
11...	10.0	207	8.5	13.3	10.5	--	1.5
11...	13.8	--	--	--	--	5.0	--
11...	15.0	205	8.4	12.5	10.4	--	1.2
11...	20.0	206	8.3	12.2	10.4	--	1.1
11...	25.0	204	8.3	12.1	10.3	--	1.1
11...	25.9	--	--	--	--	1.0	--
11...	30.0	203	8.3	11.8	10.3	--	0.71
11...	40.0	202	8.3	11.4	10.3	--	0.08
11...	50.0	198	8.3	10.7	10.3	--	<0.01
11...	60.0	199	8.2	9.7	10.3	--	<0.01
11...	70.0	200	8.2	9.4	10.3	--	<0.01
11...	80.0	200	8.2	9.1	10.3	--	<0.01
11...	90.0	200	8.2	8.9	10.3	--	<0.01
11...	100	204	8.2	8.6	10.3	--	<0.01
11...	110	205	8.1	8.4	10.3	--	<0.01
11...	120	205	8.1	8.3	10.3	--	<0.01
11...	130	214	8.1	8.1	10.2	--	<0.01
11...	140	221	8.1	7.8	10.1	--	0.01
11...	150	243	8.1	7.5	10.0	--	0.05
11...	160	252	8.1	7.1	9.9	--	0.81
11...	170	262	8.1	6.6	10.1	--	0.81
11...	180	276	8.1	6.1	10.0	--	0.92
11...	190	275	8.0	5.7	10.0	--	0.46
11...	193	275	8.0	5.7	10.0	--	0.46
11...	200	276	8.0	5.4	9.9	--	0.28

KOOTENAI RIVER BASIN

12301830 LAKE KOOCANUSA AT TENMILE CREEK, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN, DISSOLVED (MG/L) (00300)	LIGHT INCIDENT PERCENT REMAINING AT DEPTH (00031)	LIGHT TRANSMISSION 1 METER PATHLENGTH (%) (00074)
JUL							
16...	0.0	198	8.7	18.9	9.3	100	37
16...	0.50	--	--	--	--	90	--
16...	2.00	198	8.7	18.9	9.3	--	35
16...	4.60	--	--	--	--	60	--
16...	5.00	198	8.7	18.0	9.5	--	35
16...	10.0	197	8.7	17.0	9.8	30	35
16...	15.0	197	8.5	16.0	9.7	--	32
16...	20.0	195	8.4	14.3	9.5	--	43
16...	25.0	192	8.3	13.6	9.5	--	39
16...	27.9	--	--	--	--	15	--
16...	30.0	192	8.3	13.2	9.4	--	32
16...	32.8	--	--	--	--	5.0	--
16...	40.0	186	8.2	12.5	9.4	--	13
16...	50.0	188	8.2	12.1	9.5	--	11
16...	60.0	184	8.2	11.7	9.5	--	7.9
16...	65.0	--	--	--	--	1.0	--
16...	70.0	196	8.2	11.0	9.5	--	13
16...	80.0	198	8.2	10.7	9.5	--	13
16...	90.0	210	8.1	10.3	9.5	--	14
16...	100	207	8.1	10.1	9.5	--	12
16...	110	200	8.1	10.0	9.6	--	8.5
16...	120	195	8.1	9.7	9.6	--	4.5
16...	130	194	8.1	9.6	9.6	--	2.3
16...	140	190	8.1	9.3	9.6	--	0.71
16...	150	190	8.1	9.2	9.7	--	0.53
16...	160	200	8.1	9.1	9.6	--	0.39
16...	170	200	8.0	8.9	9.6	--	0.28
16...	180	200	8.0	8.9	9.6	--	0.23
16...	190	200	8.0	8.8	9.6	--	0.13
16...	200	200	8.0	8.5	9.5	--	0.08
16...	210	210	8.0	8.3	9.3	--	0.05
16...	220	210	7.9	7.9	9.3	--	0.46
16...	230	220	7.9	7.3	9.3	--	0.39
16...	240	260	7.9	6.5	9.3	--	0.16
16...	250	265	7.9	6.1	9.2	--	0.10
16...	260	270	8.0	5.9	9.1	--	0.07
16...	266	280	7.9	5.7	8.8	--	<0.01
16...	270	280	7.9	5.7	8.8	--	<0.01
16...	276	280	7.9	5.5	8.8	--	<0.01
AUG							
13...	0.0	203	8.6	20.9	9.2	100	52
13...	0.50	--	--	--	--	90	--
13...	2.00	202	8.6	20.8	9.4	--	50
13...	3.60	--	--	--	--	60	--
13...	5.00	203	8.6	20.5	9.4	--	50
13...	10.0	204	8.6	20.5	9.4	--	50
13...	15.0	204	8.6	20.4	9.4	--	50
13...	16.0	--	--	--	--	30	--
13...	20.0	203	8.6	19.9	9.5	--	48
13...	25.0	203	8.5	19.3	9.7	--	45
13...	26.2	--	--	--	--	15	--
13...	30.0	203	8.2	15.7	9.4	--	50
13...	40.0	202	8.0	14.2	9.3	--	52
13...	47.5	--	--	--	--	5.0	--
13...	50.0	202	8.0	13.6	9.2	--	50
13...	60.0	197	8.0	12.6	9.3	--	45
13...	70.0	196	8.0	12.3	9.3	--	41
13...	75.0	--	--	--	--	1.0	--
13...	80.0	196	7.9	11.8	9.3	--	37
13...	90.0	198	7.9	11.5	9.4	--	37
13...	100	207	7.9	11.0	9.5	--	45
13...	115	212	7.9	10.1	9.6	--	30
13...	130	213	8.0	9.8	9.7	--	21
13...	145	214	8.0	9.6	9.7	--	7.9
13...	160	217	8.0	9.4	9.7	--	9.8
13...	175	221	8.0	9.0	9.8	--	5.3
13...	190	224	7.9	8.5	9.7	--	1.1
13...	205	243	7.9	8.0	9.5	--	0.23
13...	220	256	7.9	7.4	9.4	--	0.46
13...	235	273	7.8	6.4	9.2	--	2.1
13...	250	303	7.8	5.8	8.8	--	1.3
13...	265	306	7.8	5.7	8.7	--	1.1
13...	277	310	7.8	5.6	8.7	--	--

12301830 LAKE KOOCANUSA AT TENMILE CREEK, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN, DISSOLVED (MG/L) (00300)	LIGHT INCIDENT PERCENT REMAINING AT DEPTH (00031)	LIGHT TRANSMISSION 1 METER PATHLENGTH (%) (00074)
SEP							
17...	0.0	192	8.5	17.1	8.6	100	50
17...	0.50	--	--	--	--	90	--
17...	2.00	192	8.5	17.1	8.7	--	50
17...	2.60	--	--	--	--	60	--
17...	5.00	193	8.5	17.1	8.7	--	50
17...	10.0	193	8.5	17.1	8.7	--	50
17...	15.0	193	8.5	17.1	8.7	--	50
17...	20.0	193	8.5	17.1	8.7	--	50
17...	23.0	--	--	--	--	30	--
17...	25.0	193	8.5	17.0	8.7	--	50
17...	30.0	193	8.5	17.0	8.7	--	50
17...	32.0	--	--	--	--	15	--
17...	40.0	193	8.5	17.0	8.7	--	48
17...	50.0	194	8.3	16.4	8.4	--	48
17...	55.0	194	8.1	15.3	7.8	5.0	45
17...	60.0	192	8.0	14.2	8.0	--	43
17...	65.0	192	7.9	13.6	8.0	--	43
17...	70.0	183	7.9	13.1	8.1	--	43
17...	80.0	178	7.9	12.4	8.2	1.0	43
17...	90.0	183	7.8	11.7	8.3	--	41
17...	100	180	7.9	11.0	8.5	--	37
17...	110	187	7.9	10.6	8.7	--	35
17...	120	187	7.9	10.1	8.9	--	33
17...	130	192	7.9	9.7	9.0	--	30
17...	140	191	7.9	9.5	9.0	--	30
17...	155	190	7.9	9.2	9.1	--	27
17...	170	185	7.9	9.0	9.1	--	16
17...	185	195	7.8	8.7	9.0	--	4.9
17...	200	195	7.8	8.4	8.8	--	1.1
17...	215	205	7.8	7.8	8.7	--	0.13
17...	230	245	7.7	6.7	8.3	--	2.1
17...	245	258	7.7	5.9	7.8	--	1.5
17...	260	262	7.7	5.7	7.6	--	3.4
17...	272	262	7.7	5.6	7.6	--	0.0
17...	282	262	7.7	5.6	7.6	--	--

KOOTENAI RIVER BASIN

12301919 LAKE KOOCANUSA AT FOREBAY, NEAR LIBBY, MT

LOCATION.--Lat 48°24'43", long 115°18'35", in SW1/4NW1/4NE1/4 sec.33, T.31 N., R.29 W., Lincoln County, Hydrologic Unit 17010101, in middle of old channel 0.2 mi upstream from Libby Dam, and 11.6 mi east of Libby.

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	SAMPLING DEPTH (FEET) (00003)	WEATHER (WMO CODE NUMBER) (00041)	TEMPERATURE AIR (DEG C) (00020)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, TOTAL (MG/L AS N) (00600)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
OCT												
15...	1130	10.0	60	8.0	3.2	<0.01	<0.10	<0.01	--	0.004	0.002	1.3
15...	1230	314	60	--	6.7	<0.01	0.10	<0.01	0.40	0.010	0.003	1.8
APR												
18...	1100	10.0	1	7.5	6.0	<0.01	0.13	<0.01	--	<0.001	<0.001	1.6
18...	1200	180	1	--	6.1	<0.01	0.15	<0.01	--	<0.001	<0.001	1.3
MAY												
13...	1000	10.0	1	12.0	7.2	<0.01	0.12	<0.01	0.42	0.008	<0.001	2.9
13...	1100	194	1	--	6.5	<0.01	0.14	0.03	--	0.005	<0.001	1.8
JUN												
11...	1200	10.0	--	19.0	6.1	0.01	0.14	0.01	0.64	0.014	<0.001	2.6
11...	1300	275	--	--	6.5	0.01	0.16	0.01	0.46	0.016	0.004	1.7
JUL												
16...	1630	10.0	--	25.0	4.9	<0.01	<0.05	<0.01	--	0.005	<0.001	2.0
16...	1730	310	--	--	6.9	0.01	0.19	0.03	0.99	0.007	<0.001	1.4
AUG												
13...	1130	10.0	--	26.0	4.0	<0.01	<0.05	<0.01	--	<0.001	<0.001	1.9
13...	1230	322	--	--	6.8	<0.01	0.21	<0.01	0.41	0.004	0.004	1.5
SEP												
17...	1430	10.0	1	20.0	3.4	<0.01	<0.05	<0.01	--	0.003	<0.001	1.5
17...	1530	305	1	--	5.1	<0.01	0.20	<0.01	--	0.004	<0.001	2.1

DATE	TIME	SAMPLING DEPTH (FEET) (00003)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)
APR							
18...	1100	10.0	150	40	12	4.6	0.2
18...	1200	180	150	41	12	4.6	0.2
AUG							
13...	1130	10.0	100	29	7.1	1.7	0.1
13...	1230	322	150	42	12	4.6	0.2

DATE	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)
APR							
18...	0.70	124	22	4.7	0.1	164	0.22
18...	0.70	129	26	4.9	0.1	173	0.23
AUG							
13...	0.40	91	10	0.60	0.1	107	0.15
13...	0.70	128	27	6.1	0.1	176	0.24

12301919 LAKE KOOCANUSA AT FOREBAY, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN, DISSOLVED (MG/L) (00300)	LIGHT INCIDENT PERCENT REMAINING AT DEPTH (00031)	LIGHT TRANSMISSION 1 METER PATHLENGTH (%) (00074)
OCT							
15...	0.0	197	8.2	12.3	9.0	100	37
15...	0.50	--	--	--	--	90	--
15...	2.00	197	8.2	12.4	9.0	--	35
15...	3.90	--	--	--	--	60	--
15...	5.00	201	8.2	12.4	9.0	--	35
15...	10.0	207	8.2	12.4	9.0	--	33
15...	13.0	--	--	--	--	30	--
15...	15.0	207	8.2	12.4	9.0	--	33
15...	20.0	204	8.2	12.4	9.0	--	33
15...	23.5	--	--	--	--	15	--
15...	25.0	201	8.2	12.4	9.0	--	33
15...	30.0	198	8.2	12.4	9.0	--	37
15...	37.5	--	--	--	--	5.0	--
15...	40.0	195	8.2	12.4	8.9	--	37
15...	50.0	191	8.2	12.4	8.9	--	33
15...	56.0	--	--	--	--	1.0	--
15...	60.0	186	8.0	11.8	8.8	--	43
15...	70.0	181	8.0	10.7	8.5	--	55
15...	75.5	--	--	--	--	0.1	--
15...	80.0	182	8.0	10.3	8.4	--	60
15...	90.0	183	8.0	10.0	8.4	--	60
15...	100	186	8.0	9.6	8.4	--	57
15...	110	189	8.0	9.3	8.6	--	57
15...	120	189	8.1	8.8	8.6	--	50
15...	130	190	8.1	8.5	8.7	--	50
15...	140	190	8.1	7.9	8.8	--	45
15...	150	192	8.1	7.7	8.8	--	43
15...	165	194	8.1	7.3	8.9	--	43
15...	180	204	8.1	6.8	8.9	--	39
15...	195	210	8.0	6.2	8.9	--	30
15...	210	220	8.0	5.8	8.9	--	24
15...	225	228	8.0	5.0	8.8	--	24
15...	240	233	7.9	4.5	8.8	--	21
15...	255	233	7.9	4.3	8.8	--	16
15...	270	234	7.9	4.2	8.7	--	16
15...	285	235	7.8	4.1	8.6	--	14
15...	300	235	7.8	4.0	--	--	--
15...	314	235	7.8	4.0	--	--	--
15...	324	235	7.8	4.0	--	--	--

KOOTENAI RIVER BASIN

12301919 LAKE KOOCANUSA AT FOREBAY, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN, DISSOLVED (MG/L) (00300)	LIGHT INCIDENT PERCENT REMAINING AT DEPTH (00031)	LIGHT TRANSMISSION 1 METER PATHLENGTH (%) (00074)
APR							
18...	0.0	300	--	3.8	11.7	100	14
18...	0.50	--	--	--	--	90	--
18...	2.00	301	--	3.6	11.5	--	13
18...	2.50	--	--	--	--	60	--
18...	3.50	--	--	--	--	30	--
18...	5.00	301	--	3.6	11.6	--	13
18...	10.0	300	8.1	3.5	11.5	--	14
18...	13.0	--	--	--	--	15	--
18...	15.0	298	--	3.5	11.7	--	17
18...	20.0	297	--	3.4	11.7	--	17
18...	21.0	--	--	--	--	5.0	--
18...	25.0	294	--	3.4	11.6	--	15
18...	30.0	294	--	3.4	11.6	--	15
18...	40.0	292	--	3.4	11.7	--	15
18...	50.0	292	--	3.5	11.9	--	13
18...	60.0	291	--	3.5	11.8	--	13
18...	70.0	290	--	3.5	11.8	--	13
18...	80.0	290	--	3.5	11.8	--	13
18...	90.0	290	--	3.5	11.8	--	13
18...	100	290	8.1	3.5	11.7	--	12
18...	110	290	--	3.5	11.7	--	18
18...	120	290	--	3.4	11.7	--	17
18...	130	293	--	3.3	11.4	--	15
18...	140	296	--	3.3	11.4	--	14
18...	150	297	--	3.2	11.2	--	11
18...	160	298	--	3.2	11.3	--	11
18...	170	299	--	3.2	11.3	--	11
18...	180	299	--	3.2	11.2	--	8.5
MAY							
13...	0.0	308	--	9.7	11.1	100	3.4
13...	0.50	--	--	--	--	90	--
13...	2.00	312	--	9.7	11.1	--	3.1
13...	2.60	--	--	--	--	60	--
13...	5.00	312	--	9.6	11.1	--	2.6
13...	6.60	--	--	--	--	30	--
13...	9.80	--	--	--	--	15	--
13...	10.0	310	8.2	9.5	11.0	--	2.6
13...	15.0	311	--	9.3	11.0	--	2.8
13...	15.7	--	--	--	--	5.0	--
13...	20.0	308	--	9.3	10.9	--	2.8
13...	25.0	307	--	8.8	10.9	1.0	3.1
13...	30.0	306	--	8.7	10.9	--	3.1
13...	36.0	--	--	--	--	0.1	--
13...	40.0	304	--	8.5	10.8	--	3.1
13...	50.0	302	8.1	8.2	10.8	--	3.8
13...	65.0	298	--	7.2	10.7	--	7.3
13...	80.0	299	--	6.4	10.8	--	11
13...	95.0	302	8.1	5.5	10.8	--	20
13...	110	305	--	5.0	10.8	--	20
13...	125	307	--	4.8	10.8	--	18
13...	140	309	--	4.6	10.8	--	19
13...	155	312	8.0	4.5	10.8	--	19
13...	170	318	--	4.4	10.8	--	9.2
13...	185	319	--	4.3	10.7	--	3.4
13...	194	319	7.9	4.3	10.7	--	1.1
13...	204	--	--	4.3	--	--	--

12301919 LAKE KOOCANUSA AT FOREBAY, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN, DISSOLVED (MG/L) (00300)	LIGHT INCIDENT PERCENT REMAINING AT DEPTH (00031)	LIGHT TRANSMISSION 1 METER PATHLENGTH (%) (00074)
JUN							
11...	0.0	210	8.4	14.4	10.2	100	2.1
11...	0.50	--	--	--	--	90	--
11...	2.00	209	8.4	14.4	10.3	60	1.9
11...	4.00	--	--	--	--	30	--
11...	5.00	208	8.4	12.2	10.5	--	1.7
11...	7.00	--	--	--	--	15	--
11...	10.0	207	8.3	11.8	10.3	--	1.2
11...	12.0	--	--	--	--	5.0	--
11...	15.0	206	8.2	11.3	10.2	--	0.81
11...	18.5	--	--	--	--	1.0	--
11...	20.0	206	8.2	11.0	10.2	--	0.46
11...	24.5	--	--	--	--	0.1	--
11...	25.0	204	8.2	11.0	10.2	--	0.33
11...	30.0	208	8.2	10.6	10.2	--	0.23
11...	40.0	207	8.2	10.1	10.0	--	0.13
11...	50.0	204	8.2	10.0	10.2	--	0.07
11...	60.0	203	8.1	9.6	10.3	--	0.01
11...	70.0	206	8.1	9.4	10.2	--	<0.01
11...	80.0	207	8.1	9.1	10.2	--	<0.01
11...	90.0	200	8.1	9.0	10.2	--	<0.01
11...	100	200	8.1	8.9	10.2	--	<0.01
11...	115	215	8.0	8.6	10.1	--	<0.01
11...	130	218	8.0	8.5	10.1	--	<0.01
11...	145	230	8.1	8.2	10.1	--	0.16
11...	160	240	8.1	7.9	10.1	--	3.4
11...	175	263	8.1	6.7	10.5	--	23
11...	190	269	8.1	5.7	10.7	--	35
11...	210	274	8.1	5.0	10.6	--	24
11...	225	274	8.1	4.9	10.5	--	19
11...	240	275	8.1	4.7	10.4	--	9.2
11...	255	275	8.1	4.7	10.3	--	2.6
11...	270	275	8.1	4.6	10.1	--	1.2
11...	275	275	8.1	4.6	10.1	--	1.2
11...	285	275	8.1	4.6	10.0	--	--
JUL							
16...	0.0	--	--	19.0	10.8	100	50
16...	0.50	--	--	--	--	90	--
16...	2.00	--	--	19.0	10.5	--	50
16...	3.30	--	--	--	--	60	--
16...	5.00	--	--	18.0	11.0	--	50
16...	10.0	203	8.2	16.5	11.3	--	43
16...	15.0	--	--	15.0	11.2	--	45
16...	15.1	--	--	--	--	30	--
16...	20.0	--	--	14.0	10.8	--	43
16...	23.3	--	--	--	--	15	--
16...	25.0	--	--	13.2	10.7	--	41
16...	30.0	--	--	12.8	10.4	--	37
16...	40.0	--	--	12.0	10.3	--	30
16...	42.3	--	--	--	--	5.0	--
16...	50.0	200	8.3	11.8	10.3	--	30
16...	60.0	--	--	11.3	10.4	--	32
16...	70.0	--	--	11.0	10.2	--	30
16...	80.0	--	--	11.5	10.4	--	23
16...	90.0	--	--	10.0	10.3	--	16
16...	100	203	8.2	9.9	10.3	--	9.2
16...	115	--	--	9.4	10.4	--	3.1
16...	130	203	8.3	9.0	10.4	--	1.3
16...	145	--	--	9.0	10.4	--	0.62
16...	160	--	--	8.9	10.6	--	0.33
16...	175	216	8.2	8.4	10.4	--	0.19
16...	190	--	--	8.0	10.4	--	0.33
16...	205	--	--	7.0	10.4	--	0.71
16...	220	271	8.2	6.5	10.6	--	2.1
16...	235	--	--	6.0	10.6	--	7.3
16...	250	292	8.2	5.2	10.6	--	12
16...	265	--	--	5.0	10.4	--	13
16...	280	--	--	5.0	10.2	--	14
16...	290	--	--	--	--	--	13
16...	310	292	8.1	5.0	10.0	--	13

KOOTENAI RIVER BASIN

12301919 LAKE KOOCANUSA AT FOREBAY, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN, DISSOLVED (MG/L) (00300)	LIGHT INCIDENT PERCENT REMAINING AT DEPTH (00031)	LIGHT TRANSMISSION 1 METER PATHLENGTH (%) (00074)
AUG							
13...	0.0	206	8.6	20.3	9.3	100	43
13...	0.50	--	--	--	--	90	--
13...	2.00	206	8.6	20.2	9.4	--	43
13...	5.00	206	8.6	20.2	9.5	60	41
13...	10.0	206	8.6	19.7	9.9	--	35
13...	15.0	206	8.5	19.3	10.0	--	30
13...	16.4	--	--	--	--	30	--
13...	20.0	205	8.5	18.9	10.0	--	32
13...	25.0	205	8.4	18.1	9.8	--	33
13...	25.6	--	--	--	--	15	--
13...	30.0	204	8.3	16.4	9.7	--	33
13...	33.8	--	--	--	--	5.0	--
13...	40.0	202	8.1	14.7	9.6	--	43
13...	50.0	200	8.0	13.5	9.5	--	35
13...	60.0	198	7.9	12.8	9.3	--	32
13...	70.0	197	7.9	12.3	9.3	--	28
13...	80.0	198	7.9	11.9	9.3	--	28
13...	90.0	205	7.9	11.5	9.3	--	28
13...	100	210	7.9	11.1	9.4	--	43
13...	115	212	7.9	10.3	9.6	--	33
13...	130	212	7.9	9.7	9.7	--	17
13...	145	216	7.9	9.3	9.8	--	11
13...	160	218	7.9	9.2	9.8	--	5.8
13...	175	220	7.9	8.9	9.8	--	2.3
13...	190	223	7.9	8.8	9.8	--	1.9
13...	205	229	7.9	8.5	9.8	--	1.1
13...	220	242	7.9	8.1	9.7	--	1.9
13...	235	275	7.9	6.9	9.7	--	6.8
13...	250	295	7.9	5.7	9.8	--	17
13...	265	297	7.9	5.4	9.7	--	17
13...	280	297	7.9	5.4	9.6	--	17
13...	295	298	7.9	5.2	9.5	--	14
13...	310	298	7.9	5.1	9.4	--	--
13...	322	298	7.9	5.1	9.4	--	--
SEP							
17...	0.0	185	8.5	17.4	8.7	100	52
17...	0.50	--	--	--	--	90	--
17...	2.00	185	8.5	17.4	8.7	--	52
17...	5.00	186	8.5	17.4	8.7	--	50
17...	5.90	--	--	--	--	60	--
17...	10.0	186	8.5	17.4	8.7	--	55
17...	15.0	186	8.5	17.3	8.7	--	55
17...	19.0	--	--	--	--	30	--
17...	20.0	187	8.5	17.3	8.7	--	55
17...	25.0	187	8.5	17.3	8.7	--	50
17...	30.0	187	8.5	17.2	8.7	--	50
17...	32.0	--	--	--	--	15	--
17...	40.0	187	8.5	17.2	8.7	--	52
17...	50.0	187	8.5	17.2	8.7	--	55
17...	60.0	187	8.2	15.4	8.4	--	55
17...	63.0	--	--	--	--	5.0	--
17...	70.0	182	8.0	13.6	8.1	--	55
17...	80.0	174	7.9	12.4	8.2	--	60
17...	90.0	174	7.9	11.9	8.4	--	63
17...	100	178	7.9	11.4	8.5	--	63
17...	115	185	7.9	11.0	8.6	--	63
17...	130	185	7.9	10.3	8.8	--	57
17...	145	186	7.9	9.9	8.7	--	52
17...	160	186	8.0	9.5	9.1	--	43
17...	175	189	8.0	9.3	9.1	--	20
17...	190	192	8.0	8.9	9.2	--	13
17...	205	205	7.9	8.4	9.2	--	4.5
17...	220	210	7.9	8.0	9.0	--	3.4
17...	235	240	7.9	7.0	8.8	--	5.3
17...	250	250	7.8	6.2	8.8	--	9.2
17...	265	260	7.9	5.6	8.7	--	13
17...	280	266	7.9	5.5	8.6	--	21
17...	295	264	7.9	5.3	8.5	--	24
17...	305	264	7.8	5.3	8.4	--	24

12301920 LAKE KOOCANUSA NEAR LIBBY, MT

LOCATION.--Lat 48°24'38", long 115°18'47", in NW1/4 sec.33, T.31 N., R.29 W., Lincoln County, Hydrologic Unit 17010101, Kootenai National Forest, in block 18 of Libby Dam on Kootenai River, 11 mi east of Libby and at river mile 221.8.

DRAINAGE AREA.--8,985 mi², approximately.

PERIOD OF RECORD.--March 1972 to current year.

GAGE.--Water-stage recorder. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to July 2, 1973, nonrecording gage on upstream face of dam at same datum.

REMARKS.--Reservoir and flow completely controlled by gravity type dam with taintor gated spillway; construction began in 1967; completed in 1973. Storage began Mar. 21, 1972. Usable capacity, 5,748,000 acre-ft between elevation 2,201.5 ft, bottom of sluice gate, and 2,459 ft, controlled spillway elevation. Dead storage, 121,200 acre-ft below elevation 2,201.5 ft. Minimum operating level, 768,700 acre-ft, elevation 2,287.0 ft for on-site power generation. Figures given herein represent usable contents. Water is used for power production, flood control, irrigation, and recreation.

COOPERATION.--Capacity table and elevations provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 5,753,000 acre-ft, Aug. 6, 1976 and Aug. 16, 1982, maximum elevation, 2,459.12 ft, Aug. 16, 1982; minimum contents observed since normal low operating level reached in May 1972, 139,600 acre-ft, Dec. 16-21, 1972, elevation, 2,226.5 ft.

EXTREMES FOR CURRENT YR.--Maximum contents, 5,744,000 acre-ft, Aug. 7, 8, elevation, 2,458.90 ft; minimum, 1,064,000 acre-ft, Apr. 2, elevation, 2,305.20 ft.

Capacity table (elevation, in feet, and contents, in acre-feet)

Elevation	Contents	Elevation	Contents
2,300	973,400		
2,320	1,338,000	2,400	3,367,000
2,340	1,759,000	2,420	4,085,000
2,360	2,232,000	2,440	4,899,000
2,380	2,765,000	2,460	5,795,000

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2453.12	2433.55	2431.73	2399.55	2356.96	2322.56	2305.55	2313.99	2384.58	2438.27	2458.31	2457.89
2	2452.31	2432.73	2431.87	2398.25	2355.48	2321.30	2305.20	2313.91	2387.41	2439.66	2458.29	2457.81
3	2451.43	2431.85	2431.34	2396.92	2354.05	2320.26	2305.28	2313.88	2390.26	2440.92	2458.46	2457.52
4	2451.64	2431.05	2430.62	2395.60	2352.65	2319.21	2305.47	2314.67	2393.03	2442.34	2458.63	2457.20
5	2450.03	2430.21	2429.93	2394.23	2351.24	2318.37	2305.93	2315.65	2395.47	2443.89	2458.69	2456.83
6	2450.03	2429.39	2429.29	2392.89	2350.05	2317.78	2306.38	2316.66	2397.39	2445.14	2458.82	2456.51
7	2449.98	2428.74	2428.50	2391.56	2348.91	2317.10	2306.46	2317.82	2399.04	2446.04	2458.90	2456.43
8	2449.46	2428.15	2427.55	2390.23	2347.78	2316.49	2306.34	2319.32	2401.06	2446.68	2458.90	2456.44
9	2448.74	2428.20	2426.56	2388.85	2346.58	2316.17	2306.06	2320.97	2403.19	2447.36	2458.52	2456.39
10	2448.13	2428.58	2425.66	2387.50	2345.41	2315.83	2305.90	2322.65	2405.25	2448.46	2458.60	2456.36
11	2447.31	2428.96	2424.74	2386.11	2344.07	2315.46	2305.96	2324.17	2407.58	2449.29	2458.70	2456.20
12	2446.53	2429.29	2423.87	2384.82	2342.76	2315.06	2305.98	2325.88	2410.28	2450.23	2458.75	2455.90
13	2446.28	2429.20	2422.83	2384.49	2341.41	2314.70	2306.34	2328.81	2412.54	2451.30	2458.72	2455.53
14	2446.15	2429.44	2421.70	2382.19	2340.05	2314.13	2306.84	2332.31	2414.18	2452.50	2458.68	2455.35
15	2445.39	2429.67	2420.58	2380.89	2338.68	2313.47	2306.96	2335.62	2415.43	2453.38	2458.62	2455.06
16	2444.57	2429.83	2419.48	2379.59	2337.36	2312.69	2306.87	2338.10	2416.38	2453.98	2458.52	2454.83
17	2443.77	2430.00	2418.37	2378.29	2336.00	2311.86	2306.74	2339.90	2417.05	2454.54	2458.63	2454.53
18	2442.93	2430.16	2417.34	2377.02	2334.69	2311.05	2306.66	2342.71	2417.87	2455.16	2458.74	2454.22
19	2442.15	2430.28	2416.03	2375.62	2333.31	2310.23	2306.62	2346.96	2418.58	2455.44	2458.65	2453.72
20	2441.82	2430.34	2414.74	2374.26	2332.00	2309.68	2307.30	2351.85	2419.55	2455.92	2458.58	2453.26
21	2441.44	2430.41	2413.47	2372.86	2330.80	2309.09	2308.12	2356.46	2420.92	2456.30	2458.53	2452.97
22	2440.63	2430.53	2412.21	2371.43	2329.73	2308.62	2308.37	2360.54	2422.50	2456.50	2458.43	2452.67
23	2439.78	2430.63	2410.93	2370.01	2328.81	2308.52	2308.65	2364.09	2424.05	2456.84	2458.31	2452.32
24	2438.95	2431.11	2409.66	2368.62	2327.76	2308.35	2309.15	2367.21	2425.65	2457.13	2458.41	2451.90
25	2438.13	2431.61	2408.44	2367.16	2326.76	2308.19	2310.03	2370.34	2427.08	2457.44	2458.46	2451.44
26	2437.26	2431.78	2407.12	2365.73	2325.71	2307.97	2310.68	2373.04	2428.80	2457.73	2458.56	2451.06
27	2437.09	2431.70	2406.02	2364.27	2324.63	2307.82	2312.21	2375.20	2430.66	2458.23	2458.54	2450.59
28	2436.84	2431.36	2404.66	2362.82	2323.74	2307.63	2313.56	2377.28	2432.54	2458.66	2458.53	2450.31
29	2436.00	2431.53	2403.30	2361.35	---	2307.05	2313.97	2378.78	2434.42	2458.75	2458.40	2450.02
30	2435.19	2431.58	2402.06	2359.88	---	2306.52	2314.06	2380.38	2436.40	2458.75	2458.21	2449.62
31	2434.35	---	2400.89	2358.40	---	2306.00	---	2382.19	---	2458.50	2458.07	---
MAX	2453.12	2433.55	2431.87	2399.55	2356.96	2322.56	2314.06	2382.19	2436.40	2458.75	2458.90	2457.89
MIN	2434.35	2428.15	2400.89	2358.40	2323.74	2306.00	2305.20	2313.88	2384.58	2438.27	2458.07	2449.62

CAL YR 1990 MAX 2458.99 MIN 2325.45
WTR YR 1991 MAX 2458.90 MIN 2305.20

†	4661	4546	3396	2192	1412	1078	1225	2827	4747	5725	5705	5320
††	-840000	-115000	-1150000	-1204000	-780000	-334000	+147000	+1602000	+1920000	+978000	-20000	-385000

CAL YR 1990 ..... †† +359000
WTR YR 1991 ..... †† -181000

† Contents, in thousands of acre-ft, at end of month.
††Change in contents, in acre-ft.

KOOTENAI RIVER BASIN

12301933 KOOTENAI RIVER BELOW LIBBY DAM, NEAR LIBBY, MT

LOCATION.--Lat 48°24'03", long 115°19'11", in SW1/4SW1/4SW1/4 sec.33, T.31 N., R.29 W., Lincoln County, Hydrologic Unit 17010101, Kootenai National Forest, on right bank 0.7 mi downstream from Libby Dam, 2.8 mi upstream from Fisher River, 11 mi east of Libby, and at river mile 221.4.
DRAINAGE AREA.--8,985 mi^2, approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1971 to current year.
GAGE.--Water-stage recorder. Datum of gage is 2,100.00 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Feb. 13, 1974, nonrecording gage at site 0.4 mi upstream at same datum.
REMARKS.--No estimated daily discharges. Water-discharge records excellent. Flow completely regulated by Lake Koocanusa since Mar. 21, 1972 (see preceding page). Diversions for irrigation of about 14,000 acres, from tributaries upstream from station in Canada and the United States. U.S. Army Corps of Engineers satellite telemeter at station.
AVERAGE DISCHARGE.--20 years, 11,210 ft^3/s, 16.94 in/yr, 8,122,000 acre-ft/yr, adjusted for change in contents in Lake Koocanusa since Mar. 21, 1972.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 47,200 ft^3/s, Aug. 5, 1974, gage height, 27.50 ft; minimum daily, 1,900 ft^3/s, Jan. 29, 1972.
EXTREMES FOR CURRENT YEAR.--Maximum discharge, 27,600 ft^3/s, Dec. 13, gage height, 24.23 ft; minimum daily, 3,750 ft^3/s, Apr. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16600	23300	3990	26600	22500	15800	8680	15500	9830	9690	24400	11800
2	23300	23300	3990	26300	22100	15900	7890	15500	9710	20100	18600	11700
3	23200	23300	16500	25800	22200	15800	6210	15000	15000	24700	11900	14900
4	23400	23300	20300	25800	22200	15700	5470	4990	17700	24900	11800	15900
5	22400	23300	20400	25600	22100	13400	7030	3960	15600	25600	15100	15900
6	7960	22800	20500	25400	20900	10900	11300	3940	16500	26300	13600	15700
7	7890	17100	21300	25400	19800	10700	11500	3980	17000	26100	14200	8590
8	17500	17400	26400	24900	19400	11000	12000	3950	17600	25500	16300	7910
9	22200	4590	26400	24700	19500	7870	12100	3980	17500	21800	24300	7850
10	21700	3990	26800	24900	19400	7920	10100	4000	17600	13800	13300	7860
11	23400	3980	27300	24600	20200	8010	7420	4010	15800	19900	13700	9960
12	23500	3940	25500	24500	20600	7840	7020	4000	16400	14800	13700	14200
13	10300	11700	27400	24400	20500	7710	3750	4000	17700	10300	14400	14600
14	8570	4300	27200	24300	20700	9980	3900	3960	17800	10000	13700	12100
15	23300	4010	27300	24100	20500	10200	7020	4000	17800	18200	13700	11800
16	23400	3990	27300	24000	20200	11300	8980	10800	17800	19000	13700	12600
17	23300	3970	27400	23600	20400	11800	9410	17800	17800	18000	9850	13700
18	23300	3990	27300	23800	20300	11600	9300	15100	14600	17000	9820	13700
19	23300	4000	27400	23900	20300	11600	9380	9980	14600	22400	13700	17600
20	12400	3980	27300	23800	20300	9870	3870	4740	12100	14100	13700	18400
21	12900	4000	27300	23800	19100	9390	3940	6780	8040	15300	13700	12200
22	23500	4020	27300	23600	17100	8100	11800	11700	7860	20100	13700	11800
23	23400	4060	27200	23400	15700	6060	15400	17100	7830	15200	13700	15200
24	23300	4000	27200	23300	15800	6020	15400	14700	7920	15100	7980	16600
25	23300	3990	27000	23100	15900	6090	15500	9340	11700	15100	7890	16000
26	23300	5670	26900	23100	15700	5810	15400	9410	8110	18100	7940	15200
27	9050	11600	26800	22900	15800	5790	4310	9340	7930	12100	8580	16500
28	9660	14200	26800	22700	15800	6000	4030	9470	6320	11500	9800	11900
29	23400	4410	26800	22500	---	8760	11800	14700	5980	18400	11900	11800
30	23300	4700	26700	22400	---	8970	15400	14400	6010	19800	13700	14800
31	23300	---	26700	22300	---	9160	---	14100	---	24800	11900	---
TOTAL	599330	290890	754680	749500	545000	305050	275310	284230	394140	567690	414260	398770
MEAN	19330	9696	24340	24180	19460	9840	9177	9169	13140	18310	13360	13290
MAX	23500	23300	27400	26600	22500	15900	15500	17800	17800	26300	24400	18400
MIN	7890	3940	3990	22300	15700	5790	3750	3940	5980	9690	7890	7850
AC-FT	1189000	577000	1497000	1487000	1081000	605100	546100	563800	781800	1126000	821700	791000
CFSM	2.15	1.08	2.71	2.69	2.17	1.10	1.02	1.02	1.46	2.04	1.49	1.48
IN.	2.48	1.20	3.12	3.10	2.26	1.26	1.14	1.18	1.63	2.35	1.72	1.65
MEAN †	5676	7764	5643	4602	5420	4409	11650	35220	45400	34220	13040	6823
CFSM †	.63	.86	.63	.51	.60	.49	1.30	3.92	5.05	3.81	1.45	.76
IN †	.73	.96	.72	.59	.63	.57	1.45	4.52	5.64	4.39	1.67	.85
AC-FT†	349000	462000	347000	283000	301000	271100	693100	2165800	2701800	2104000	801700	406000

OBSERVED

CAL YR 1990	TOTAL	4762000	MEAN	13050	MAX	27400	MIN	3930	AC-FT	9445000
WTR YR 1991	TOTAL	5578850	MEAN	15280	MAX	27400	MIN	3750	AC-FT	11070000

ADJUSTED

CAL YR 1990	TOTAL	4943032	MEAN	13540	CFSM	1.51	IN	20.46	AC-FT	9804500
CAL YR 1991	TOTAL	5488028	MEAN	15040	CFSM	1.67	IN	22.72	AC-FT	10885500

(†) Adjusted for change in contents in Lake Koocanusa.

12301933 KOOTENAI RIVER BELOW LIBBY DAM, NEAR LIBBY, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1967 to current year. Prior to March 25, 1974, at site, 3.2 mi downstream.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1967 to September 1969.
WATER TEMPERATURE: October 1967 to September 1977.
SUSPENDED SEDIMENT DISCHARGE: October 1967 to January 1976.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1968-69): Maximum, 525 microsiemens, Dec. 24, 1967; minimum, 174 microsiemens, May 26, 1969.
WATER TEMPERATURE (water years 1967-77): Maximum, 21.5°C, Aug. 6, 1970; minimum 0.0°C on many days during winter periods most years prior to Libby Dam.
SEDIMENT CONCENTRATION (water years 1967-76): Maximum daily mean, 1,200 mg/L, June 5, 1968; minimum daily mean, 1 mg/L on many days in 1968, 1969, 1972-75.
SEDIMENT LOAD (water years 1967-76): Maximum daily, 200,000 tons, June 5, 1968; minimum daily, 5.4 tons, Jan. 28, 1972.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRESSURE (MM OF HG) (00025)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)
OCT 16...	1400	23300	95	3	218	8.1	8.0	10.5	709	8.9	86
NOV 15...	1400	4010	95	3	212	7.9	7.0	9.5	720	8.8	82
DEC 14...	1000	27100	95	1	265	8.1	-1.0	7.5	712	10.1	90
JAN 16...	1100	23800	100	3	253	7.8	0.0	3.0	719	11.1	87
FEB 19...	1200	20400	100	3	270	8.2	3.0	2.0	709	11.5	89
MAR 19...	1000	15000	0	1	278	8.2	7.0	2.5	699	11.7	94
APR 19...	0800	7240	0	0	300	8.2	5.0	3.5	714	12.3	99
MAY 14...	0815	3910	50	1	298	8.3	8.5	7.5	710	10.4	93
JUN 12...	1445	19700	30	1	205	8.1	17.0	9.5	710	10.6	99
JUL 17...	1500	22400	100	51	184	8.0	18.5	11.5	711	9.3	92
AUG 14...	1430	13700	60	1	197	8.6	22.0	12.0	712	9.6	95
SEP 18...	1430	13800	10	1	207	8.1	16.0	13.5	717	8.6	88

DATE	BICARBONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CARBONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, TOTAL (MG/L AS N) (00600)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
OCT 16...	119	0	96	4.8	<0.01	<0.10	<0.01	--	0.005	0.002	1.7
NOV 15...	122	0	100	4.9	<0.01	0.10	<0.01	--	0.003	0.002	1.8
DEC 14...	130	0	105	5.0	<0.01	0.10	0.02	0.40	0.005	0.001	1.7
JAN 16...	129	0	104	4.3	<0.01	<0.10	<0.01	--	0.007	<0.001	1.3
FEB 19...	136	0	112	4.9	0.01	<0.10	<0.01	--	<0.001	<0.001	1.2
MAR 19...	139	0	116	5.2	<0.01	0.12	<0.01	--	0.003	<0.001	1.4
APR 19...	148	0	122	5.9	<0.01	0.14	<0.01	--	0.001	<0.001	2.0
MAY 14...	146	0	119	6.9	<0.01	0.14	0.02	0.64	0.007	<0.001	2.2
JUN 12...	122	0	98	5.9	0.02	0.19	0.02	--	0.021	0.001	2.5
JUL 17...	115	0	94	5.1	0.01	0.13	0.04	0.53	0.007	<0.001	1.9
AUG 14...	106	2	95	4.3	<0.01	0.10	0.01	--	0.002	<0.001	1.6
SEP 18...	110	0	91	3.9	<0.01	0.10	<0.01	1.0	0.009	<0.001	1.5

KOOTENAI RIVER BASIN

12301933 KOOTENAI RIVER BELOW LIBBY DAM, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)
APR										
19...	0800	150	42	12	4.8	0.2	0.60	140	24	4.8
AUG										
14...	1430	100	29	7.1	1.7	0.1	0.40	87	13	2.0

DATE	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	ARSENIC TOTAL (UG/L AS AS) (01002)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)
APR									
19...	0.1	167	0.23	3260	<1	110	3	40	<10
AUG									
14...	<0.1	112	0.15	4130	<1	40	--	<10	<10

KOOTENAI RIVER BASIN

12302055 FISHER RIVER NEAR LIBBY, MT

LOCATION.--Lat 48°21'20", long 115°18'50", in NW1/4 NE1/4NW1/4 sec.21, T.30 N., R.29 W., Lincoln County, Hydrologic Unit 17010102, on left bank 0.8 mi upstream from mouth and 11.4 mi east of Libby.

DRAINAGE AREA.--838 mi^2.

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

GAGE.--Water-stage recorder. Datum of gage is 2,134.10 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark).

REMARKS.--Estimated daily discharges: Dec. 20 to Feb. 4. Records good except those for estimated daily discharges, which are poor. Diversions of about 700 acres upstream from station. Several observations of water temperature and specific conductance were made during the year. U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--24 years, 492 ft^3/s, 7.98 in/yr, 356,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,720 ft^3/s, Jan 16, 1974, gage height, 9.29 ft; minimum, 29 ft^3/s, Jan. 2, 1977, gage height, 2.37 ft, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of about May 22, 1948, reached a discharge of 6,560 ft^3/s, by slope-area measurement at site 0.5 mi upstream.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,380 ft^3/s, Nov. 25, gage height, 7.82 ft; minimum, 99 ft^3/s, Oct. 1, gage height, 2.94 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	101	490	816	e310	e360	802	757	1410	1410	861	262	144
2	102	340	713	e310	e360	731	944	1350	1430	805	290	143
3	103	278	630	e290	e370	802	1140	1300	1470	786	267	141
4	115	249	586	e280	e380	1090	1340	1260	1350	783	248	140
5	165	240	591	e310	406	1070	2220	1200	1200	756	242	138
6	163	222	524	e310	522	968	3440	1210	1120	685	239	137
7	142	209	472	e300	563	912	3040	1340	1310	620	231	134
8	134	201	441	e330	591	860	2450	1620	1430	576	222	134
9	129	217	439	e340	608	811	2110	2080	1330	547	213	137
10	130	993	491	e340	609	798	1920	1950	1260	527	210	139
11	132	1060	618	e360	607	768	1740	1720	1380	505	204	136
12	128	703	667	e380	620	722	1600	1830	1540	480	201	136
13	136	554	653	e420	642	693	1530	2370	1240	465	195	134
14	136	508	626	e450	648	665	1530	2350	1070	459	192	138
15	135	451	572	e440	666	643	1540	2080	959	434	192	138
16	149	397	533	e430	734	623	1510	1950	889	409	187	139
17	159	361	518	e420	849	599	1490	1910	855	390	181	134
18	150	339	526	e420	883	587	1480	2540	803	391	190	130
19	150	316	366	e410	880	590	1500	2860	791	369	181	131
20	153	300	e260	e400	1240	618	1580	2660	859	351	171	128
21	151	282	e200	e380	1450	652	1720	2290	1060	338	169	126
22	186	284	e210	e360	1350	681	1940	2110	922	323	166	127
23	190	567	e240	e370	1250	699	2220	1990	874	313	165	128
24	168	1100	e260	e380	1160	709	2540	1820	871	309	161	126
25	157	3830	e280	e370	1060	723	2680	1710	909	306	158	125
26	161	3790	e290	e340	995	708	2320	1540	877	311	155	125
27	194	1980	e300	e360	946	674	1970	1370	860	293	154	124
28	179	1360	e290	e350	910	658	1720	1310	841	281	152	123
29	176	1090	e260	e320	---	633	1560	1310	824	270	154	123
30	174	978	e280	e340	---	629	1480	1360	840	261	151	123
31	398	---	e300	e350	---	671	---	1410	---	255	147	---
TOTAL	4846	23689	13952	11170	21659	22789	55011	55210	32574	14459	6050	3981
MEAN	156	790	450	360	774	735	1834	1781	1086	466	195	133
MAX	398	3830	816	450	1450	1090	3440	2860	1540	861	290	144
MIN	101	201	200	280	360	587	757	1200	791	255	147	123
AC-FT	9610	46990	27670	22160	42960	45200	109100	109500	64610	28680	12000	7900
CFSM	.19	.94	.54	.43	.92	.88	2.19	2.13	1.30	.56	.23	.16
IN.	.22	1.05	.62	.50	.96	1.01	2.44	2.45	1.45	.64	.27	.18

CAL YR 1990 TOTAL 247049 MEAN 677 MAX 3830 MIN 101 AC-FT 490000 CFSM .81 IN. 10.97
WTR YR 1991 TOTAL 265390 MEAN 727 MAX 3830 MIN 101 AC-FT 526400 CFSM .87 IN. 11.78

e Estimated

KOOTENAI RIVER BASIN

12303000 KOOTENAI RIVER AT LIBBY, MT

LOCATION.--Lat 48°24'03", long 115°33'08", in SW1/4SE1/4SW1/4 sec.34, T.31 N., R.31 W., Lincoln County, Hydrologic Unit 17010101, on right bank 1,800 ft downstream from highway bridge at Libby, 0.8 mi downstream from Libby Creek, and at river mile 204.3.
DRAINAGE AREA.--10,240 mi^2, approximately.
PERIOD OF RECORD.--October 1910 to September 1991 (discontinued). Monthly discharge only for some periods, published in WSP 1316.
REVISED RECORDS.--WSP 1042: 1933. WSP 1246: 1912(M), 1915(M), 1916, 1918-19(M), 1924-27(M).
GAGE.--Water-stage recorder. Datum of gage is 2,041.54 ft above National Geodetic Vertical Datum of 1929. Prior to Apr. 28, 1931, nonrecording gages at site 1,800 ft upstream at different datum.
REMARKS.--No estimated daily discharges this year. Records good. Flow regulated by Lake Koocanusa (station number 12301920) since Mar. 21, 1972. Diversions for irrigation of about 14,500 acres from tributaries upstream from station in Canada and the United States. Two observations of water temperature and specific conductance were made during the year.
AVERAGE DISCHARGE.--81 years, 12,110 ft^3/s, 16.06 in/yr, 8,774,000 acre-ft/yr, adjusted for change in contents in Lake Koocanusa since Mar. 21, 1972.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 121,000 ft^3/s, June 21, 1916, gage height, 20.7 ft, present datum, derived from gage-relation study; minimum observed, 895 ft^3/s, Jan. 11, 1930, result of discharge measurement.
EXTREMES FOR CURRENT YEAR.--Maximum discharge, 28,800 ft^3/s, Dec. 13, gage height, 8.87 ft; minimum daily, 4,740 ft^3/s, Nov. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13700	24800	6050	27400	23300	16800	9890	17000	12400	9930	24400	11600
2	23200	24300	5700	27200	23100	17100	9780	17000	12600	19400	18800	11500
3	23400	24200	15000	26400	23000	16700	7880	16700	16200	25800	13000	13900
4	23500	24100	21300	26500	23200	17300	7520	8120	19900	25900	11800	15400
5	23900	24000	21700	26200	23400	15100	10700	5870	18400	26500	14500	15500
6	9960	24000	21500	26000	22500	12900	16600	5750	17000	27000	13700	14900
7	8400	17700	21600	26000	21000	12500	16100	6090	19000	26700	13900	10100
8	15500	18600	27200	25600	20700	12200	15000	6600	19800	26100	14800	7920
9	23000	6770	27200	25300	20900	9100	14900	7190	19500	24300	24100	7850
10	21400	7470	27700	25400	20800	9080	13400	6910	19500	13800	14300	7840
11	23700	6960	28500	25100	21300	9550	10300	6570	19300	19300	13600	8850
12	23700	5900	26800	25100	21900	8880	9260	6890	18000	16200	13600	13900
13	13000	13100	28700	25200	21800	8730	6380	8060	19400	11800	14200	14200
14	8330	5820	28500	25200	22000	10600	6140	7870	19100	10700	13500	12100
15	22000	5190	28400	25100	21900	10800	8710	7410	18800	17200	13500	11700
16	23600	5050	28400	24900	21700	11900	10400	12100	18700	19200	13500	13200
17	23400	4960	28600	24600	22000	12200	11300	19700	18600	18100	10400	13400
18	23300	4880	28400	24700	22000	12600	11200	20200	16000	16800	9710	13400
19	23300	4840	28200	24800	21900	12300	11300	16900	15500	21800	12900	16200
20	12900	4810	28000	24700	22500	10600	7060	9640	13800	15300	13500	17900
21	12800	4740	27900	24700	22000	10200	6470	10100	10900	15200	13500	12600
22	23500	4790	27900	24400	19300	9830	12500	14400	9740	19400	13400	11500
23	23500	5310	27900	24200	17600	7270	18300	19500	9400	16000	*13500	13700
24	23400	7790	28000	24200	17400	6110	18800	19000	9330	15100	8830	15900
25	23400	14200	27800	23900	17400	8120	19000	12500	12200	15100	7920	15400
26	23500	10900	27700	23700	17100	6850	18500	12200	10700	16900	7950	14700
27	10500	14500	27600	23800	17000	6770	8920	11800	9000	13500	8260	16200
28	9740	16100	27600	23500	16900	6900	6610	11800	8530	11600	9690	12300
29	22800	9320	27400	23200	---	8910	12000	16700	7510	17000	10500	11600
30	23900	6450	27400	23000	---	9490	17000	16600	7620	18700	14000	13200
31	24700	---	27400	23100	---	9970	---	16300	---	24300	11900	---
TOTAL	604930	351550	782050	773100	585600	337360	351920	373470	446430	574630	411160	388460
MEAN	19510	11720	25230	24940	20910	10880	11730	12050	14880	18540	13260	12950
MAX	24700	24800	28700	27400	23400	17300	19000	20200	19900	27000	24400	17900
MIN	8330	4740	5700	23000	16900	6110	6140	5750	7510	9930	7920	7840
AC-FT	1200000	697300	1551000	1533000	1162000	669200	698000	740800	885500	1140000	815500	770500
CFSM	1.91	1.14	2.46	2.44	2.04	1.06	1.15	1.18	1.45	1.81	1.30	1.26
IN.	2.20	1.28	2.84	2.81	2.13	1.23	1.28	1.36	1.62	2.09	1.49	1.41
MEAN †	5855	9786	6522	5351	6878	5451	14200	38100	47150	34450	12940	6478
CFSM †	.57	.96	.64	.52	.67	.53	1.39	3.72	4.60	3.36	1.26	.63
IN †	.66	1.07	.73	.60	.70	.61	1.55	4.29	5.14	3.88	1.46	.71
AC-FT †	360000	582300	401000	329000	382000	335200	845000	2343000	2806000	2118000	795500	385500

OBSERVED

CAL YR 1990	TOTAL	5130150	MEAN	14060	MAX	28700	MIN	4220	AC-FT	10180000
WTR YR 1991	TOTAL	5980660	MEAN	16390	MAX	28700	MIN	4740	AC-FT	11860000

ADJUSTED

CAL YR 1990	TOTAL	5311669	MEAN	14550	CFSM	1.42	IN	19.29	AC-FT	10540000
WTR YR 1991	TOTAL	5889487	MEAN	16140	CFSM	1.58	IN	21.39	AC-FT	11680000

(†) Adjusted for change in contents in Lake Koocanusa.

KOOTENAI RIVER BASIN

12303100 FLOWER CREEK NEAR LIBBY, MT

LOCATION.--Lat 48°20'41", long 115°36'20", in NW1/4SE1/4SE1/4 sec.19, T.30 N., R.31 W., Lincoln County, Hydrologic Unit 17010101, Kootenai National Forest, on left bank 30 ft downstream from road bridge, 0.3 mi upstream from South Fork, 1.0 mi upstream from reservoir, 4.0 mi southwest of Libby, and at river mile 4.5.

DRAINAGE AREA.--11.1 mi^2.

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

REVISED RECORDS.--WDR MT-1972: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,866 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Dec. 20 to Jan. 4. Records good except those for estimated daily discharges, which are poor. No known regulation or diversion upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--31 years, 26.4 ft^3/s, 32.29 in/yr, 19,130 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 709 ft^3/s, Jan. 16, 1974, gage height, 5.53 ft; maximum gage height, 6.10 ft, Jan. 15, 1974, backwater from ice; minimum discharge, 3.1 ft^3/s, Nov. 20, 1979; minimum gage height, 1.35 ft, Jan. 11, 1975.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 25	0800	250	3.63	May 19	0830	*295	3.83
Dec. 23	1700	a	*5.54				

a--Backwater from ice.

Minimum discharge, 4.9 ft^3/s, Sept. 23-25,29,30, gage height, 1.62 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.6	28	26	e11	6.8	15	11	28	118	80	19	6.8
2	5.6	21	23	e10	6.8	24	15	26	147	85	20	6.5
3	5.6	17	21	e9.5	7.5	14	17	25	156	92	18	6.3
4	9.3	15	19	e8.7	7.7	16	26	24	122	100	17	6.0
5	20	13	18	8.4	9.8	16	95	24	88	94	17	5.8
6	11	12	17	8.0	10	14	87	28	80	75	16	5.6
7	9.0	11	15	7.9	9.8	12	48	38	119	61	15	5.3
8	7.9	11	14	7.9	9.7	12	34	54	110	53	15	6.0
9	7.6	18	14	7.9	9.8	11	28	56	102	51	14	6.5
10	7.9	42	15	7.7	10	11	25	41	125	50	13	6.0
11	7.3	41	15	7.6	10	10	22	44	156	47	13	5.8
12	7.3	32	14	9.4	10	9.7	20	79	132	45	12	5.6
13	7.3	28	14	10	10	9.7	20	104	84	44	12	5.6
14	7.1	26	13	9.8	9.8	9.3	21	87	68	44	12	6.8
15	7.3	22	12	9.5	9.7	9.0	20	83	56	39	12	6.0
16	7.6	20	12	9.2	10	8.7	20	81	53	36	11	5.6
17	7.3	18	12	8.9	11	8.4	20	114	51	36	11	5.3
18	7.3	17	12	8.9	11	8.4	20	214	49	38	11	5.6
19	7.6	16	e10	8.9	11	8.4	21	248	59	34	11	5.3
20	7.1	15	e8.0	8.6	17	8.4	25	174	124	31	10	5.3
21	7.3	14	e6.5	8.3	17	8.1	31	160	141	29	9.3	5.1
22	9.7	15	e7.5	8.1	16	8.4	41	143	99	28	9.0	5.1
23	8.4	19	e8.5	8.0	15	8.4	59	147	88	26	8.7	4.9
24	7.9	62	e9.5	7.7	14	8.4	74	115	84	26	8.4	4.9
25	8.1	198	e10	7.6	13	8.7	58	107	74	27	8.1	4.9
26	15	93	e11	7.4	12	8.7	42	83	79	25	7.9	5.1
27	13	54	e12	7.3	12	8.4	36	69	80	23	7.6	5.1
28	13	39	e11	7.3	12	8.4	31	75	79	22	7.3	5.1
29	12	33	e10	7.0	---	7.9	28	85	81	21	7.6	4.9
30	14	29	e9.5	7.1	---	7.9	27	102	88	20	7.1	4.9
31	38	---	e10	6.9	---	8.7	---	107	---	19	6.8	---
TOTAL	309.1	979	409.5	260.5	308.4	327.0	1022	2765	2892	1401	366.8	167.7
MEAN	9.97	32.6	13.2	8.40	11.0	10.5	34.1	89.2	96.4	45.2	11.8	5.59
MAX	38	198	26	11	17	24	95	248	156	100	20	6.8
MIN	5.6	11	6.5	6.9	6.8	7.9	11	24	49	19	6.8	4.9
AC-FT	613	1940	812	517	612	649	2030	5480	5740	2780	728	333
CFSM	.90	2.94	1.19	.76	.99	.95	3.07	8.04	8.68	4.07	1.07	.50
IN.	1.04	3.28	1.37	.87	1.03	1.10	3.43	9.27	9.69	4.70	1.23	.56

CAL YR 1990 TOTAL 10592.2 MEAN 29.0 MAX 198 MIN 5.6 AC-FT 21010 CFSM 2.61 IN. 35.50
WTR YR 1991 TOTAL 11208.0 MEAN 30.7 MAX 248 MIN 4.9 AC-FT 22230 CFSM 2.77 IN. 37.56

e Estimated

KOOTENAI RIVER BASIN

12303500 LAKE CREEK AT TROY, MT

LOCATION.--Lat 48°26'49", long 115°52'34" in SE1/4NW1/4SW1/4 sec.18, T.31 N., R.33 W., Lincoln County, Hydrologic Unit 17010101, Kootenai National Forest, on right bank 1,000 ft upstream from bridge on U.S. Highway 2, 0.5 mi upstream from mouth, 0.6 mi downstream from Champion International Dam (Troy Dam), and 1.3 mi southeast of Troy.

DRAINAGE AREA.--210 mi^2.

PERIOD OF RECORD.--January 1945 to September 1957, October 1982 to current year.

REVISED RECORDS.--WSP 1216: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 1,900 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Nov. 1, 1946, wire-weight gage at site 0.2 mi upstream at different datum. Jan. 11, 1945, to Sept. 30, 1957, water-stage recorder at same site at different datum.

REMARKS.--Estimated daily discharges: Dec. 29-31, Aug. 19 to Sept. 4. Records good except those for estimated daily discharges, which are poor. Diurnal fluctuation caused by small hydroelectric plant 0.6 mi upstream. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--21 years (1946-57, 1982-91), 459 ft^3/s, 29.68 in/yr, 332,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,820 ft^3/s, Nov. 25, 1990, gage height, 5.64 ft; minimum, 2.0 ft^3/s, Sept. 1, 1947, Sept. 15, 1948.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,820 ft^3/s, Nov. 25, gage height, 5.64 ft; minimum daily, 115 ft^3/s, Oct. 9, Sept. 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	125	231	1010	397	274	449	364	725	1340	901	308	e165
2	127	209	908	321	268	445	335	725	1460	884	304	e160
3	127	174	809	297	309	483	376	722	1550	880	280	e155
4	149	158	737	287	325	621	564	712	1440	886	276	e115
5	195	172	705	282	431	527	1890	708	1320	859	264	147
6	155	159	555	280	455	517	1970	691	1270	789	260	155
7	148	162	611	273	448	492	1390	816	1420	728	260	168
8	155	158	532	284	429	471	1130	941	1380	699	249	177
9	115	279	498	284	413	456	977	1060	1320	678	245	178
10	137	1060	545	280	405	452	928	1060	1340	620	242	174
11	129	777	532	271	402	443	842	1010	1500	606	234	174
12	137	598	527	320	384	424	780	1100	1500	579	238	173
13	132	555	510	366	390	417	733	1420	1250	559	227	169
14	130	513	497	349	390	399	688	1410	1160	539	231	180
15	139	451	461	363	390	399	667	1360	1040	515	227	173
16	130	432	451	354	401	377	645	1360	995	487	315	175
17	138	390	452	355	427	373	599	1420	974	457	272	169
18	139	384	474	336	423	374	606	1890	933	486	260	165
19	153	346	439	357	468	355	606	2180	938	442	e240	158
20	148	341	435	342	636	373	647	2150	1090	419	e225	157
21	144	334	421	339	630	345	680	1990	1220	410	e215	160
22	170	354	404	326	600	367	723	1810	1040	384	e205	157
23	153	503	413	328	595	363	876	1780	1020	388	e195	171
24	137	964	415	309	534	357	1030	1630	995	368	e190	149
25	142	2940	420	306	532	351	1060	1500	961	362	e190	156
26	146	2520	397	294	485	369	959	1370	932	368	e180	160
27	143	1850	336	300	485	344	835	1280	887	336	e175	156
28	138	1420	336	293	466	349	811	1240	913	323	e170	142
29	144	1210	e310	278	---	352	779	1240	924	319	e175	151
30	148	1120	e340	279	---	335	746	1330	933	311	e170	161
31	245	---	e370	280	---	334	---	1310	---	298	e170	---
TOTAL	4518	20764	15850	9730	12395	12713	25236	39940	35045	16880	7192	4850
MEAN	146	692	511	314	443	410	841	1288	1168	545	232	162
MAX	245	2940	1010	397	636	621	1970	2180	1550	901	315	180
MIN	115	158	310	271	268	334	335	691	887	298	170	115
AC-FT	8960	41190	31440	19300	24590	25220	50060	79220	69510	33480	14270	9620
CFSM	.69	3.30	2.43	1.49	2.11	1.95	4.01	6.14	5.56	2.59	1.10	.77
IN.	.80	3.68	2.81	1.72	2.20	2.25	4.47	7.08	6.21	2.99	1.27	.86

CAL YR 1990 TOTAL 186672 MEAN 511 MAX 2940 MIN 106 AC-FT 370300 CFSM 2.44 IN. 33.07
WTR YR 1991 TOTAL 205113 MEAN 562 MAX 2940 MIN 115 AC-FT 406800 CFSM 2.68 IN. 36.33

e Estimated

KOOTENAI RIVER BASIN

12304040 BASIN CREEK NEAR YAAK, MT

LOCATION.--Lat 48°55'49", long 115°28'52", in NE1/4SE1/4NE1/4 sec.34, T.37 N., R.30 W., Lincoln County, Hydrologic Unit 17010103, Kootenai National Forest, on left back 1.1 mi upstream from East Fork Yaak River and 12.5 mi northeast of Yaak.

DRAINAGE AREA.--27.4 mi^2.

PERIOD OF RECORD.--May 1990 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,830 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 28, Dec. 7, 8, 18-31, Jan. 1-9, 19-31, Feb. 1, 2, 24, 25, 28, Mar. 1-4, 8, 11, 17, 18, 26, 27, 29. Records good except those for estimated daily discharges, which are poor. No known diversion or regulation upstream from station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 325 ft^3/s, May 19, 1991, gage height, 3.61 ft; minimum, 6.0 ft^3/s, Sept. 27,28, 1990, gage height, 0.33 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 325 ft^3/s, May 19, gage height, 3.61 ft; minimum, 6.4 ft^3/s, Sept. 28-30, gage height, 0.34 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.8	13	50	e22	e11	e16	19	88	168	75	28	12
2	7.7	11	47	e20	e12	e15	22	83	193	73	26	11
3	8.1	9.9	43	e19	15	e19	22	79	211	72	20	11
4	11	10	42	e17	15	e22	39	75	185	71	19	11
5	22	9.7	39	e16	21	20	103	74	159	66	17	11
6	12	9.3	36	e15	20	18	95	78	147	60	18	11
7	10	9.0	e34	e14	16	17	70	86	156	54	19	10
8	9.6	8.9	e32	e13	15	e17	62	106	154	50	17	11
9	9.4	43	35	e12	15	17	57	124	145	48	16	12
10	12	68	38	12	14	17	52	115	147	50	15	10
11	9.9	42	36	12	14	e16	49	116	183	47	15	9.5
12	9.8	31	33	16	14	16	48	156	175	43	14	9.1
13	9.7	27	31	19	14	15	50	250	136	41	14	9.5
14	8.8	26	31	16	14	15	51	224	115	37	13	11
15	8.1	22	30	14	15	15	50	211	100	36	12	10
16	9.6	20	29	13	15	15	52	204	92	34	12	8.7
17	8.9	19	28	13	16	e14	53	232	86	35	12	9.5
18	10	18	e26	14	16	e14	56	292	82	35	12	8.3
19	10	17	e23	e13	18	14	59	317	80	32	12	7.9
20	8.6	16	e16	e12	27	15	66	297	86	30	11	7.5
21	9.2	15	e12	e12	23	15	77	283	97	28	10	7.5
22	9.9	21	e13	e12	22	15	93	271	93	27	10	8.3
23	9.0	46	e15	e11	20	15	117	254	92	25	10	8.3
24	7.3	131	e17	e11	e19	15	153	221	90	23	10	7.9
25	8.1	238	e18	e11	e19	15	148	198	87	25	10	7.9
26	10	128	e20	e11	19	e13	126	177	85	24	10	7.9
27	9.7	89	e22	e11	19	e12	108	157	84	21	10	8.3
28	9.5	e71	e19	e10	e18	14	98	146	81	20	11	7.6
29	9.3	62	e16	e9.0	---	e13	91	144	83	22	13	7.1
30	9.6	56	e20	e9.5	---	15	86	149	80	18	12	7.1
31	17	---	e22	e10	---	16	---	157	---	18	12	---
TOTAL	311.6	1286.8	873	419.5	476	485	2172	5364	3672	1240	440	278.9
MEAN	10.1	42.9	28.2	13.5	17.0	15.6	72.4	173	122	40.0	14.2	9.30
MAX	22	238	50	22	27	22	153	317	211	75	28	12
MIN	7.3	8.9	12	9.0	11	12	19	74	80	18	10	7.1
AC-FT	618	2550	1730	832	944	962	4310	10640	7280	2460	873	553
CFSM	.37	1.57	1.03	.49	.62	.57	2.64	6.32	4.47	1.46	.52	.34
IN.	.42	1.75	1.19	.57	.65	.66	2.95	7.28	4.99	1.68	.60	.38

WTR YR 1991 TOTAL 17018.8 MEAN 46.6 MAX 317 MIN 7.1 AC-FT 33760 CFSM 1.70 IN. 23.11

e Estimated

KOOTENAI RIVER BASIN

12304500 YAAK RIVER NEAR TROY, MT

LOCATION.--Lat 48°33'43", long 115°58'09", in NE1/4SE1/4SE1/4 sec.5, T.32 N., R.34 W., Lincoln County, Hydrologic Unit 17010103, Kootenai National Forest, on right bank 500 ft upstream from bridge on U.S. Highway 2, 0.3 mi upstream from mouth, and 7.7 mi northwest of Troy.

DRAINAGE AREA.--766 mi^2.

PERIOD OF RECORD.--October 1910 to September 1916 (fragmentary record), March 1956 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,839.2 ft above National Geodetic Vertical Datum of 1929. Oct. 15, 1910, to Sept. 30, 1916, nonrecording gage at several sites within 11 mi of present site at various datums.

REMARKS.--Estimated daily discharges: Dec. 21 to Feb. 12. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 30 acres upstream from station. Several observations of water temperature and specific conductance were made during the year. U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--35 years, 885 ft^3/s, 15.69 in/yr, 641,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,100 ft^3/s, May 21, 1956, gage height, 9.70 ft, in gage well, 10.8 ft, from outside gage; minimum daily, 50 ft^3/s, Dec. 9, 1972.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May to June 1948 reached a stage of 11.0 ft, from floodmarks; discharge, 12,500 ft^3/s. Flood in May 1954 reached a stage of 11.4 ft, from floodmarks; discharge, 13,400 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 25	0645	7,620	8.21	Apr. 24	2315	5,340	7.36
Apr. 5	2200	*8,800	*8.50	May 19	2400	7,310	8.05

Minimum, 112 ft^3/s, Oct. 1, gage height, 3.00 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	114	370	1000	e300	e480	805	779	3020	3810	1560	352	176
2	119	308	915	e290	e500	745	1000	3010	3980	1480	444	166
3	123	253	822	e270	e510	830	1210	2760	4110	1440	408	160
4	150	225	796	e250	e540	1030	1850	2540	3650	1400	356	156
5	195	218	781	e270	e600	1030	6570	2480	3160	1290	331	154
6	232	208	715	e270	e630	923	7240	2690	2960	1150	317	151
7	197	196	670	e270	e640	857	4810	3210	3110	1020	342	148
8	164	188	610	e290	e650	809	3410	3840	3080	934	339	148
9	151	270	631	e310	e660	775	2740	4390	2870	885	310	160
10	175	1520	871	e340	e700	765	2370	3930	2870	860	292	165
11	178	1390	1090	e360	e740	723	2060	3770	3500	856	283	157
12	182	903	984	e380	e770	698	1910	4500	3630	791	268	149
13	181	699	862	e480	816	676	1890	5910	2970	743	257	145
14	168	671	793	e530	813	652	2050	5600	2460	709	248	175
15	165	606	730	e500	812	628	2130	5280	2120	663	249	183
16	173	522	697	e480	874	614	2160	4960	1990	610	241	172
17	170	471	659	e460	941	594	2190	5160	1900	609	231	157
18	177	442	649	e460	930	584	2220	6420	1730	688	227	147
19	203	410	420	e450	931	601	2340	7140	1710	620	218	143
20	190	389	332	e440	1330	613	2620	6860	1910	554	210	140
21	185	370	e230	e420	1380	613	3080	6430	2250	512	200	138
22	192	406	e210	e410	1230	625	3620	5940	1920	482	193	137
23	199	916	e230	e430	1120	626	4300	5510	1840	454	187	138
24	196	2760	e250	e440	1040	631	5040	4850	1790	431	182	138
25	176	6500	e270	e430	972	661	5000	4380	1760	445	178	135
26	190	3790	e280	e420	931	641	4230	3920	1710	493	172	132
27	205	2190	e280	e440	908	616	3530	3540	1680	473	170	130
28	207	1530	e270	e440	902	628	3100	3350	1620	420	171	128
29	206	1270	e240	e410	---	610	2870	3430	1690	387	212	126
30	213	1150	e260	e430	---	604	2780	3520	1680	365	207	123
31	350	---	e280	e450	---	653	---	3730	---	347	194	---
TOTAL	5726	31141	17827	12120	23350	21860	91099	136070	75460	23671	7989	4477
MEAN	185	1038	575	391	834	705	3037	4389	2515	764	258	149
MAX	350	6500	1090	530	1380	1030	7240	7140	4110	1560	444	183
MIN	114	188	210	250	480	584	779	2480	1620	347	170	123
AC-FT	11360	61770	35360	24040	46310	43360	180700	269900	149700	46950	15850	8880
CFSM	.24	1.36	.75	.51	1.09	.92	3.96	5.73	3.28	1.00	.34	.19
IN.	.28	1.51	.87	.59	1.13	1.06	4.42	6.61	3.66	1.15	.39	.22

CAL YR 1990 TOTAL 420513 MEAN 1152 MAX 6500 MIN 114 AC-FT 834100 CFSM 1.50 IN. 20.42
WTR YR 1991 TOTAL 450790 MEAN 1235 MAX 7240 MIN 114 AC-FT 894100 CFSM 1.61 IN. 21.89

e Estimated

KOOTENAI RIVER BASIN

12305000 KOOTENAI RIVER AT LEONIA, ID

LOCATION.--Lat 48°37'04", long 116°02'47", in NW1/4NW1/4NW1/4 sec. 20, T.33 N., R.34 W., principal Meridian, Lincoln County, Mont., Hydrologic Unit 17010104, on right bank at Leonia, 450 ft east of Montana-Idaho State line, 0.5 mi upstream from Boulder Creek, and at mile 171.6.

DRAINAGE AREA.--11,740 mi^2, approximately.

PERIOD OF RECORD.--March 1928 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,790.25 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1970, at datum 90 ft lower. Prior to Nov. 13, 1928, nonrecording gage on bridge 250 ft upstream at datum 90.41 ft lower.

REMARKS.--No estimated daily discharges. Records good. Station equipment includes satellite telemetry. Diversions above station for irrigation of about 14,600 acres. Flow regulated by Lake Koocanusa since Mar. 21, 1972.

AVERAGE DISCHARGE.--63 years, 13,940 ft^3/s, 16.12 in/yr, 10,100,000 acre-ft/yr (flows not adjusted for storage change in upstream reservoir).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 123,000 ft^3/s May 28, 1948, gage height, 33.40 ft; minimum, 996 ft^3/s Dec. 9, 1936; minimum gage height, 7.56 ft, Dec. 10, 1929.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods of June 1894 and 1916 reached stages of 34.6 and 31.6 ft, respectively, present datum, from information by Great Northern Railway.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 38,900 ft^3/s, May 18, gage height 20.20 ft; minimum, 5,090 ft^3/s Oct. 1, gage height, 10.87 ft.

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

11.0	5300	16.0	19400
12.0	7200	18.0	28000
14.0	12400	20.0	37800

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10100	26800	9290	30100	25100	18700	11200	23100	22100	11800	26700	12000
2	24200	26000	8140	29800	24800	18400	11100	23100	20900	21200	21500	11900
3	24500	25600	13300	28700	24800	18600	10200	22500	23500	31000	15700	13000
4	24700	25400	22800	28600	25200	20500	10600	14800	29200	31000	12600	15000
5	25400	25300	24400	28400	26400	17300	23900	10500	27400	31500	14500	15900
6	13900	25200	24200	28200	26300	15400	34300	10400	22800	32100	14900	15900
7	8970	18800	24100	28200	24000	14600	28600	11500	27000	31400	14400	13100
8	13600	19700	30600	27900	23400	13700	22600	13200	28100	30700	14500	8420
9	24600	11200	30600	27400	23300	11100	21700	14900	27300	29700	25000	8370
10	22300	10800	31600	27500	23100	10500	20000	13900	27200	16200	17500	8270
11	25000	10600	32900	27300	23400	10200	16100	13200	29400	20100	14100	8240
12	25200	8330	30800	27500	24300	10100	13600	14700	25900	20400	14100	13300
13	15600	13400	32700	28000	24200	9910	11600	19000	26900	15000	14200	14300
14	8830	8980	32400	28000	24300	11000	10200	18400	25500	12400	14600	13300
15	21100	6840	32100	27900	24300	12800	11800	17300	24400	16100	14000	12100
16	25000	6450	32000	27600	24300	12900	13600	19800	24000	21400	14100	13000
17	24800	6180	32100	27300	24700	12500	15400	30300	23700	20700	11900	13700
18	24700	6020	32100	27200	24800	13700	15400	36600	20600	19600	10400	13600
19	24800	5860	31200	27400	24800	13000	15700	36100	19900	23600	12500	15400
20	15100	5740	30800	27200	26500	11600	13600	24300	19300	20000	13900	18600
21	13300	5610	30500	27000	26800	10900	11700	22300	17600	15500	13900	14600
22	23400	5690	30500	26800	23600	10900	16200	26400	14400	19400	13900	11900
23	25000	6980	30700	26400	20800	8610	27700	31500	13500	18300	13900	12900
24	24800	12400	30800	26400	20100	7070	30300	32800	13000	16400	10800	16300
25	24800	32500	30600	26000	19800	9110	30500	21700	14900	16500	8540	15800
26	25000	23400	30500	25600	19400	7690	28200	20100	16200	17400	8480	15400
27	13800	19800	30500	25700	19100	7550	18800	18800	11900	17300	8450	15600
28	10600	20200	30300	25400	19000	7520	12200	18300	12800	12800	10000	14300
29	21200	16500	29900	25100	---	8470	14300	22400	11500	15400	10200	11800
30	25200	9440	29900	25000	---	9650	22800	24900	11200	20000	14300	12700
31	26500	---	30000	25000	---	10400	---	25000	---	26600	12800	---
TOTAL	636000	445720	872330	844600	660600	374380	543900	651800	632100	651500	436370	398700
MEAN	20520	14860	28140	27250	23590	12080	18130	21030	21070	21020	14080	13290
MAX	26500	32500	32900	30100	26800	20500	34300	36600	29400	32100	26700	18600
MIN	8830	5610	8140	25000	19000	7070	10200	10400	11200	11800	8450	8240
AC-FT	1262000	884100	1730000	1675000	1310000	742600	1079000	1293000	1254000	1292000	865500	790800

CAL YR 1990 TOTAL 6188030 MEAN 16950 MAX 33500 MIN 4650 AC-FT 12270000
WTR YR 1991 TOTAL 7148000 MEAN 19580 MAX 36600 MIN 5610 AC-FT 14180000

PEND OREILLE RIVER BASIN

12323170 SILVER BOW CREEK ABOVE BLACKTAIL CREEK, AT BUTTE, MT

LOCATION.--Lat 46°00'08", long 112°30'43", in SE1/4NE1/4NE1/4 sec.19, T.3 N., R.7 W., Silver Bow County, Hydrologic Unit 17010201, on right bank about 200 ft west of Continental Drive and Texas Avenue in Butte, 0.3 mi downstream of Horse Canyon, about 0.3 mi upstream of Harrison Ave. bridge, 1.2 mi upstream of Blacktail Creek, and at river mile 22.7.

DRAINAGE AREA.--Indeterminate.

PERIOD OF RECORD.--October 1983 to current year.

GAGE.--Water-stage recorder and V-notch sharp-crested weir. Datum of gage is 5,470.80 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges this year. Records good. Flow regulated by Montana Resources Inc. operations.

AVERAGE DISCHARGE.--8 years, 0.035 ft^3/s, 25.4 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 57 ft^3/s, May 29, 1990, gage height, 3.35 ft; no flow on many days each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1.7 ft^3/s, May 18, gage height, 2.09 ft; no flow most days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.04	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.13	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.04	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.14	.00
29	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.13	0.05	0.00	0.14	0.00
MEAN	.000	.000	.000	.000	.004	.000	.000	.004	.002	.000	.005	.000
MAX	.00	.00	.00	.00	.05	.00	.00	.13	.04	.00	.14	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.00	.00	.00	.00	.2	.00	.00	.3	.1	.00	.3	.00

CAL YR 1990 TOTAL 3.44 MEAN .009 MAX 1.3 MIN .00 AC-FT 6.8
WTR YR 1991 TOTAL 0.42 MEAN .001 MAX .14 MIN .00 AC-FT .8

PEND OREILLE RIVER BASIN

12323240 BLACKTAIL CREEK AT BUTTE, MT

LOCATION.--Lat 45°54'38", long 112°31'38", in SW1/4NE1/4SE1/4 sec.24, T.3 N., R.8 W., Silver Bow County, Hydrologic Unit 17010201, on left bank, 70 feet upstream of culvert under George Street in Butte, and 0.2 mi upstream of Silver Bow Creek.

DRAINAGE AREA.--95.4 mi^2.

PERIOD OF RECORD.--October 1988 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 5,430 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Dec. 19-31, Jan. 1-6, 25, 26, 29, 30. Records good. Slight regulation by Basin Creek Reservoir. Diversions for irrigation of about 1,400 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 85 ft^3/s, May 29, 1990, gage height, 3.55 ft; minimum, 4.6 ft^3/s, July 10, 1991.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 40 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 18	1800	*53	2.50	June 22	1800	53	*2.60
June 4	2300	47	2.23	Aug. 28	0130	46	2.36
June 6	1700	44	2.13				

Minimum discharge, 4.6 ft^3/s, July 10, gage height, 0.90 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.1	9.6	8.5	e7.5	7.6	7.9	8.2	9.5	21	12	9.2	8.0
2	8.4	9.4	8.5	e7.5	7.7	7.7	9.4	11	18	11	8.7	7.3
3	8.0	9.5	8.5	e7.0	8.4	7.7	10	10	17	9.7	8.6	7.3
4	7.9	11	8.5	e7.0	8.3	7.9	11	9.7	21	9.3	8.9	7.2
5	8.5	10	8.5	e7.0	8.0	8.1	12	9.5	26	8.8	8.9	6.8
6	8.0	9.2	8.2	e7.0	7.9	7.7	14	11	30	8.2	9.1	7.0
7	7.8	8.9	8.1	7.4	7.8	7.4	13	12	29	7.6	9.4	7.0
8	8.2	9.2	8.2	7.4	8.1	7.7	11	15	30	7.7	9.3	13
9	8.1	9.7	8.2	7.4	8.1	6.9	10	17	23	7.2	9.2	12
10	8.3	9.8	8.2	7.7	8.1	6.9	9.4	16	19	7.2	9.7	11
11	8.5	9.2	8.2	7.8	8.2	7.0	9.3	20	17	6.8	9.1	12
12	8.6	9.1	8.2	8.8	8.2	6.5	8.9	20	16	6.6	9.5	9.5
13	8.5	9.1	8.2	8.5	8.2	6.7	9.1	19	15	6.6	9.5	9.2
14	8.3	9.5	8.0	8.5	8.2	6.9	9.2	21	15	8.7	9.5	10
15	8.5	9.0	7.9	8.4	8.2	6.7	9.4	20	15	7.7	9.3	9.2
16	9.6	8.5	7.9	8.2	8.6	7.3	10	19	15	7.3	9.3	8.8
17	8.8	8.7	7.9	8.6	8.1	7.1	11	23	15	7.3	9.2	8.9
18	9.1	9.1	7.9	9.0	7.9	7.0	11	31	14	7.0	9.3	8.7
19	9.2	9.3	e7.5	8.6	8.0	7.2	11	28	13	7.1	9.1	8.4
20	8.6	9.1	e6.5	8.5	8.3	7.3	12	27	16	6.9	9.1	8.4
21	8.6	8.6	e6.0	8.3	8.2	8.1	12	26	13	6.9	8.8	8.0
22	8.9	8.9	e6.0	8.2	8.0	7.4	12	26	19	6.9	8.5	8.1
23	8.5	9.0	e6.5	8.0	8.2	7.3	13	23	14	6.9	8.7	8.0
24	8.6	9.2	e7.0	7.9	8.2	8.0	14	20	13	7.1	8.2	8.2
25	8.9	9.4	e7.0	e7.5	8.2	7.5	14	19	12	7.2	7.8	8.3
26	9.3	9.2	e7.5	e7.5	8.2	8.2	13	18	12	7.9	8.1	8.3
27	8.9	8.5	e7.5	8.1	8.2	7.7	11	20	14	7.9	9.2	8.2
28	9.1	8.5	e7.0	8.1	8.0	7.3	10	19	14	8.0	17	7.9
29	9.1	8.5	e6.5	e7.5	---	8.1	10	18	13	8.0	8.3	8.6
30	9.1	8.5	e7.0	e7.0	---	7.3	9.7	19	14	8.2	8.3	8.2
31	11	---	e7.5	7.4	---	7.6	---	22	---	8.3	8.1	---
TOTAL	269.0	275.2	237.1	243.3	227.1	230.1	327.6	578.7	523	244.0	284.9	261.5
MEAN	8.68	9.17	7.65	7.85	8.11	7.42	10.9	18.7	17.4	7.87	9.19	8.72
MAX	11	11	8.5	9.0	8.6	8.2	14	31	30	12	17	13
MIN	7.8	8.5	6.0	7.0	7.6	6.5	8.2	9.5	12	6.6	7.8	6.8
AC-FT	534	546	470	483	450	456	650	1150	1040	484	565	519

CAL YR 1990 TOTAL 3688.9 MEAN 10.1 MAX 27 MIN 6.0 AC-FT 7320
WTR YR 1991 TOTAL 3701.5 MEAN 10.1 MAX 31 MIN 6.0 AC-FT 7340

e Estimated

PEND OREILLE RIVER BASIN

12323250 SILVER BOW CREEK BELOW BLACKTAIL CREEK, AT BUTTE, MT

LOCATION.--Lat 45°59'49", long 112°33'43", in SW1/4SE1/4NW1/4 sec.23, T.3 N., R.8 W., Silver Bow County, Hydrologic Unit 17010201, on right bank 150 ft upstream of Interstate Highway 90 overpass in Butte, 0.8 mi upstream of Whiskey Gulch, 1.3 mi downstream of Blacktail Creek, and at river mile 20.2.

DRAINAGE AREA.--103 mi^2.

PERIOD OF RECORD.--October 1983 to current year.

GAGE.--Water-stage recorder. Datum of gage is 5,410.87 ft above National Geodetic Vertical Datum of 1929 (levels by Stiller and Associates).

REMARKS.--No estimated daily discharges this year. Records fair except those above 50 ft^3/s, which are poor. Flow slightly regulated by Silver Bow County sewage treatment plant. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--8 years, 22.5 ft^3/s, 16,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 439 ft^3/s, May 29, 1990, gage height, 3.72 ft, from rating curve extended above 40ft^3/s; maximum gage height, 3.91 ft, June 28, 1986; minimum discharge, 9.3 ft^3/s, Dec. 27,30,31, 1988 and Jan. 8,12,13, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 216 ft^3/s, June 22, gage height, 3.18 ft, from rating curve extended above 40 ft^3/s; minimum, 9.4 ft^3/s, Sept. 5,6, gage height, 1.27 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17	19	17	17	17	16	19	17	29	21	15	13
2	17	18	17	17	17	16	20	18	25	19	15	13
3	17	18	17	17	18	16	20	18	24	18	14	14
4	17	19	17	16	17	17	21	17	35	17	14	13
5	18	17	17	16	17	17	21	17	42	17	15	13
6	17	16	17	16	17	16	24	17	48	16	16	14
7	17	16	17	16	17	16	23	19	46	15	16	13
8	17	17	16	16	17	18	21	22	45	15	16	25
9	17	17	17	16	17	16	20	24	33	15	16	22
10	17	17	17	16	17	16	19	25	27	17	16	19
11	17	17	18	16	16	16	19	34	26	15	16	20
12	17	17	17	17	16	16	18	28	24	15	16	16
13	17	17	17	16	16	16	18	27	23	15	16	16
14	17	17	16	16	16	17	18	31	23	20	17	17
15	17	16	16	16	16	17	18	30	23	16	16	16
16	18	17	16	16	17	18	19	27	21	16	16	16
17	16	17	16	17	16	17	20	39	21	16	16	15
18	17	17	16	17	16	17	19	59	21	15	16	15
19	17	17	17	16	16	17	19	43	24	15	16	16
20	16	17	17	16	16	18	20	43	32	14	16	16
21	16	17	17	16	17	19	20	40	21	14	16	16
22	17	17	18	16	17	17	20	40	48	15	16	16
23	17	17	18	16	16	17	22	34	24	14	16	15
24	17	17	19	16	16	19	23	29	23	14	16	15
25	16	18	18	16	16	18	23	27	22	15	16	15
26	16	17	18	16	16	20	21	26	21	14	17	15
27	16	18	18	16	16	18	19	31	26	14	18	16
28	16	17	18	16	17	18	18	28	24	14	36	16
29	17	17	18	17	---	19	18	26	23	14	14	16
30	18	17	18	16	---	18	17	27	24	14	14	16
31	20	---	18	17	---	18	---	31	---	14	14	---
TOTAL	526	515	533	504	463	534	597	894	848	483	507	478
MEAN	17.0	17.2	17.2	16.3	16.5	17.2	19.9	28.8	28.3	15.6	16.4	15.9
MAX	20	19	19	17	18	20	24	59	48	21	36	25
MIN	16	16	16	16	16	16	17	17	21	14	14	13
AC-FT	1040	1020	1060	1000	918	1060	1180	1770	1680	958	1010	948

CAL YR 1990 TOTAL 7571 MEAN 20.7 MAX 98 MIN 15 AC-FT 15020
WTR YR 1991 TOTAL 6882 MEAN 18.9 MAX 59 MIN 13 AC-FT 13650

PEND OREILLE RIVER BASIN

12323600 SILVER BOW CREEK AT OPPORTUNITY, MT

LOCATION.--Lat 46°06'28", long 112°48'17", in SE1/4SW1/4SE1/4 sec.11, T.4 N., R.10 W., Deer Lodge County, Hydrologic Unit 17010201, on left bank 200 ft downstream from Stuart Street bridge, 0.5 mi east of Opportunity, and 1.0 mi upstream from Mill Creek.

DRAINAGE AREA.--284 mi^2.

PERIOD OF RECORD.--July 1988 to current year (seasonal records only).

GAGE.--Water-stage recorder. Datum of gage is 4,912.37 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Mar. 1-3, 7, Oct. 30, 31. Records good. Numerous diversions upstream from station for irrigation and municipal use. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 654 ft^3/s, Mar. 9, 1989, gage height, 5.61 ft; minimum daily, 13 ft^3/s, Aug. 7, 1990.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 257 ft^3/s, May 19, gage height, 3.90 ft; minimum daily, 16 ft^3/s, July 31.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1991
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e32	47	42	101	65	22	18	24		
2			e31	50	41	99	60	23	20	28		
3			e36	53	41	103	55	17	20	28		
4			38	53	39	111	52	23	19	29		
5			39	59	38	185	50	23	19	29		
6			36	64	41	185	46	19	19	29		
7			e36	57	46	206	38	17	20	29		
8			36	50	54	183	38	17	27	29		
9			37	48	63	164	36	17	44	36		
10			37	46	57	149	39	17	28	37		
11			38	45	66	136	33	18	34	37		
12			41	45	72	126	28	18	29	37		
13			38	44	74	114	28	17	25	37		
14			38	44	85	99	33	17	29	37		
15			39	45	86	90	39	18	26	40		
16			39	46	87	84	30	19	25	39		
17			40	48	105	77	33	19	25	38		
18			39	48	153	70	31	19	25	38		
19			41	40	183	75	30	19	25	38		
20			42	42	144	106	26	19	24	37		
21			45	45	130	91	27	18	23	39		
22			43	49	135	85	28	18	23	36		
23			40	55	130	107	39	18	23	37		
24			42	59	121	80	35	18	24	38		
25			42	57	124	79	29	18	34	38		
26			40	50	119	75	29	18	35	40		
27			40	45	121	73	23	19	35	40		
28			38	42	115	79	18	43	37	39		
29			38	43	106	71	17	22	42	40		
30			41	42	104	73	17	18	37	e33		
31			44	---	104	---	16	17	---	e34		
TOTAL			1206	1461	2826	3276	1068	605	814	1090		
MEAN			38.9	48.7	91.2	109	34.5	19.5	27.1	35.2		
MAX			45	64	183	206	65	43	44	40		
MIN			31	40	38	70	16	17	18	24		
AC-FT			2390	2900	5610	6500	2120	1200	1610	2160		

e Estimated

PEND OREILLE RIVER BASIN

12323770 WARM SPRINGS CREEK AT WARM SPRINGS, MT

LOCATION.--Lat 46°10'51", long 112°47'07", in SW1/4SW1/4SW1/4 sec.18, T.5 N., R.9 W., Deer Lodge County, Hydrologic Unit 17010201, on left bank at county road bridge 0.2 mi southeast of Warm Springs post office, and at river mile 0.9.

DRAINAGE AREA.--163 mi^2.

PERIOD OF RECORD.--October 1983 to current year.

GAGE.--Water-stage recorder. Datum of gage is 4,811.25 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Nov. 27-29, Dec. 1-8, Dec. 13 to Feb. 13, Mar. 1-4. Records good except those for flows less than 10 ft^3/s, which are fair, and those for estimated daily discharges, which are poor. Numerous diversions upstream from station for irrigation and municipal use. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--8 years, 41.8 ft^3/s, 30,280 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 462 ft^3/s, June 21, 1984, gage height, 4.61 ft; maximum gage height, 5.7 ft, in winter of 1985-86, backwater from ice; no flow Aug. 4,5, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 339 ft^3/s, June 7, gage height, 3.75 ft; maximum gage height, 4.31 ft, Feb. 5, backwater from ice; minimum daily discharge, 2.4 ft^3/s, Aug. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	27	e27	e10	e17	e15	10	16	79	133	3.0	7.5
2	11	26	e25	e11	e23	e13	10	17	90	117	2.9	8.1
3	14	25	e23	e9.0	e28	e15	11	16	126	108	3.9	10
4	19	29	e24	e8.0	e30	e18	10	14	148	99	4.1	14
5	19	31	e26	e8.0	e29	17	12	14	201	95	3.8	15
6	21	30	e24	e8.0	e28	15	13	14	272	75	4.4	13
7	21	30	e23	e9.0	e27	15	11	14	315	57	4.4	12
8	21	30	e25	e10	e26	18	11	15	291	48	3.3	17
9	21	30	26	e12	e25	22	10	18	226	42	3.2	19
10	21	31	27	e13	e24	22	9.6	18	214	43	2.6	19
11	21	31	28	e14	e24	21	10	22	239	41	2.9	29
12	23	30	28	e16	e23	21	9.8	22	250	37	3.1	29
13	24	30	e27	e17	e23	21	9.6	21	226	35	2.8	25
14	24	31	e25	e19	23	21	10	24	204	34	3.2	28
15	27	30	e22	e18	24	21	11	27	172	31	3.4	28
16	30	29	e19	e18	26	21	12	30	160	27	3.0	27
17	29	30	e16	e17	25	21	12	35	147	25	3.2	25
18	30	30	e19	e17	24	20	11	74	135	21	4.4	25
19	30	30	e14	e16	24	21	14	103	140	12	3.6	25
20	30	30	e9.0	e15	25	21	16	94	221	8.1	2.9	23
21	29	29	e8.0	e13	24	21	18	88	207	6.5	2.4	21
22	31	29	e7.0	e11	24	20	18	98	185	5.2	3.8	21
23	30	30	e7.5	e13	24	20	18	105	180	4.2	4.8	21
24	30	29	e8.0	e12	24	21	17	119	157	3.7	5.7	21
25	30	29	e8.5	e11	23	20	19	153	144	4.0	5.7	15
26	30	30	e9.0	e10	23	21	18	143	136	4.5	5.3	14
27	29	e28	e10	e11	19	22	18	132	128	4.5	6.0	12
28	26	e29	e9.0	e11	17	21	17	107	133	4.0	10	17
29	27	e29	e8.0	e9.0	---	17	17	94	131	3.7	6.0	13
30	25	29	e8.0	e10	---	13	17	100	144	3.0	4.3	14
31	25	---	e9.0	e13	---	10	---	97	---	3.1	4.7	---
TOTAL	758	881	549.0	389.0	676	585	400.0	1844	5401	1134.5	126.8	567.6
MEAN	24.5	29.4	17.7	12.5	24.1	18.9	13.3	59.5	180	36.6	4.09	18.9
MAX	31	31	28	19	30	22	19	153	315	133	10	29
MIN	10	25	7.0	8.0	17	10	9.6	14	79	3.0	2.4	7.5
AC-FT	1500	1750	1090	772	1340	1160	793	3660	10710	2250	252	1130

CAL YR 1990 TOTAL 11560.9 MEAN 31.7 MAX 169 MIN 1.4 AC-FT 22930
WTR YR 1991 TOTAL 13311.9 MEAN 36.5 MAX 315 MIN 2.4 AC-FT 26400

e Estimated

PEND OREILLE RIVER BASIN

12323800 CLARK FORK NEAR GALEN, MT

LOCATION.--Lat 46°12'30", long 112°45'59", in NE1/4NE1/4NE1/4 sec.7, T.5 N., R.9 W., Deer Lodge County, Hydrologic Unit 17010201, on right bank at upstream side of bridge on county road, 2.6 mi downstream from Silver Bow Creek and Warm Springs Creek, 2 mi south of Galen, and at river mile 482.7.

DRAINAGE AREA.--793 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1988 to current year.

GAGE.--Water-stage recorder. Datum of gage is 4,749.24 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Nov. 27 to Dec. 1, Dec. 6-8, 14-16, Dec. 18 to Feb. 8, Mar. 1, 2. Water-discharge records good except those for estimated daily discharges, which are poor. Some regulation by settling ponds on Silver Bow Creek near Warm Springs. Numerous diversions upstream of station for irrigation and municipal use. Satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 795 ft^3/s, June 7, 1991, gage height, 4.18 ft; minimum daily, 9.6 ft^3/s, Aug. 18, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 795 ft^3/s, June 7, gage height, 4.18 ft; minimum daily, 13 ft^3/s, Aug. 10, 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	40	54	e60	e40	e55	e64	68	72	275	282	23	24
2	39	57	52	e45	e65	e60	71	67	283	255	25	23
3	42	64	49	e42	e75	74	79	70	328	230	22	23
4	53	74	61	e40	e80	77	87	71	367	205	20	25
5	53	88	69	e39	e78	76	86	70	496	187	19	24
6	54	90	e60	e39	e74	71	89	67	629	155	20	22
7	55	87	e54	e40	e72	71	93	64	738	122	18	22
8	59	88	e58	e42	e70	75	88	71	686	110	16	41
9	64	81	62	e45	69	84	83	81	564	97	14	42
10	65	79	63	e48	68	78	71	81	526	98	13	47
11	67	80	68	e52	68	79	73	100	548	98	14	50
12	74	79	66	e56	67	81	79	115	554	91	15	52
13	68	80	62	e62	68	82	79	119	476	86	17	64
14	69	69	e60	e66	69	81	77	127	422	79	13	67
15	73	69	e52	e62	73	83	75	148	361	80	14	85
16	74	72	e45	e60	80	78	73	166	313	68	14	70
17	76	75	41	e60	83	74	77	178	293	62	15	60
18	83	73	e45	e58	82	76	78	258	267	59	16	65
19	75	77	e37	e56	83	77	82	364	260	50	15	58
20	74	77	e33	e54	84	76	81	345	372	45	21	60
21	85	81	e32	e50	83	80	77	342	372	40	28	42
22	78	82	e30	e45	82	83	77	333	331	37	26	44
23	76	82	e32	e50	81	83	79	330	328	34	22	46
24	79	80	e35	e48	78	85	86	353	310	34	18	43
25	83	78	e38	e45	76	81	90	388	289	30	18	35
26	77	72	e40	e43	75	85	91	380	271	37	17	37
27	74	e66	e44	e45	72	84	88	371	265	39	20	36
28	75	e60	e42	e50	69	81	83	353	272	35	33	40
29	60	e62	e38	e42	---	76	79	319	267	31	26	39
30	53	e66	e35	e45	---	71	77	314	286	29	23	35
31	59	---	e36	e50	---	68	---	298	---	25	23	---
TOTAL	2056	2242	1499	1519	2079	2394	2416	6415	11749	2830	598	1321
MEAN	66.3	74.7	48.4	49.0	74.2	77.2	80.5	207	392	91.3	19.3	44.0
MAX	85	90	69	66	84	85	93	388	738	282	33	85
MIN	39	54	30	39	55	60	68	64	260	25	13	22
AC-FT	4080	4450	2970	3010	4120	4750	4790	12720	23300	5610	1190	2620

CAL YR 1990 TOTAL 33129 MEAN 90.8 MAX 362 MIN 18 AC-FT 65710
WTR YR 1991 TOTAL 37118 MEAN 102 MAX 738 MIN 13 AC-FT 73620

e Estimated

PEND OREILLE RIVER BASIN

12323800 CLARK FORK NEAR GALEN, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1971-74, 1988 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)
OCT											
04...	1420	--	54	--	--	564	22.0	12.0	--	--	--
24...	1130	--	90	80	1	500	13.0	3.5	137	0	112
NOV											
21...	1420	--	75	--	--	541	2.0	1.0	--	--	--
JAN											
04...	1120	--	42	--	--	743	-10.0	0.0	--	--	--
14...	1200	E66	--	100	2	--	3.0	0.0	--	--	--
FEB											
07...	1015	E72	--	0	0	--	-1.0	0.0	--	--	--
13...	1045	--	67	--	--	627	2.0	2.0	--	--	--
MAR											
06...	1145	--	91	100	2	520	2.5	1.5	120	4	104
APR											
01...	1510	--	70	--	--	557	21.0	10.0	--	--	--
09...	1015	--	91	100	2	--	5.0	4.0	--	--	--
25...	1045	--	91	100	76	--	5.0	7.0	--	--	--
MAY											
14...	1405	--	128	--	--	469	7.5	10.0	--	--	--
22...	1415	--	344	--	--	317	19.0	14.0	--	--	--
28...	0930	--	372	100	3	291	13.0	8.5	91	2	78
JUN											
05...	1430	--	511	--	--	237	12.0	9.0	--	--	--
06...	0900	--	626	50	1	232	12.0	8.0	74	2	63
07...	0925	--	765	--	--	226	11.0	10.0	--	--	--
10...	1400	--	545	10	1	220	23.0	14.5	--	--	--
JUL											
01...	1100	--	293	20	1	--	20.0	12.0	--	--	--
09...	1315	--	100	--	--	336	29.0	17.0	--	--	--
19...	1300	--	51	0	0	--	--	18.5	--	--	--
AUG											
09...	1015	--	15	--	--	751	25.0	20.0	--	--	--
14...	1415	--	14	50	1	720	21.5	20.0	137	6	121
16...	1055	--	13	--	--	742	18.0	17.0	--	--	--

DATE	TIME	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)
OCT										
24...	1130	8.2	230	66	15	5	4	<1	<1.0	16
MAR										
06...	1145	8.8	220	66	14	14	7	<1	<1.0	32
MAY										
28...	0930	8.6	130	41	7.8	32	30	<1	<1.0	38
JUN										
06...	0900	8.4	110	33	6.2	46	27	1	<1.0	140
AUG										
14...	1415	8.4	370	110	22	21	18	<1	<1.0	14

DATE	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
OCT									
24...	3	230	4	1	<1	180	110	40	10
MAR									
06...	10	510	6	5	<1	360	220	60	12
MAY									
28...	9	470	28	8	<1	150	65	60	17
JUN									
06...	14	2900	82	24	3	730	65	120	16
AUG									
14...	8	130	9	1	<1	120	74	20	9

12323800 CLARK FORK NEAR GALEN, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	TEMPERATURE WATER (DEG C) (00010)	DISCHARGE, IN CUBIC FEET PER SECOND (00060)	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT							
24...	1130	3.5	--	90	4	0.97	79
JAN							
14...	1200	0.0	E66	--	4	E0.71	83
FEB							
07...	1015	0.0	E72	--	9	E1.7	72
MAR							
06...	1145	1.5	--	91	12	2.9	76
APR							
09...	1015	4.0	--	91	21	5.2	91
25...	1045	7.0	--	91	12	2.9	83
MAY							
28...	0930	8.5	--	372	16	16	76
JUN							
06...	0900	8.0	--	626	119	201	76
10...	1400	14.5	--	545	31	46	68
JUL							
01...	1100	12.0	--	293	10	7.9	82
19...	1300	18.5	--	51	4	0.55	78
AUG							
14...	1415	20.0	--	14	4	0.15	86

PEND OREILLE RIVER BASIN

12324200 CLARK FORK AT DEER LODGE, MT

LOCATION.--Lat 46°23'52", long 112°44'31", in SW1/4SW1/4SW1/4 sec.33, T.8 N., R.9 W., Powell County, Hydrologic Unit 17010201, on left bank 35 ft upstream from Milwaukee Avenue Bridge in Deer Lodge, 0.05 mi upstream from Taylor Creek, 0.24 mi downstream from Tin Cup Joe Creek, and at river mile 461.2.

DRAINAGE AREA.--1,005 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1978 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 4,502.24 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Nov. 27-29, Dec. 7, 8, Dec. 12 to Jan. 10, Jan. 20 to Feb. 2, Mar. 1-3. Water-discharge records good except those for estimated daily discharges, which are fair. Diversions upstream from station for irrigation of about 31,000 acres. Some regulation by settling ponds on Silver Bow Creek near Warm Springs.

AVERAGE DISCHARGE.--13 years, 275 ft^3/s, 199,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,500 ft^3/s, May 23, 1981, gage height, 5.35 ft; minimum daily, 22 ft^3/s, Aug. 18, 1988, Aug. 6, 9, 10, 1991.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 18	2300	a	*4.54				
June 8	0030	*1,020	4.02	No other peak greater than base discharge.			

a--backwater from ice

Minimum daily discharge, 22 ft^3/s, Aug. 6, 9, 10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	96	174	171	e150	e160	e160	189	168	324	322	25	69
2	97	164	155	e155	e170	e155	186	158	307	291	26	53
3	100	168	159	e150	173	e175	190	159	329	262	27	57
4	105	188	170	e140	184	197	195	164	360	237	26	63
5	110	214	184	e140	199	202	199	161	483	221	25	64
6	110	219	174	e150	201	179	207	156	663	207	22	59
7	112	205	e160	e150	207	175	217	155	826	159	26	60
8	119	218	e170	e160	204	178	205	155	924	151	25	69
9	124	223	181	e170	189	184	195	163	797	139	22	85
10	130	216	180	e180	195	191	180	177	685	141	22	91
11	129	205	184	186	192	188	177	197	664	148	24	92
12	135	201	e165	191	177	186	185	224	685	151	23	104
13	139	193	e160	190	176	189	191	217	633	139	23	100
14	134	186	e150	192	177	191	191	223	585	120	23	111
15	155	179	e145	192	182	196	184	236	493	127	23	139
16	172	174	e140	190	200	191	181	250	411	112	23	125
17	168	184	e150	194	205	182	179	248	366	95	23	116
18	172	187	e160	192	196	177	185	314	313	91	23	114
19	183	187	e140	188	194	188	185	458	289	89	26	112
20	181	192	e120	e185	212	188	186	468	404	59	24	112
21	183	191	e125	e170	212	189	182	430	523	51	24	106
22	196	202	e125	e160	209	190	178	406	440	46	32	97
23	188	213	e130	e170	207	189	186	399	403	38	38	104
24	189	204	e130	e160	201	189	191	405	387	34	35	108
25	194	194	e135	e150	197	188	193	432	372	31	31	104
26	194	193	e145	e140	195	178	196	456	347	37	28	97
27	184	e155	e150	e140	193	196	188	429	316	40	28	98
28	187	e160	e140	e135	183	194	183	429	308	37	54	95
29	184	e170	e130	e130	---	188	176	365	297	34	56	103
30	165	193	e135	e135	---	180	175	345	305	31	54	104
31	172	---	e145	e150	---	183	---	345	---	27	73	---
TOTAL	4707	5752	4708	5085	5390	5736	5655	8892	14239	3667	934	2811
MEAN	152	192	152	164	192	185	188	287	475	118	30.1	93.7
MAX	196	223	184	194	212	202	217	468	924	322	73	139
MIN	96	155	120	130	160	155	175	155	289	27	22	53
AC-FT	9340	11410	9340	10090	10690	11380	11220	17640	28240	7270	1850	5580

CAL YR 1990 TOTAL 64015 MEAN 175 MAX 490 MIN 29 AC-FT 127000
WTR YR 1991 TOTAL 67576 MEAN 185 MAX 924 MIN 22 AC-FT 134000

e Estimated

PERIOD OF RECORD.--Water years 1969-71, 1979-83, 1985 to current year.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: October 1978 to September 1983.
SUSPENDED-SEDIMENT DISCHARGE: March 1985 to August 1986, April 1987 to current year.

REMARKS.--Unpublished records of once-daily water temperature are available in files of District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE (water years 1978-1983): Maximum, 23.0°C, on several days in 1979, 1980, and 1983; minimum, 0.0°C on many days during winter periods.
SEDIMENT CONCENTRATION: Maximum daily mean, 760 mg/L, Mar. 10, 1989; minimum daily mean, 2 mg/L, July 14, 15, 1991
SEDIMENT LOAD: Maximum daily, 2,840 tons, Feb. 24, 1986; minimum daily, 0.19 ton, Aug. 10, 1988.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATION: Maximum daily mean, 320 mg/L, June 6; minimum daily mean, 2 mg/L, July 14, 15.
SEDIMENT LOAD: Maximum daily, 703 tons, June 7; minimum daily, 0.45 ton, Aug. 20.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
04...	1245	102	--	--	577	21.0	12.0	--	--	--
24...	1415	167	50	1	550	15.0	5.0	12	5.4	78
NOV										
21...	1225	176	60	2	588	1.5	1.0	11	5.2	85
JAN										
04...	1345	143	0	0	625	-12.0	0.0	22	8.5	74
14...	1030	189	100	2	--	5.0	0.0	18	9.2	79
15...	1250	181	--	--	571	6.0	1.0	--	--	--
FEB										
13...	1220	169	100	3	568	6.0	3.0	24	11	85
MAR										
06...	1445	168	100	2	545	10.0	2.0	18	8.2	87
APR										
01...	1310	189	80	3	539	25.0	10.0	26	13	79
25...	1145	189	100	2	--	6.0	7.0	24	12	83
MAY										
14...	1205	219	100	3	542	14.5	11.0	46	27	82
22...	1630	413	--	--	404	21.0	17.0	--	--	--
28...	1200	443	100	2	360	12.0	10.5	55	66	74
JUN										
06...	1100	648	25	1	299	22.5	10.0	332	581	60
10...	1530	714	10	1	265	25.5	16.0	125	241	58
JUL										
01...	0930	323	25	1	--	27.0	12.5	24	21	68
09...	1140	135	--	--	445	22.5	17.0	--	--	--
AUG										
14...	1620	25	30	1	500	24.0	21.5	9	0.61	67
16...	0915	24	--	--	524	18.0	13.5	--	--	--
22...	1350	34	--	--	527	32.0	21.0	--	--	--

PEND OREILLE RIVER BASIN

12324200 CLARK FORK AT DEER LODGE, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	BICARBONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CARBONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STANDARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)
OCT											
24...	1415	193	3	163	8.5	260	75	17	8	8	<1
MAR											
06...	1445	186	0	149	8.2	250	74	15	13	8	<1
MAY											
28...	1200	121	0	97	8.3	160	49	9.0	32	24	<1
JUN											
06...	1100	103	0	83	8.1	140	42	7.7	87	24	2
AUG											
14...	1620	199	10	178	8.5	220	65	14	15	12	<1

DATE	CADMIUM DISSOLVED (UG/L AS CD) (01025)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
OCT											
24...	<1	18	5	250	<3	2	<1	80	21	40	7
MAR											
06...	<1	29	4	590	7	5	<1	140	50	30	13
MAY											
28...	<1	100	11	1600	23	13	<1	340	26	100	16
JUN											
06...	<1	420	18	7300	32	59	1	970	73	380	19
AUG											
14...	<1	14	8	60	7	2	<1	30	12	10	3

PEND OREILLE RIVER BASIN

12324200 CLARK FORK AT DEER LODGE, MT--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	9	2.3	12	5.6	14	6.5	27	11	32	14	26	11
2	9	2.4	11	4.9	16	6.7	21	8.8	37	17	28	12
3	10	2.7	12	5.4	17	7.3	20	8.1	41	19	29	14
4	11	3.1	12	6.1	17	7.8	22	8.3	44	22	29	15
5	12	3.6	13	7.5	15	7.5	34	13	46	25	25	14
6	15	4.5	14	8.3	14	6.6	29	12	49	27	22	11
7	17	5.1	13	7.2	15	6.5	20	8.1	52	29	21	9.9
8	15	4.8	14	8.2	15	6.9	17	7.3	40	22	24	12
9	12	4.0	15	9.0	16	7.8	16	7.3	26	13	26	13
10	9	3.2	14	8.2	15	7.3	16	7.8	16	8.4	24	12
11	8	2.8	12	6.6	13	6.5	16	8.0	13	6.7	22	11
12	8	2.9	11	6.0	12	5.3	17	8.8	15	7.2	22	11
13	8	3.0	11	5.7	12	5.2	18	9.2	25	12	23	12
14	9	3.3	11	5.5	9	3.6	19	9.8	31	15	25	13
15	11	4.6	11	5.3	6	2.3	21	11	31	15	26	14
16	13	6.0	11	5.2	5	1.9	21	11	31	17	25	13
17	13	5.9	11	5.5	5	2.0	20	10	30	17	25	12
18	13	6.0	11	5.6	8	3.5	14	7.3	29	15	25	12
19	12	5.9	11	5.6	8	3.0	10	5.1	28	15	25	13
20	12	5.9	12	6.2	8	2.6	9	4.5	28	16	25	13
21	12	5.9	11	5.7	8	2.7	14	6.4	27	15	21	11
22	12	6.4	10	5.5	8	2.7	23	9.9	25	14	22	11
23	12	6.1	12	6.9	8	2.8	28	13	24	13	20	10
24	12	6.1	13	7.2	8	2.8	30	13	26	14	18	9.2
25	15	7.9	12	6.3	8	2.9	31	13	28	15	21	11
26	14	7.3	11	5.7	10	3.9	31	12	28	15	25	12
27	13	6.5	10	4.2	16	6.5	20	7.6	26	14	26	14
28	11	5.6	10	4.3	25	9.5	14	5.1	25	12	27	14
29	12	6.0	12	5.5	35	12	12	4.2	---	---	26	13
30	12	5.3	13	6.8	40	15	18	6.6	---	---	22	11
31	12	5.6	---	---	33	13	26	11	---	---	20	9.9
TOTAL	---	150.7	---	185.7	---	180.6	---	278.2	---	444.3	---	374.0
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	26	13	17	7.7	35	31	22	19	27	1.8	6	1.1
2	28	14	17	7.3	34	28	14	11	23	1.6	6	.86
3	24	12	15	6.4	42	37	12	8.5	24	1.7	8	1.2
4	30	16	16	7.1	50	49	9	5.8	33	2.3	10	1.7
5	35	19	15	6.5	200	261	7	4.2	28	1.9	10	1.7
6	35	20	12	5.1	320	573	13	7.3	18	1.1	8	1.3
7	34	20	11	4.6	315	703	22	9.4	19	1.3	7	1.1
8	28	15	13	5.4	258	644	22	9.0	23	1.6	7	1.3
9	24	13	16	7.0	150	323	20	7.5	20	1.2	8	1.8
10	19	9.2	20	9.6	121	224	18	6.9	15	.89	10	2.5
11	19	9.1	24	13	110	197	16	6.4	10	.65	10	2.5
12	24	12	34	21	108	200	10	4.1	8	.50	11	3.1
13	24	12	30	18	75	128	4	1.5	8	.50	13	3.5
14	22	11	34	20	55	87	2	.65	9	.56	15	4.5
15	23	11	34	22	59	79	2	.69	10	.62	16	6.0
16	19	9.3	39	26	37	41	4	1.2	13	.81	16	5.4
17	21	10	39	26	32	32	9	2.3	14	.87	14	4.4
18	21	10	67	57	39	33	14	3.4	14	.87	14	4.3
19	22	11	275	340	38	30	18	4.3	11	.77	14	4.2
20	23	12	155	196	64	70	20	3.2	7	.45	17	5.1
21	23	11	90	104	54	76	24	3.3	8	.52	22	6.3
22	20	9.6	78	86	28	33	32	4.0	20	1.7	21	5.5
23	20	10	71	76	26	28	38	3.9	22	2.3	18	5.1
24	20	10	75	82	20	21	37	3.4	26	2.5	16	4.7
25	23	12	83	97	19	19	34	2.8	29	2.4	15	4.2
26	20	11	83	102	20	19	28	2.8	30	2.3	13	3.4
27	18	9.1	73	85	18	15	23	2.5	30	2.3	12	3.2
28	18	8.9	54	63	26	22	23	2.3	28	4.1	11	2.8
29	17	8.1	42	41	32	26	28	2.6	21	3.2	13	3.6
30	17	8.0	36	34	32	26	30	2.5	14	2.0	14	3.9
31	---	---	37	34	---	---	30	2.2	9	1.8	---	---
TOTAL	---	356.3	---	1609.7	---	4055	---	148.64	---	47.11	---	100.26

TOTAL LOAD FOR YEAR: 7930.51 TONS

PEND OREILLE RIVER BASIN

12324590 LITTLE BLACKFOOT RIVER NEAR GARRISON, MT

LOCATION.--Lat 46°32'12", long 112°43'33", in SE1/4NE1/4 sec.16, T.9 N., R.9 W., Powell County, Hydrologic Unit 17010201, on left bank 200 ft downstream from bridge on county road, 4 mi east of Garrison, and at river mile 4.0.

DRAINAGE AREA.--398 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1972 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 4,430 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Oct. 4 to Nov. 21, Dec. 20 to Feb. 10. Water-discharge records good except those for estimated daily discharges, which are fair. A few minor irrigation holding reservoirs in upper reaches of drainage. Diversions for irrigation of about 10,500 acres upstream from station.

AVERAGE DISCHARGE.--19 years, 162 ft^3/s, 117,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,650 ft^3/s, May 21, 1981, gage height, 8.79 ft, from floodmark; minimum, 6.0 ft^3/s, Aug. 24, 1977, gage height, 2.94 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 900 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 19	1200	*906	*4.83	No other peak greater than base discharge.			

Minimum daily discharge, 21 ft^3/s, Aug. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	45	e58	54	e50	e50	79	94	139	404	174	63	29
2	45	e58	60	e46	e52	103	113	137	362	156	65	29
3	47	e56	57	e44	e52	93	131	129	338	135	61	30
4	e49	e58	59	e42	e54	93	127	126	328	126	57	31
5	e50	e60	60	e40	e54	167	166	123	434	115	54	30
6	e50	e64	60	e42	e52	89	172	127	441	89	53	31
7	e50	e66	57	e44	e56	69	141	134	500	85	52	34
8	e52	e68	58	e46	e54	66	125	140	449	88	50	35
9	e52	e70	58	e46	e52	62	115	145	386	88	43	33
10	e54	e70	59	e46	e52	69	111	136	347	88	39	31
11	e56	e70	62	e50	55	71	107	164	323	81	34	47
12	e56	e68	60	e54	53	63	99	253	305	86	34	45
13	e58	e66	50	e54	51	63	100	271	276	86	32	42
14	e58	e64	51	e52	52	61	105	301	251	89	27	44
15	e60	e62	42	e50	55	61	111	319	237	92	29	48
16	e62	e60	48	e52	70	60	108	338	226	97	30	50
17	e62	e60	52	e54	83	60	105	401	222	91	30	48
18	e62	e60	50	e58	68	60	101	591	197	88	31	47
19	e62	e62	37	e52	66	69	103	851	186	84	30	47
20	e62	e62	e36	e48	285	83	108	780	339	80	29	45
21	e64	e62	e34	e46	178	84	123	718	443	75	25	42
22	e64	69	e32	e46	112	80	137	681	286	73	23	42
23	e64	74	e34	e44	104	73	156	676	246	74	21	43
24	e64	72	e36	e42	83	71	172	629	233	74	22	44
25	e64	73	e38	e40	74	65	182	608	226	69	23	44
26	e64	76	e38	e38	71	61	164	585	208	72	24	49
27	e64	66	e40	e40	69	64	154	540	194	70	25	44
28	e62	61	e38	e38	67	62	149	511	179	67	31	43
29	e62	66	e34	e36	---	61	146	460	171	62	31	45
30	e60	68	e36	e36	---	61	144	443	180	60	31	44
31	e60	---	e40	e40	---	75	---	455	---	62	29	---
TOTAL	1784	1949	1470	1416	2124	2298	3869	11911	8917	2776	1128	1216
MEAN	57.5	65.0	47.4	45.7	75.9	74.1	129	384	297	89.5	36.4	40.5
MAX	64	76	62	58	285	167	182	851	500	174	65	50
MIN	45	56	32	36	50	60	94	123	171	60	21	29
AC-FT	3540	3870	2920	2810	4210	4560	7670	23630	17690	5510	2240	2410

CAL YR 1990 TOTAL 59180 MEAN 162 MAX 974 MIN 32 AC-FT 117400
WTR YR 1991 TOTAL 40858 MEAN 112 MAX 851 MIN 21 AC-FT 81040

e Estimated

12324590 LITTLE BLACKFOOT RIVER NEAR GARRISON, MT--Continued

WATER QUALITY RECORDS

PERIOD OF RECORD.--Water years 1985 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT											
04...	1030	--	47	--	--	295	19.0	10.0	--	--	--
24...	1615	--	61	20	1	275	19.0	7.0	1	0.16	90
NOV											
21...	1005	--	58	--	--	289	1.0	1.5	--	--	--
JAN											
03...	1230	--	44	--	--	288	-11.0	0.0	--	--	--
14...	1330	E52	--	100	2	--	7.5	0.0	4	E0.56	95
FEB											
07...	0900	E56	--	0	0	--	-2.5	0.0	9	E1.4	79
12...	1135	--	52	--	--	275	0.0	2.0	--	--	--
MAR											
06...	1015	--	73	100	2	--	-0.5	0.0	8	1.6	87
28...	1120	--	59	--	--	288	4.5	3.0	--	--	--
APR											
09...	0900	--	117	100	2	--	4.5	3.0	10	3.2	50
25...	0930	--	188	100	2	--	4.5	4.5	18	9.1	90
MAY											
14...	1825	--	313	--	--	175	13.0	10.0	--	--	--
19...	1715	--	863	20	1	161	18.5	11.5	248	578	61
20...	1100	--	777	--	--	150	12.0	8.0	--	--	--
JUN											
03...	1245	--	355	--	--	180	20.0	13.0	--	--	--
10...	1630	--	360	20	1	195	21.0	16.0	7	6.8	81
JUL											
01...	0830	--	185	25	1	--	--	--	3	1.5	82
09...	1330	--	94	--	--	269	27.0	17.0	--	--	--
AUG											
14...	1050	--	28	0	0	270	17.5	16.0	1	0.08	80
22...	1030	--	25	--	--	296	22.0	16.0	--	--	--

DATE	TIME	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)
OCT											
24...	1615	152	5	129	8.4	130	39	8.9	5	5	<1
MAY											
19...	1715	79	0	64	8.0	74	21	5.2	12	6	<1
AUG											
14...	1050	156	3	132	8.5	130	39	8.8	7	7	<1

DATE	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
OCT											
24...	<1	2	1	40	3	1	<1	10	3	10	<3
MAY											
19...	<1	11	3	5700	100	14	<1	230	18	50	24
AUG											
14...	<1	2	1	50	7	1	<1	<10	4	<10	4

PEND OREILLE RIVER BASIN

12324680 CLARK FORK AT GOLDCREEK, MT

LOCATION.--Lat 46°35'26", long 112°55'40", in SE1/4NW1/4SW1/4 sec.25, T.10 N., R.11 W., Powell County, Hydrologic Unit 17010201, on right bank at county road bridge, 0.4 mi north of the town of Goldcreek, 1.1 mi downstream from Gold Creek, and at river mile 436.9.

DRAINAGE AREA.--1,704 mi^2.

PERIOD OF RECORD.--October 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is 4,172.80 ft above National Geodetic Vertical Datum of 1929. June 13 to Oct. 21, 1982, nonrecording gage at site 350 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Dec. 19 to Feb. 18. Records good except those for estimated daily discharges, which are fair. Some regulation by settling ponds on Silver Bow Creek near Warm Springs. Diversion for irrigation of about 40,100 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--14 years, 552 ft^3/s, 399,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft^3/s, May 22, 1981, gage height, 11.17 ft, from floodmarks, from rating curve extended above 6,500 ft^3/s on basis of contracted-opening measurement of peak flow; minimum daily, 55 ft^3/s, Sept. 4, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,140 ft^3/s, June 8, gage height, 6.52 ft; minimum daily, 79 ft^3/s, Aug. 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	189	307	325	e270	e260	235	323	329	828	687	152	102
2	194	296	293	e230	e300	254	349	314	767	622	153	105
3	204	290	297	e220	e310	337	371	313	769	560	148	99
4	218	310	316	e230	e320	327	371	308	847	516	148	98
5	232	356	311	e240	e310	456	412	307	1160	475	151	99
6	236	351	293	e250	e310	334	434	302	1460	411	148	100
7	240	342	306	e260	e310	294	425	302	1930	346	147	95
8	249	350	314	e270	e310	293	400	309	2040	314	145	105
9	254	358	358	e280	e320	294	367	329	1690	288	140	123
10	263	372	304	e280	e310	311	353	336	1500	270	132	123
11	272	351	307	e300	e300	333	343	367	1430	267	125	174
12	274	344	299	e320	e280	320	339	495	1450	266	120	174
13	278	338	276	e330	e290	306	345	530	1340	245	114	164
14	275	331	320	e320	e310	304	346	556	1180	245	102	173
15	289	320	272	e310	e340	307	347	594	1010	249	97	183
16	320	310	248	e300	e390	304	339	627	864	254	97	211
17	320	309	268	e310	e420	299	335	691	789	247	95	201
18	314	318	255	e330	e400	292	334	969	690	215	93	209
19	328	321	e250	e310	392	306	330	1650	617	209	97	221
20	326	327	e230	e290	555	328	333	1550	866	190	94	211
21	324	321	e230	e270	513	326	341	1420	1300	161	88	205
22	342	328	e220	e270	379	324	354	1350	1020	150	84	194
23	340	355	e210	e260	362	319	366	1310	892	148	84	196
24	331	350	e220	e250	333	314	394	1260	849	143	83	203
25	334	337	e230	e240	319	312	403	1260	817	140	80	206
26	337	338	e220	e230	308	288	394	1270	752	156	82	198
27	321	309	e240	e230	307	318	369	1170	695	160	79	200
28	320	324	e220	e220	298	307	359	1110	666	157	98	194
29	319	341	e210	e220	---	300	347	970	649	153	102	194
30	308	349	e230	e210	---	295	344	911	666	143	91	201
31	302	---	e250	e230	---	305	---	901	---	147	92	---
TOTAL	8853	9953	8322	8280	9556	9642	10867	24110	31533	8534	3461	4961
MEAN	286	332	268	267	341	311	362	778	1051	275	112	165
MAX	342	372	358	330	555	456	434	1650	2040	687	153	221
MIN	189	290	210	210	260	235	323	302	617	140	79	95
AC-FT	17560	19740	16510	16420	18950	19120	21550	47820	62550	16930	6860	9840

CAL YR 1990 TOTAL 149516 MEAN 410 MAX 1750 MIN 141 AC-FT 296600
WTR YR 1991 TOTAL 138072 MEAN 378 MAX 2040 MIN 79 AC-FT 273900

e Estimated

PEND OREILLE RIVER BASIN

12325500 FLINT CREEK NEAR SOUTHERN CROSS, MT

LOCATION.--Lat 46°13'59", long 113°17'56", in SE1/4NW1/4 sec.36, T.6 N., R.14 W., Granite County, Hydrologic Unit 17010202, on left wing of weir 0.5 mi downstream from power plant, 2.0 mi downstream from Georgetown Dam, 3.5 mi northwest of Southern Cross, 6.8 mi south of Philipsburg, and at river mile 36.8.

DRAINAGE AREA.--52.6 mi^2.

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

REVISED RECORDS.--WSP 1216: 1942(M). WSP 1246: Drainage area.

GAGE.--Water-stage recorder and sharp-crested, contracted, rectangular weir. Elevation of gage is 5,630 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to June 3, 1982, nonrecording gage at same site and datum. Prior to Nov. 27, 1973, gage at same site and datum 0.20 ft higher.

REMARKS.--No estimated daily discharges during year. Records good. Flow regulated by Georgetown Lake (station number 12325000). Several observations of water temperature and specific conductance were made during the water year. Flow may be augumented by transbasin diversion from Silver Lake to Georgetown Lake or reduced by pumping from Georgetown Lake to Silver Lake.

AVERAGE DISCHARGE.--51 years, 29.4 ft^3/s, 21,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 174 ft^3/s, June 13, 1942, gage height, 1.86 ft; maximum gage height observed, 2.60 ft June 19-23, 1980; probably no flow for parts of May 23, 1942, Aug. 20, 1943, Oct. 6, 1954, Nov. 29, Dec. 1, 1966, and no flow Nov. 30, 1966, when generator was shut down.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 61 ft^3/s, June 4, gage height, 1.37 ft; minimum daily, 4.2 ft^3/s, Sept. 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29	9.8	9.4	9.4	9.4	9.4	21	22	60	34	29	28
2	29	9.8	9.4	9.4	9.4	9.4	21	22	60	34	28	28
3	29	9.8	9.4	9.4	9.4	9.4	21	22	60	34	28	28
4	29	9.8	9.4	9.4	9.4	9.4	21	22	60	34	28	28
5	29	9.8	9.4	9.4	9.4	9.4	21	22	60	34	29	28
6	29	9.8	9.4	9.4	9.4	9.4	21	22	60	34	29	28
7	29	9.8	9.4	9.4	9.4	9.4	21	22	60	34	29	28
8	29	9.8	9.4	9.4	9.4	9.4	21	22	60	34	28	29
9	29	9.8	9.4	9.4	9.4	9.4	21	22	60	34	28	28
10	29	9.8	9.4	9.4	9.4	9.4	21	22	60	31	28	28
11	30	9.8	9.4	9.4	9.4	9.4	21	22	60	29	28	29
12	30	9.8	9.4	9.4	9.4	9.4	21	22	60	29	28	28
13	30	9.8	9.4	9.4	9.4	12	21	22	60	29	28	28
14	30	9.5	9.4	9.4	9.4	20	21	23	60	29	28	29
15	30	9.4	9.4	9.4	9.4	20	21	23	60	29	28	29
16	30	9.4	9.4	9.3	9.4	21	21	22	60	29	28	29
17	25	9.4	9.4	9.0	9.4	21	21	23	60	29	29	28
18	19	9.4	9.4	9.3	9.4	21	21	23	60	29	28	28
19	17	9.4	9.4	9.4	9.4	21	21	23	49	29	28	28
20	10	9.4	9.4	9.4	9.4	21	22	33	35	29	28	28
21	9.8	9.4	9.4	9.4	9.4	21	22	46	35	29	28	28
22	9.8	9.4	9.4	9.3	9.4	21	22	47	35	29	28	28
23	9.8	9.4	9.4	9.3	9.4	21	22	47	34	29	28	28
24	9.8	9.4	9.6	9.4	9.4	21	22	47	34	28	28	21
25	9.8	9.4	9.8	9.4	9.4	21	22	47	34	28	28	8.2
26	9.8	9.4	9.5	9.4	9.4	21	22	46	34	29	28	4.2
27	9.8	9.4	9.4	9.4	9.4	21	22	47	34	28	29	9.4
28	9.8	9.4	9.4	9.4	9.4	21	22	47	34	28	29	25
29	9.8	9.4	9.4	9.4	---	21	22	46	34	28	29	26
30	9.8	9.4	9.6	9.4	---	21	22	52	34	28	29	26
31	9.8	---	9.8	9.4	---	21	---	60	---	28	28	---
TOTAL	648.8	287.3	292.7	290.6	263.2	500.8	641	988	1506	939	877	768.8
MEAN	20.9	9.58	9.44	9.37	9.40	16.2	21.4	31.9	50.2	30.3	28.3	25.6
MAX	30	9.8	9.8	9.4	9.4	21	22	60	60	34	29	29
MIN	9.8	9.4	9.4	9.0	9.4	9.4	21	22	34	28	28	4.2
AC-FT	1290	570	581	576	522	993	1270	1960	2990	1860	1740	1520

CAL YR 1990 TOTAL 7546.8 MEAN 20.7 MAX 95 MIN 9.4 AC-FT 14970
WTR YR 1991 TOTAL 8003.2 MEAN 21.9 MAX 60 MIN 4.2 AC-FT 15870

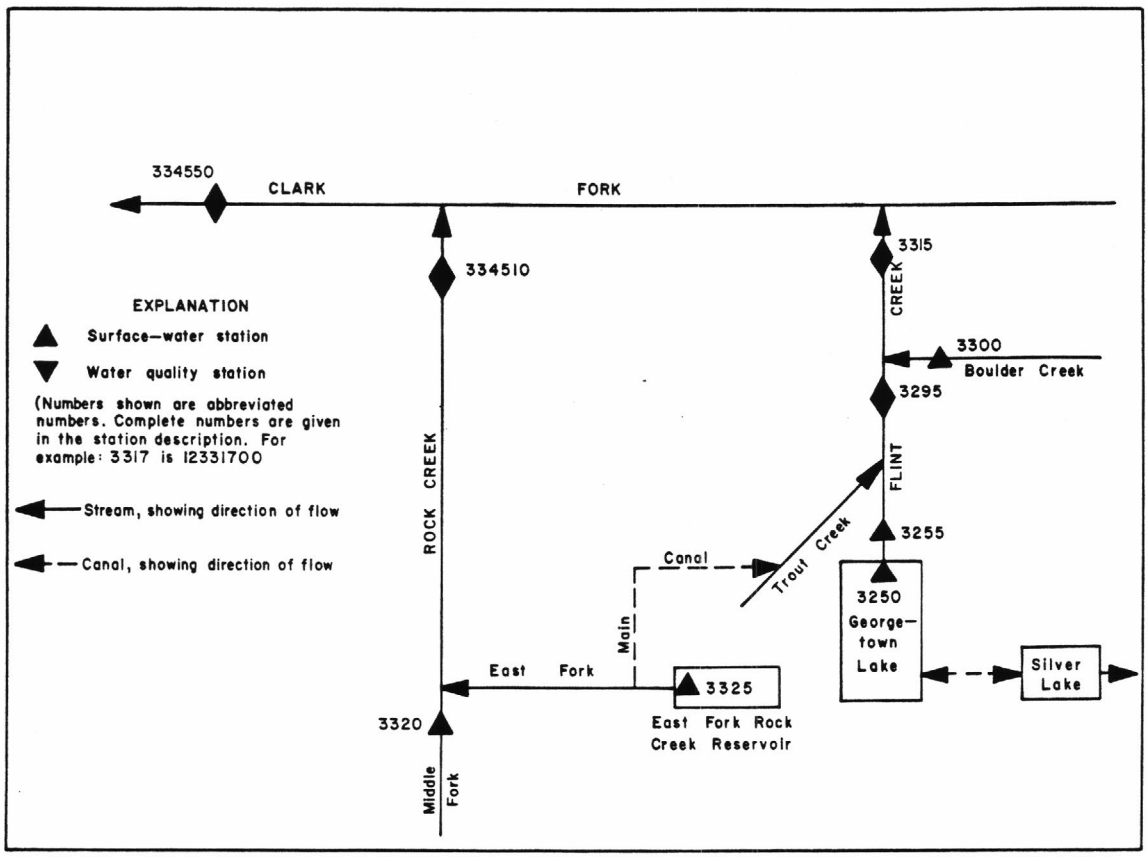

Figure 14.--Schematic diagram showing diversions and storage in Flint and Rock Creek basins.

PEND OREILLE RIVER BASIN

12329500 FLINT CREEK AT MAXVILLE, MT

LOCATION.--Lat 46°27'50", long 113°14'20", in NE1/4SW1/4NW1/4 sec.9, T.8 N., R.13 W., Granite County, Hydrologic Unit 17010202, on right bank 0.4 mi west of Maxville and 1.0 mi upstream from Boulder Creek.

DRAINAGE AREA.--208 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1941 to current year. April 1939 to September 1941 at site 0.5 mi upstream; records not equivalent owing to diversions.

REVISED RECORDS.--WSP 1216: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 4,828.38 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Dec. 13-15, 18-31, Jan. 4-6, 19-30, Feb. 28, Mar. 1, 2, 26, 27. Water-discharge records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year. Some regulation by Georgetown Lake (station number 12325000). Diversions for irrigation of about 8,200 acres upstream from station. During irrigation season, flow is supplemented by water from East Fork Rock Creek which is diverted in sec.5, T.4 N., R.14 W., 500 ft below Rock Creek Dam, through a canal into Trout Creek, thence into Flint Creek.

AVERAGE DISCHARGE.--50 years, 98.7 ft^3/s, 71,510 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,680 ft^3/s, Mar. 28, 1943, gage height, 6.79 ft, from rating curve extended above 600 ft^3/s; maximum gage height, 8.08 ft, Feb. 4, 1963, backwater from ice; minimum daily discharge, 15 ft^3/s, Feb. 25, 1962.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 246 ft^3/s, June 7, gage height, 3.70 ft; minimum daily, 22 ft^3/s, Dec. 20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	52	54	43	34	35	e28	57	59	79	119	103	43
2	56	52	38	35	39	e32	58	56	84	102	123	42
3	59	47	44	36	42	44	60	55	99	95	114	42
4	58	54	48	e33	44	55	60	52	102	80	79	44
5	57	59	50	e30	45	58	64	50	116	74	62	46
6	63	55	47	e33	44	41	65	50	164	74	79	46
7	65	53	43	34	39	40	63	52	204	71	96	44
8	67	57	47	36	40	42	60	53	197	72	102	54
9	66	58	50	38	39	39	58	62	147	60	101	56
10	65	62	51	39	39	43	56	61	160	61	93	48
11	65	58	52	40	38	41	56	63	174	63	100	60
12	66	56	46	41	40	39	55	64	153	54	100	59
13	68	55	e41	41	40	41	57	61	137	49	98	51
14	69	55	e40	40	40	44	61	65	117	54	95	52
15	68	55	e39	43	44	46	59	71	103	57	91	55
16	70	51	36	42	51	47	58	69	101	53	86	52
17	69	53	36	41	49	47	57	78	105	58	86	51
18	65	55	e32	41	44	47	58	131	100	71	86	49
19	63	54	e27	e41	44	51	57	152	99	83	83	50
20	62	54	e22	e37	51	51	57	119	197	79	77	50
21	59	50	e24	e26	50	50	59	104	181	82	71	58
22	61	53	e26	e27	48	50	60	106	138	87	77	58
23	58	53	e29	e28	47	50	61	116	144	92	77	62
24	56	52	e31	e28	45	50	64	121	134	104	80	60
25	56	53	e32	e27	45	48	66	127	128	108	81	59
26	56	54	e33	e26	43	e46	64	108	116	121	85	57
27	56	44	e33	e27	42	e47	61	86	113	108	67	56
28	56	47	e28	e26	e40	49	59	95	104	98	66	57
29	55	50	e24	e25	---	49	59	71	102	71	53	66
30	54	51	e26	e28	---	50	61	75	125	60	47	66
31	53	---	e30	31	---	55	---	83	---	68	44	---
TOTAL	1893	1604	1148	1054	1207	1420	1790	2515	3923	2428	2602	1593
MEAN	61.1	53.5	37.0	34.0	43.1	45.8	59.7	81.1	131	78.3	83.9	53.1
MAX	70	62	52	43	51	58	66	152	204	121	123	66
MIN	52	44	22	25	35	28	55	50	79	49	44	42
AC-FT	3750	3180	2280	2090	2390	2820	3550	4990	7780	4820	5160	3160

CAL YR 1990 TOTAL 25927 MEAN 71.0 MAX 228 MIN 22 AC-FT 51430
WTR YR 1991 TOTAL 23177 MEAN 63.5 MAX 204 MIN 22 AC-FT 45970

e Estimated

PEND OREILLE RIVER BASIN

12329500 FLINT CREEK AT MAXVILLE, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--November 1990 to August 1991.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV										
21...	1300	56	--	--	317	1.0	0.5	--	--	--
JAN										
03...	1405	36	--	--	328	-8.0	0.0	--	--	--
FEB										
12...	1355	40	--	--	308	6.0	1.0	--	--	--
MAR										
14...	1500	41	90	1	302	7.5	3.5	--	--	--
APR										
02...	1555	56	--	--	280	8.0	8.0	--	--	--
12...	1315	48	60	1	285	7.5	4.0	19	2.5	93
MAY										
02...	1330	54	100	71	280	3.5	4.0	--	--	--
13...	1030	59	5	1	276	15.0	7.5	--	--	--
21...	1245	107	--	--	175	17.0	10.0	--	--	--
30...	1310	69	--	2	240	11.5	10.5	--	--	--
JUN										
07...	1300	199	--	--	145	20.0	10.0	--	--	--
12...	1130	162	1	1	134	21.0	9.5	--	--	--
27...	1145	110	40	1	252	18.0	12.5	--	--	--
JUL										
10...	1600	62	--	--	309	26.0	18.0	--	--	--
12...	1030	51	0	0	268	21.5	15.0	--	--	--
25...	1000	104	2	1	293	21.0	16.0	--	--	--
AUG										
08...	1130	101	0	0	295	24.0	15.5	--	--	--
15...	1030	93	--	--	308	16.0	14.0	--	--	--
22...	1000	77	0	0	289	20.0	14.5	--	--	--

DATE	TIME	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)
MAR											
14...	1500	8.6	--	--	--	--	--	--	--	--	--
APR											
12...	1315	8.6	130	34	12	--	--	--	--	--	--
MAY											
02...	1330	8.3	130	34	12	--	--	--	--	--	--
13...	1030	8.3	130	34	11	--	--	--	--	--	--
30...	1310	8.3	110	30	9.6	--	--	--	--	--	--
JUN											
12...	1130	8.1	61	16	5.2	--	--	--	--	--	--
27...	1145	8.3	120	32	9.9	--	--	--	--	--	--
JUL											
12...	1030	8.5	150	40	12	--	--	--	--	--	--
25...	1000	8.2	140	38	12	--	--	--	--	--	--
AUG											
08...	1130	8.3	140	37	12	--	--	--	--	--	--
22...	1000	8.4	140	37	12	8.7	0.3	2.8	150	11	2.4

12329500 FLINT CREEK AT MAXVILLE, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	ANTIMONY, TOTAL (UG/L AS SB) (01097)	ANTIMONY, DISSOLVED (UG/L AS SB) (01095)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DISSOLVED (UG/L AS CD) (01025)
MAR											
14...	--	--	--	--	--	2	--	12	--	<1	--
APR											
12...	--	--	--	--	--	1	<1	10	6	<1	<1
MAY											
02...	--	--	--	--	--	1	<1	12	7	<1	<1
13...	--	--	--	--	--	2	1	20	10	<1	<1
30...	--	--	--	--	--	3	3	27	10	<1	<1
JUN											
12...	--	--	--	--	--	6	2	35	11	<1	<1
27...	--	--	--	--	--	3	2	22	9	<1	<1
JUL											
12...	--	--	--	--	--	2	2	22	15	<1	<1
25...	--	--	--	--	--	4	1	31	12	<1	<1
AUG											
08...	--	--	--	--	--	3	2	24	8	<1	<1
22...	0.20	21	185	0.25	38.5	2	1	18	11	<1	<1

DATE	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
MAR										
14...	3	--	330	--	5	--	80	--	20	--
APR										
12...	8	1	490	11	8	1	130	58	10	4
MAY										
02...	7	1	380	16	9	<1	130	65	20	3
13...	11	1	760	18	13	<1	210	65	30	16
30...	34	13	830	33	21	2	240	49	60	13
JUN										
12...	8	<1	900	44	28	<1	360	32	70	34
27...	20	13	550	21	14	1	200	30	40	7
JUL										
12...	7	1	300	10	--	<1	160	80	20	5
25...	12	1	1000	13	--	2	310	36	60	6
AUG										
08...	6	2	700	9	14	<1	190	24	30	4
22...	5	<1	540	7	12	<1	160	34	20	<3

PEND OREILLE RIVER BASIN

462828113141901 FLINT CREEK BELOW LONDONDERRY MINE, NEAR MAXVILLE, MT

LOCATION.--Lat 46°28'28", long 113°14'19", in NE1/4NW1/4SW1/4 sec.4, T.8 N., R.13 W., Granite County, Hydrologic Unit 17010202, 0.2 mi downstream from Londonderry mine adit, approximately 0.3 mi upstream from mouth of Boulder Creek, and 0.8 mi northwest of Maxville.

PERIOD OF RECORD.--April to August 1991.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
APR											
12...	1030	55	50	1	270	5.0	2.0	8.1	130	34	12
AUG											
22...	1130	75	0	0	288	28.0	15.0	8.6	140	37	12

DATE	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
APR										
12...	--	--	--	--	--	--	--	--	--	--
AUG										
22...	8.7	0.3	2.7	150	10	2.5	0.20	21	184	0.25

DATE	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	ANTI-MONY, TOTAL (UG/L AS SB) (01097)	ANTI-MONY, DIS-SOLVED (UG/L AS SB) (01095)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)
APR										
12...	--	2	1	17	6	<1	<1	21	1	1200
AUG										
22...	37.3	2	2	18	12	<1	<1	5	<1	470

DATE	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR										
12...	11	19	<1	500	57	50	<3	25	3.7	91
AUG										
22...	10	12	<1	150	24	30	4	--	--	--

PEND OREILLE RIVER BASIN

12330000 BOULDER CREEK AT MAXVILLE, MT

LOCATION.--Lat 46°28'20", long 113°13'59", in SE1/4NE1/4SW1/4 sec.4, T.8 N., R.13 W., Granite County, Hydrologic Unit 17010202, on right bank 0.2 mi upstream from mouth and 0.7 mi north of Maxville.

DRAINAGE AREA.--71.3 mi^2.

PERIOD OF RECORD.--April 1939 to current year. Monthly discharge only for some periods, published in WSP 1316.

GAGE.--Water-stage recorder. Elevation of gage is 4,750 ft above National Geodetic Vertical Datum of 1929, from topographic map. Apr. 15, 1939, to July 7, 1941, nonrecording gage at site 75 ft upstream at different datum. July 8-20, 1941, nonrecording gage at site 175 ft upstream at datum 1.03 ft higher.

REMARKS.--Estimated daily discharges: Nov. 3, 7, Dec. 1-4, 7, 8, Dec. 12 to Jan. 2, Jan. 5-7, 21, 22, 25-27, 29-31, Feb. 28 to Mar. 3. Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year. Diversions upstream for irrigation of about 240 acres near the station.

AVERAGE DISCHARGE.--52 years, 46.3 ft^3/s, 33,540 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,460 ft^3/s, June 19, 1975, gage height, 4.55 ft, in gage well, 4.80 ft, from floodmarks; minimum, 3.0 ft^3/s about Mar. 24, 1964, gage height, 0.73 ft, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 220 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 7	0730	*370	*3.24	Only peak greater than base discharge.			

Minimum daily discharge, 3.6 ft^3/s, Sept. 27, 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.4	18	e16	e16	15	e14	13	6.9	89	75	9.3	9.5
2	6.6	16	e17	e16	15	e13	13	6.8	121	64	9.4	6.5
3	7.2	e15	e18	17	15	e14	13	6.4	162	60	8.9	6.0
4	7.4	16	e19	15	15	16	13	6.2	176	57	8.4	6.3
5	7.7	16	18	e14	15	16	15	6.2	212	56	8.2	5.9
6	7.9	17	17	e15	15	15	15	6.6	216	52	8.2	5.8
7	7.5	e18	e16	e16	15	15	14	8.1	312	48	8.0	5.9
8	7.2	20	e16	16	15	15	13	11	227	45	7.7	9.3
9	7.0	19	17	16	15	15	13	16	186	43	6.9	14
10	6.9	20	17	16	15	15	12	13	185	40	6.9	9.5
11	6.7	20	18	16	15	15	12	14	210	37	7.5	14
12	6.7	20	e17	16	15	15	12	22	190	34	7.1	12
13	7.0	20	e16	16	15	15	12	21	159	28	6.8	6.7
14	7.2	21	e17	16	15	15	11	31	132	29	6.8	7.4
15	7.3	21	e16	16	15	15	8.4	32	108	29	6.6	8.8
16	7.5	18	e16	16	16	15	9.4	34	99	26	11	8.4
17	7.2	20	e16	16	15	15	7.3	56	90	25	14	6.8
18	7.2	20	e16	16	15	15	5.7	155	81	24	14	5.8
19	11	20	e14	16	15	15	5.8	188	84	22	14	5.3
20	16	20	e11	16	15	15	6.0	140	147	19	14	4.7
21	16	19	e12	e14	15	15	6.3	126	125	14	13	4.5
22	19	19	e14	e14	15	15	7.2	146	104	13	13	4.1
23	18	19	e14	16	15	15	8.3	167	101	13	13	3.9
24	17	19	e14	16	15	15	9.7	172	91	12	13	3.9
25	17	20	e14	e14	15	15	15	179	81	12	12	3.9
26	18	20	e15	e14	15	15	9.9	134	74	13	12	3.7
27	18	18	e15	e15	15	15	9.6	110	73	12	12	3.6
28	18	19	e15	15	e14	15	7.3	92	68	11	17	3.6
29	18	19	e13	e13	---	15	7.3	85	64	9.8	14	4.0
30	18	19	e14	e14	---	14	7.2	90	87	9.3	13	3.9
31	17	---	e15	e14	---	15	---	89	---	8.9	12	---
TOTAL	349.6	566	483	476	420	462	311.4	2170.2	4054	941.0	327.7	197.7
MEAN	11.3	18.9	15.6	15.4	15.0	14.9	10.4	70.0	135	30.4	10.6	6.59
MAX	19	21	19	17	16	16	15	188	312	75	17	14
MIN	6.4	15	11	13	14	13	5.7	6.2	64	8.9	6.6	3.6
AC-FT	693	1120	958	944	833	916	618	4300	8040	1870	650	392

CAL YR 1990 TOTAL 11982.6 MEAN 32.8 MAX 284 MIN 6.4 AC-FT 23770
WTR YR 1991 TOTAL 10758.6 MEAN 29.5 MAX 312 MIN 3.6 AC-FT 21340

e Estimated

PEND OREILLE RIVER BASIN

12331500 FLINT CREEK NEAR DRUMMOND, MT

LOCATION.--Lat 46°37'44", long 113°09'02", in NE1/4NW1/4NE1/4 sec. 18, T.10 N.,R.12 W., Granite County, Hydrologic Unit 17010202, on left bank 5 ft upstream from county bridge, 2.0 mi upstream from mouth, and 2.7 mi south of Drummond.

DRAINAGE AREA.--490 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1990 to September 1991. June 1948 to September 1949 at same site with different datum.

GAGE.--Water-stage recorder. Datum of gage is 4,017.27 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Aug. 1-16, 1990, Nov. 27 to Dec. 8, Dec. 12 to Feb. 12, and Mar. 1-5. Water-discharge records good except those for estimated daily discharges, which are poor. Some regulation by Georgetown Lake (station number 12325000). Diversions for irrigation of about 25,000 acres of which 1,000 acres are downstream from station. During irrigation season, flow is supplemented by water from East Fork Rock Creek which is diverted in sec.5, T.4 N., R.14 W., 500 ft below Rock Creek Dam, through a canal into Trout Creek, thence into Flint Creek.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 418 ft3/s, June 7, 1991, gage height, 3.37 ft; maximum gage height recorded, 5.00 ft, Jan. 26, 1991, backwater from ice; minimum daily discharge, 2.0 ft3/s, July 18,21,30, 1991.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 418 ft3/s, June 7, gage height, 3.37 ft; maximum gage height recorded, 5.00 ft, Jan. 26, backwater from ice; minimum daily discharge, 2.0 ft3/s, July 18,21,30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR AUGUST 1990 TO SEPTEMBER 1990
MEAN VALUES

DATE	AUG	SEPT	DATE	AUG	SEPT	DATE	AUG	SEPT	DATE	AUG	SEPT	DATE	AUG	SEPT	DATE	AUG	SEPT
1	e15	36	6	e16	55	11	e9.0	62	16	e5.0	59	21	60	62	26	55	50
2	e15	36	7	e15	59	12	e10	63	17	4.9	61	22	47	62	27	48	50
3	e15	36	8	e12	65	13	e7.0	58	18	6.8	62	23	41	59	28	45	48
4	e16	46	9	e10	67	14	e5.0	59	19	21	61	24	40	59	29	42	48
5	e16	52	10	e9.0	62	15	e5.0	58	20	109	60	25	61	52	30	40	49
															31	36	--

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	45	112	e90	e70	e75	e70	88	90	58	140	4.3	17
2	46	108	e80	e75	e80	e65	92	81	67	107	11	14
3	51	99	e90	e70	e85	e70	94	77	86	93	14	13
4	54	109	e95	e65	e90	e80	94	69	104	75	10	14
5	63	117	e95	e60	e95	e85	105	63	174	68	5.2	16
6	98	110	e90	e65	e90	84	107	63	245	64	6.9	18
7	104	112	e90	e70	e85	81	102	63	367	48	7.6	19
8	114	117	e95	e75	e80	80	98	54	348	51	8.5	26
9	114	120	100	e70	e80	78	95	53	254	40	5.5	40
10	113	123	95	e70	e80	82	93	47	226	33	4.4	36
11	116	116	98	e75	e80	79	91	50	254	30	4.9	48
12	120	112	e90	e80	e85	74	91	40	225	26	4.5	38
13	121	111	e85	e90	86	78	92	32	169	17	4.1	35
14	122	111	e80	e95	88	78	96	23	118	3.7	4.5	36
15	123	113	e75	e90	90	82	92	20	90	2.9	4.4	36
16	134	108	e75	e90	99	82	91	7.7	78	2.8	3.7	37
17	129	110	e75	e90	97	82	91	2.6	71	2.2	4.2	38
18	124	112	e65	e90	84	79	88	115	54	2.0	5.3	36
19	123	111	e55	e85	82	84	89	308	61	2.4	4.9	37
20	129	110	e45	e80	99	84	89	272	238	2.3	4.9	39
21	127	104	e40	e75	100	82	91	212	288	2.0	4.3	38
22	131	109	e45	e70	88	82	92	187	189	2.2	4.2	41
23	127	109	e50	e70	86	80	94	193	182	2.5	3.6	44
24	122	107	e60	e70	82	81	100	184	175	2.8	4.0	45
25	120	110	e65	e65	80	78	110	193	167	4.0	4.5	43
26	117	e90	e65	e60	79	79	106	154	143	7.6	4.8	43
27	116	e85	e70	e65	77	83	101	108	121	8.3	5.3	50
28	115	e90	e60	e65	74	80	95	98	106	4.9	8.9	62
29	113	e100	e50	e60	---	79	94	64	97	3.7	7.2	70
30	110	e90	e55	e65	---	79	97	62	155	2.0	13	74
31	110	---	e60	e70	---	85	---	62	---	2.3	24	---
TOTAL	3351	3235	2283	2290	2396	2465	2858	3047.3	4910	852.6	206.6	1103
MEAN	108	108	73.6	73.9	85.6	79.5	95.3	98.3	164	27.5	6.66	36.8
MAX	134	123	100	95	100	85	110	308	367	140	24	74
MIN	45	85	40	60	74	65	88	2.6	54	2.0	3.6	13
AC-FT	6650	6420	4530	4540	4750	4890	5670	6040	9740	1690	410	2190

WTR YR 1991 TOTAL 28997.5 MEAN 79.4 MAX 367 MIN 2.0 AC-FT 57520

e Estimated

PEND OREILLE RIVER BASIN

12331500 FLINT CREEK NEAR DRUMMOND, MT.

WATER QUALITY RECORDS

PERIOD OF RECORD.--Water years 1972-73, 1985 to current year.

REMARKS.--Flow affected by diversions for irrigation upstream from station.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT											
25...	1030	--	120	0	0	350	8.0	4.0	8	2.6	89
31...	1000	--	110	--	--	361	9.0	5.0	--	--	--
JAN											
15...	1535	--	93	--	--	335	2.5	0.0	--	--	--
16...	1500	E92	--	100	2	--	8.0	0.0	33	E8.2	90
FEB											
12...	1030	--	86	100	70	338	3.0	1.0	14	3.3	91
MAR											
07...	1000	--	87	100	3	325	2.0	0.0	22	5.2	86
APR											
04...	1155	--	97	--	--	318	13.0	8.0	--	--	--
09...	1130	--	94	100	2	--	8.5	4.0	37	9.4	96
25...	1315	--	106	100	2	--	--	--	52	15	95
MAY											
20...	0745	--	288	10	1	--	6.0	6.5	95	74	85
21...	0950	--	227	--	--	190	12.0	7.0	--	--	--
JUN											
04...	1000	--	108	100	3	237	18.0	9.0	32	9.3	88
07...	1530	--	408	--	--	187	18.0	11.0	--	--	--
11...	1745	--	256	50	1	205	21.0	14.5	44	30	80
JUL											
02...	0700	--	110	0	0	--	9.5	11.0	8	2.4	90
10...	1110	--	35	--	--	464	25.5	16.0	--	--	--
AUG											
14...	1305	--	5.4	--	--	517	27.0	19.5	--	--	--
15...	0925	--	4.7	0	0	500	15.0	14.0	4	0.05	88

DATE	TIME	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)
OCT											
25...	1030	203	4	170	8.4	170	47	13	7	7	<1
MAR											
07...	1000	185	0	148	8.3	160	43	12	9	7	<1
JUN											
04...	1000	126	1	107	8.4	110	32	8.3	13	8	<1
AUG											
15...	0925	308	0	249	8.3	250	69	19	13	12	<1

DATE	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
OCT											
25...	<1	3	3	180	6	3	1	70	24	20	4
MAR											
07...	<1	4	1	390	14	5	1	90	23	<10	7
JUN											
04...	<1	7	2	700	30	11	1	140	40	10	3
AUG											
15...	<1	2	2	100	17	2	<1	110	93	10	6

PEND OREILLE RIVER BASIN

12332000 MIDDLE FORK ROCK CREEK NEAR PHILIPSBURG, MT

LOCATION(REVISED).--Lat 46°11'03", long 113°30'05", in SW1/4NW1/4SE1/4 sec.17, T.5 N., R.15 W., Granite County, Hydrologic Unit 17010202, on left bank 40 ft downstream from bridge on county highway, 1.2 mi upstream from East Fork, 3.4 mi upstream from West Fork, and 15 mi southwest of Philipsburg.

DRAINAGE AREA.--123 mi^2.

PERIOD OF RECORD.--September 1937 to current year. Monthly discharges only January to March 1938, published in WSP 1316.

GAGE.--Water-stage recorder. Datum of gage is 5,444.08 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 25, 1990, gage located at several sites 0.8 to 1.0 mi downstream. See WSP 1736 or 1933 for history of changes prior to Oct. 1, 1955.

REMARKS.--Estimated daily discharges: Nov. 3, 7, 8, Nov. 27 to Apr. 1. Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year. A few small diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--54 years, 120 ft^3/s, 13.25 in/yr, 87,940 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,680 ft^3/s, June 16, 1974, gage height, 5.58 ft; minimum daily, 5.3 ft^3/s, Feb. 9, 1953.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 650 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft3/s)	Gage height (ft)
June 7	0900	*959	*4.31	June 12	0500	764	3.86

Minimum daily discharge, 17 ft^3/s, Dec. 20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	41	42	e25	e27	e30	e25	e34	44	327	282	81	46
2	41	39	e26	e29	e33	e28	35	43	384	267	79	45
3	42	e35	e28	e30	e35	e32	36	'42	498	259	77	44
4	42	39	e31	e28	e34	e35	37	41	551	254	74	43
5	42	40	e30	e24	e34	e33	45	41	614	248	73	42
6	45	38	e29	e26	e32	e30	51	42	867	233	75	40
7	43	e35	e28	e28	e30	e28	42	46	905	217	72	40
8	42	e36	e30	e29	e29	e30	37	55	715	204	68	50
9	42	37	e34	e30	e29	e32	35	75	591	192	65	51
10	41	38	e35	e32	e30	e33	33	66	575	200	67	47
11	41	37	e33	e34	e30	e33	32	64	668	186	65	60
12	40	36	e30	e35	e31	e32	26	72	693	171	63	63
13	41	36	e28	e36	e32	e31	31	78	596	163	60	53
14	41	36	e26	e37	e33	e30	33	103	513	162	57	60
15	41	36	e25	e36	e35	e30	34	116	422	157	56	63
16	46	33	e25	e35	e38	e30	33	131	382	147	54	57
17	45	38	e26	e34	e37	e31	32	177	349	137	54	52
18	42	36	e23	e33	e35	e32	32	271	328	133	57	51
19	43	36	e20	e31	e37	e33	32	302	346	127	54	48
20	42	36	e17	e27	e38	e35	34	301	489	121	53	46
21	40	30	e19	e24	e37	e34	36	304	429	116	50	43
22	44	29	e21	e25	e36	e33	42	345	385	112	49	43
23	43	34	e22	e26	e35	e31	44	426	369	108	50	43
24	41	34	e23	e27	e33	e31	51	489	350	108	48	41
25	39	36	e24	e25	e34	e30	51	549	324	104	48	41
26	39	35	e25	e22	e33	e29	47	487	309	107	46	41
27	40	e28	e25	e23	e32	e28	45	413	302	100	46	39
28	39	e30	e23	e22	e30	e29	43	354	287	95	63	39
29	39	e32	e19	e20	---	e31	43	322	285	90	60	40
30	40	e29	e21	e23	---	e32	44	340	301	85	52	40
31	40	---	e24	e27	---	e33	---	338	---	82	49	---
TOTAL	1287	1056	795	885	932	964	1150	6477	14154	4967	1865	1411
MEAN	41.5	35.2	25.6	28.5	33.3	31.1	38.3	209	472	160	60.2	47.0
MAX	46	42	35	37	38	35	51	549	905	282	81	63
MIN	39	28	17	20	29	25	26	41	285	82	46	39
AC-FT	2550	2090	1580	1760	1850	1910	2280	12850	28070	9850	3700	2800
CFSM	.34	.29	.21	.23	.27	.25	.31	1.70	3.84	1.30	.49	.38
IN.	.39	.32	.24	.27	.28	.29	.35	1.96	4.28	1.50	.56	.43

CAL YR 1990 TOTAL 36624 MEAN 100 MAX 618 MIN 17 AC-FT 72640 CFSM .82 IN. 11.08
WTR YR 1991 TOTAL 35943 MEAN 98.5 MAX 905 MIN 17 AC-FT 71290 CFSM .80 IN. 10.87

e Estimated

PEND OREILLE RIVER BASIN

12334510 ROCK CREEK NEAR CLINTON, MT

LOCATION.--Lat 46°43'21", long 113°40'56", in NW1/4NE1/4SW1/4 sec.12, T.11 N., R.17 W., Missoula County, Hydrologic Unit 17010202, on left bank 100 ft downstream from private road bridge, 0.2 mi upstream from mouth, and 3.7 mi southeast of Clinton.

DRAINAGE AREA.--885 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1972 to current year.

GAGE.--Water-stage recorder. Datum of gage is 3,519.46 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Dec. 2, 8, 15-26. Water-discharge records good except those for estimated daily discharges, which are poor. Some regulation by East Fork Rock Creek Reservoir (station number 12332500). During irrigation season water is diverted from East Fork Rock Creek in sec.5, T.4 N., R.14 W., 500 ft below Rock Creek Dam, through a canal into Trout Creek, thence into Flint Creek. Diversions for irrigation of about 16,100 acres.

AVERAGE DISCHARGE.--19 years, 538 ft^3/s, 8.26 in/yr, 389,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,520 ft^3/s, June 20, 1975, gage height, 7.49 ft, rating then in use; maximum gage height, 7.53 ft, May 22, 1981, and June 17, 1982; minimum discharge, 41 ft^3/s, Dec. 27, 1988, result of freezeup, but may have been less during the period of ice effect, Feb. 1-20, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1972 reached a stage of 8.52 ft, from floodmark, discharge, 6,500 ft^3/s; local residents report flood of 1927 reached a stage of about 9.5 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,610 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 25	1700	2,290	5.94	June 20	1800	1,920	5.80
June 7	2100	*3,370	*6.75				

Minimum daily discharge, 50 ft^3/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	187	221	155	161	139	136	188	265	1270	1170	340	219
2	195	220	e160	179	149	114	225	265	1300	1020	330	212
3	200	197	192	170	152	160	235	262	1530	943	310	207
4	204	211	186	159	157	202	245	254	1770	893	301	204
5	209	239	195	146	156	228	292	245	1850	860	286	200
6	208	230	174	141	160	203	342	242	2380	805	296	193
7	207	201	153	140	156	174	321	257	3120	750	283	196
8	208	206	e150	150	140	169	278	297	2950	721	275	219
9	210	220	170	161	151	162	258	389	2450	677	266	253
10	214	223	194	163	147	164	244	423	2220	676	259	243
11	217	227	211	161	145	165	229	416	2290	676	281	265
12	216	219	192	165	146	157	219	443	2410	613	273	328
13	225	212	156	173	158	158	210	481	2160	586	256	292
14	225	211	149	173	159	157	207	567	1890	618	240	288
15	224	212	e140	169	163	160	211	663	1650	614	226	293
16	241	200	e150	167	181	160	215	708	1460	579	218	278
17	238	190	e160	165	197	159	206	825	1340	543	214	266
18	228	202	e120	164	182	154	204	1440	1230	538	211	257
19	229	204	e80	157	171	161	205	1850	1190	513	212	258
20	226	202	e60	143	204	179	206	1810	1670	487	211	250
21	220	196	e55	119	221	175	218	1690	1670	468	204	241
22	226	193	e50	110	207	171	238	1690	1410	449	195	231
23	234	196	e60	123	193	164	264	1850	1300	437	191	228
24	225	194	e80	133	185	159	299	2000	1270	438	193	223
25	219	203	e100	127	176	156	338	2170	1190	430	195	216
26	219	217	e120	112	173	151	331	2070	1100	440	198	208
27	222	194	147	121	168	153	307	1770	1070	437	207	203
28	221	177	133	125	161	152	285	1590	1040	408	254	198
29	218	164	121	116	---	149	271	1410	1070	373	251	199
30	218	200	119	103	---	151	269	1370	1220	341	246	202
31	217	---	134	127	---	161	---	1370	---	325	228	---
TOTAL	6750	6181	4266	4523	4697	5064	7560	31082	50470	18828	7650	7070
MEAN	218	206	138	146	168	163	252	1003	1682	607	247	236
MAX	241	239	211	179	221	228	342	2170	3120	1170	340	328
MIN	187	164	50	103	139	114	188	242	1040	325	191	193
AC-FT	13390	12260	8460	8970	9320	10040	15000	61650	100100	37350	15170	14020
CFSM	.25	.23	.16	.16	.19	.18	.28	1.13	1.90	.69	.28	.27
IN.	.28	.26	.18	.19	.20	.21	.32	1.31	2.12	.79	.32	.30

CAL YR 1990 TOTAL 168338 MEAN 461 MAX 2370 MIN 50 AC-FT 333900 CFSM .52 IN. 7.08
WTR YR 1991 TOTAL 154141 MEAN 422 MAX 3120 MIN 50 AC-FT 305700 CFSM .48 IN. 6.48

e Estimated

PEND OREILLE RIVER BASIN

12334510 ROCK CREEK NEAR CLINTON, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1979-83, 1985 to current year.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: September 1979 to September 1983.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE (water years 1979-83): Maximum, 20.5°C, July 23, 1980; minimum, 0.0°C, on many days during winter periods.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
09...	1100	213	--	--	158	7.5	5.5	--	--	--
25...	1400	215	0	0	150	17.5	6.0	1	0.58	87
NOV										
29...	1300	156	--	--	146	3.0	1.0	--	--	--
JAN										
16...	1000	172	100	2	--	5.0	1.0	1	0.46	89
16...	1500	166	--	--	132	1.0	1.0	--	--	--
FEB										
07...	1230	159	0	0	--	4.0	1.0	2	0.86	78
25...	1120	169	--	--	138	10.0	1.5	--	--	--
MAR										
07...	1330	178	100	2	--	12.5	1.5	2	0.96	76
APR										
01...	1100	173	--	--	147	18.0	6.0	--	--	--
09...	1300	257	100	2	--	8.5	5.0	2	1.4	87
29...	0930	269	100	61	--	5.5	5.5	4	2.9	81
MAY										
22...	1300	1710	--	--	68	23.0	10.0	--	--	--
JUN										
04...	1315	1820	40	1	70	20.0	9.5	20	98	56
06...	1430	2480	95	2	80	25.0	9.5	96	643	60
07...	1030	3020	--	--	67	13.0	9.0	--	--	--
11...	1555	2470	80	1	70	20.5	11.5	56	373	42
13...	0945	2160	--	--	77	13.0	8.0	--	--	--
28...	0910	1030	--	--	104	16.0	11.0	--	--	--
JUL										
08...	1150	725	--	--	115	24.0	14.0	--	--	--
AUG										
08...	1345	273	--	--	138	23.5	18.0	--	--	--
15...	1215	230	0	0	140	18.0	15.5	2	1.2	76

DATE	TIME	BICARBONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CARBONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STANDARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)
OCT											
25...	1400	89	0	73	8.2	69	18	5.9	<1	<1	<1
JUN											
04...	1315	37	0	30	7.9	--	--	--	--	--	--
06...	1430	35	0	29	7.8	30	8.1	2.4	2	<1	<1
AUG											
15...	1215	83	1	70	8.4	65	17	5.5	<1	<1	<1

DATE	CADMIUM DISSOLVED (UG/L AS CD) (01025)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
OCT											
25...	<1	2	<1	50	8	<1	<1	<10	1	<10	<3
JUN											
04...	--	--	--	--	--	--	--	--	--	--	--
06...	<1	11	2	1300	74	5	1	40	4	<10	<3
AUG											
15...	<1	1	<1	40	21	<1	<1	<10	2	<10	6

PEND OREILLE RIVER BASIN

12334550 CLARK FORK AT TURAH BRIDGE, NEAR BONNER, MT

LOCATION.--Lat 46°49'34", long 113°48'48", in SW1/4NW1/4SW1/4 sec. 1, T.12, N., R.18 W., Missoula County, Hydrologic Unit 17010201, revised, on left bank 0.8 mi southeast of Turah, 4 mi southeast of Bonner, and at river mile 370.2.

DRAINAGE AREA.--3,641 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1985 to current year. Water-discharge records for the period March 1985 to September 1985 are available in files of the Helena district office.

GAGE.--Water-stage recorder. Elevation of gage is 3,320 ft, from topographic map. Prior to May 9, 1986, non-recording gage at same site at datum 2.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 1, 2, 8, Dec. 18 to Jan. 11, Jan. 20-22, 25-31. Water-discharge records good except those for estimated daily discharges, which are poor. Some regulation by settling ponds on Silver Bow Creek near Anaconda and by Georgetown Lake (station number 12325000) on Flint Creek. Diversions for irrigation of about 100,000 acres upstream from station.

AVERAGE DISCHARGE.--6 years, 1,062 ft³/s, 769,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,700 ft³/s, Feb. 25, 1986, gage height, 6.52 ft, from graph based on gage readings, datum then in use; maximum gage height, 6.72 ft, May 30, 1986; minimum discharge, 231 ft³/s, Sept. 4-6, 1988, gage height, 1.67 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,520 ft³/s, June 8, gage height, 6.26 ft; minimum discharge, 238 ft³/s, Dec. 19, gage height, 1.69 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	553	790	e750	e600	559	689	699	831	2490	2240	565	468
2	557	792	e680	e650	594	582	754	806	2410	2010	591	461
3	582	763	669	e620	634	596	800	787	2540	1830	583	451
4	608	776	699	e600	666	777	824	773	2840	1670	560	438
5	616	853	769	e580	676	978	872	751	3080	1570	542	433
6	643	876	742	e550	705	913	986	734	3940	1470	532	438
7	678	813	684	e580	709	781	998	737	5000	1350	528	440
8	697	810	e630	e600	675	747	933	771	5390	1260	532	472
9	718	857	692	e620	682	724	875	848	4780	1190	524	530
10	718	883	764	e640	674	716	835	917	4230	1140	508	557
11	729	888	780	e650	669	727	801	935	4090	1120	517	586
12	741	859	765	665	675	713	783	974	4200	1050	509	697
13	754	844	691	719	694	702	768	1090	3960	1010	489	678
14	764	839	650	730	711	699	759	1170	3560	1010	462	674
15	772	830	632	704	739	698	767	1330	3120	1000	450	689
16	813	813	629	697	797	702	766	1420	2760	974	438	682
17	843	777	646	689	862	703	755	1550	2510	928	426	680
18	826	794	e500	701	857	688	745	2200	2280	906	428	674
19	819	803	e350	685	810	685	745	3330	2130	871	430	683
20	823	798	e250	e650	855	712	747	3950	2660	828	430	686
21	823	797	e300	e600	1120	723	758	3730	3320	784	415	661
22	830	779	e350	e550	1020	720	786	3550	3190	743	406	643
23	850	801	e400	598	914	712	823	3590	2790	710	394	637
24	839	817	e450	605	855	697	867	3720	2670	692	392	632
25	830	811	e500	e550	805	692	936	3780	2550	675	380	619
26	827	830	e550	e500	781	682	963	3880	2370	683	369	614
27	825	816	e580	e520	763	661	923	3560	2230	688	382	604
28	815	727	e550	e550	744	674	878	3300	2070	675	470	596
29	809	721	e520	e450	---	663	852	2970	2040	629	479	600
30	803	795	e500	e400	---	661	849	2710	2230	591	473	611
31	788	---	e550	e500	---	670	---	2650	---	566	458	---
TOTAL	23293	24352	18222	18753	21245	22087	24847	63344	93430	32863	14662	17634
MEAN	751	812	588	605	759	712	828	2043	3114	1060	473	588
MAX	850	888	780	730	1120	978	998	3950	5390	2240	591	697
MIN	553	721	250	400	559	582	699	734	2040	566	369	433
AC-FT	46200	48300	36140	37200	42140	43810	49280	125600	185300	65180	29080	34980

CAL YR 1990 TOTAL 415232 MEAN 1138 MAX 4610 MIN 250 AC-FT 823600
WTR YR 1991 TOTAL 374732 MEAN 1027 MAX 5390 MIN 250 AC-FT 743300

e Estimated

12334550 CLARK FORK AT TURAH BRIDGE, NEAR BONNER, MT.--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1985 to current year.
PERIOD OF DAILY RECORD.--
SUSPENDED-SEDIMENT DISCHARGE: March 1985 to current year.
REMARKS.--Unpublished records of once-daily water temperatures are available in files of District office.
EXTREMES FOR PERIOD OF DAILY RECORD.--
SEDIMENT CONCENTRATION: Maximum daily mean, 1,140 mg/L, Feb. 25, 1986; minimum daily mean, 1 mg/L, Sep. 12, 1987.
SEDIMENT LOAD: Maximum daily, 24,400 tons, Feb. 25, 1986; minimum daily 1.1 tons, Sep. 12, 1987.
EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATION: Maximum daily mean, 243 mg/L, June 7; minimum daily mean, 2 mg/L, on several days in July and August.
SEDIMENT LOAD: Maximum daily, 3,280 tons, June 7; minimum daily, 2.1 tons, Aug. 23, 24, 25.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
09...	1430	728	70	1	426	26.0	8.5	8	16	91
25...	1600	37	10	1	411	19.0	8.0	8	0.80	92
NOV										
28...	1500	708	100	3	415	4.5	2.0	6	11	87
JAN										
16...	1120	695	100	2	376	13.0	2.0	12	23	80
FEB										
25...	1400	795	35	1	388	8.0	5.0	18	39	86
MAR										
07...	1500	775	100	3	408	2.5	3.0	16	33	88
APR										
01...	1300	702	40	1	--	20.0	10.0	18	34	86
04...	0940	821	--	--	374	13.0	8.0	--	--	--
29...	1115	852	100	61	--	8.0	7.0	14	32	85
MAY										
20...	1015	4000	80	2	--	17.5	9.5	172	1860	75
30...	1545	2650	--	--	214	14.0	11.0	--	--	--
JUN										
04...	1545	2930	100	3	200	15.5	12.0	32	253	64
07...	0630	4910	95	2	160	10.0	11.0	211	2800	61
11...	1030	3980	100	2	185	19.0	13.5	55	591	72
27...	1130	2210	30	1	256	12.0	12.0	12	72	60
JUL										
25...	1020	681	--	--	310	25.0	17.5	--	--	--
AUG										
12...	0915	516	--	--	335	18.0	15.0	--	--	--
15...	1450	451	20	1	330	21.0	19.5	3	3.7	78

DATE	TIME	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)
OCT											
25...	1600	167	7	146	8.6	200	55	14	5	5	<1
MAR											
07...	1500	151	5	130	8.6	180	52	12	8	5	<1
JUN											
04...	1545	78	0	64	8.3	--	--	--	--	--	--
07...	0630	73	0	59	8.1	74	21	5.2	12	5	1
AUG											
15...	1450	135	7	121	8.7	160	45	12	5	5	<1

DATE	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
OCT											
25...	<1	7	2	150	3	1	<1	50	4	20	<3
MAR											
07...	<1	14	3	400	7	3	<1	50	5	<10	4
JUN											
04...	--	--	--	--	--	--	--	--	--	--	--
07...	<1	80	6	3600	54	22	1	270	8	110	8
AUG											
15...	<1	3	2	90	6	<1	<1	10	3	<10	4

12334550 CLARK FORK AT TURAH BRIDGE, NEAR BONNER, MT.--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	4	6.0	9	19	5	10	7	11	9	14	12	22
2	5	7.5	7	15	6	11	7	12	9	14	12	19
3	6	9.4	7	14	8	14	7	12	9	15	13	21
4	6	9.8	8	17	9	17	6	9.7	9	16	33	69
5	6	10	10	23	8	17	5	7.8	8	15	67	177
6	6	10	9	21	7	14	5	7.4	8	15	44	108
7	7	13	8	18	6	11	4	6.3	8	15	17	36
8	7	13	7	15	7	12	5	8.1	8	15	10	20
9	8	16	8	19	10	19	8	13	8	15	10	20
10	8	16	12	29	11	23	13	22	7	13	10	19
11	8	16	14	34	10	21	16	28	7	13	7	14
12	10	20	13	30	10	21	20	36	7	13	6	12
13	10	20	14	32	9	17	32	62	8	15	6	11
14	9	19	12	27	8	14	35	69	8	15	6	11
15	9	19	9	20	8	14	19	36	11	22	5	9.4
16	10	22	7	15	7	12	12	23	16	34	9	17
17	11	25	6	13	6	10	11	20	26	61	9	17
18	11	25	7	15	6	8.1	11	21	28	65	9	17
19	11	24	8	17	8	7.6	11	20	22	48	12	22
20	10	22	9	19	8	5.4	12	21	28	65	16	31
21	8	18	9	19	8	6.5	13	21	91	275	13	25
22	9	20	10	21	8	7.6	11	16	74	204	11	21
23	11	25	10	22	8	8.6	8	13	44	109	15	29
24	10	23	12	26	8	9.7	7	11	27	62	16	30
25	8	18	13	28	8	11	7	10	20	43	11	21
26	8	18	13	29	8	12	7	9.5	18	38	8	15
27	9	20	11	24	8	13	8	11	16	33	9	16
28	9	20	6	12	8	12	9	13	12	24	11	20
29	10	22	6	12	8	11	11	13	---	---	8	14
30	10	22	5	11	8	11	12	13	---	---	11	20
31	10	21	---	---	8	12	11	15	---	---	12	22
TOTAL	---	549.7	---	616	---	392.5	---	590.8	---	1286	---	905.4
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	18	34	12	27	26	175	10	60	4	6.1	4	5.1
2	28	57	10	22	27	176	8	43	4	6.4	4	5.0
3	22	48	9	19	26	178	8	40	5	7.9	4	4.9
4	28	62	9	19	32	245	5	23	5	7.6	4	4.7
5	33	78	10	20	43	358	4	17	6	8.8	4	4.7
6	53	141	9	18	115	1220	4	16	6	8.6	4	4.7
7	43	116	12	24	243	3280	4	15	6	8.6	4	4.8
8	27	68	16	33	195	2840	3	10	6	8.6	4	5.1
9	20	47	18	41	106	1370	3	9.6	6	8.5	4	5.7
10	15	34	19	47	75	857	3	9.2	6	8.2	6	9.0
11	13	28	16	40	65	718	4	12	5	7.0	7	11
12	10	21	22	58	67	760	4	11	5	6.9	20	38
13	11	23	32	94	50	535	2	5.5	4	5.3	17	31
14	14	29	34	107	42	404	2	5.5	4	5.0	13	24
15	14	29	43	154	32	270	2	5.4	3	3.6	11	20
16	12	25	45	173	32	238	2	5.3	3	3.5	11	20
17	9	18	51	213	26	176	2	5.0	4	4.6	11	20
18	10	20	135	802	20	123	2	4.9	4	4.6	11	20
19	11	22	200	1800	20	115	2	4.7	4	4.6	11	20
20	11	22	165	1760	41	294	2	4.5	3	3.5	10	19
21	14	29	100	1010	60	538	2	4.2	2	2.2	8	14
22	17	36	76	728	46	396	2	4.0	2	2.2	7	12
23	19	42	72	698	26	196	2	3.8	2	2.1	7	12
24	29	68	72	723	20	144	3	5.6	2	2.1	7	12
25	27	68	68	694	15	103	3	5.5	2	2.1	8	13
26	22	57	60	629	15	96	3	5.5	3	3.0	8	13
27	17	42	47	452	11	66	3	5.6	3	3.1	8	13
28	11	26	39	347	10	56	3	5.5	5	6.3	8	13
29	13	30	39	313	9	50	3	5.1	5	6.5	9	15
30	13	30	41	300	13	78	4	6.4	6	7.7	8	13
31	---	---	28	200	---	---	4	6.1	6	7.4	---	---
TOTAL	---	1350	---	11565	---	16055	---	363.9	---	172.6	---	406.7

TOTAL LOAD FOR YEAR: 34253.6 TONS.

PEND OREILLE RIVER BASIN

12335500 NEVADA CREEK ABOVE RESERVOIR, NEAR FINN, MT

LOCATION.--Lat 46°46'42", long 112°46'00", in SW1/4NW1/4SW1/4 sec.20, T.12 N., R.9 W., Powell County, Hydrologic Unit 17010203, on right bank 0.7 mi upstream from Nevada Lake, 1.1 mi downstream from Gallagher Creek, 4.0 mi west of Finn, and 11 mi southeast of Helmville.

DRAINAGE AREA.--116 mi^2.

PERIOD OF RECORD.--April 1939 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 4,640 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Apr. 30, 1942, nonrecording gage at site 0.1 mi revised, downstream at different datum. Apr. 30, 1942 to July 26, 1953, water-stage recorder at site 0.2 mi downstream at different datum. July 26, 1953, to Nov. 6, 1978, water-stage recorder at site 0.8 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Nov. 17, Dec. 1, Dec. 14 to Mar. 14, Mar. 26-27. Records good except those for estimated daily discharges which are poor. Diversions for irrigation of about 2,900 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--52 years, 37.0 ft^3/s, 26,810 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,800 ft^3/s, June 2, 1953, gage height, 6.00 ft, site and datum then in use, from rating curve extended above 400 ft^3/s on basis of inflow-outflow study of Nevada Lake; maximum gage height, 7.40 ft, May 29, 1953, site and datum then in use, backwater from diversion dam; minimum discharge, probably less than 2.0 ft^3/s at times in 1944, 1957, 1972-73, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 290 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Feb. 20	2000	ice jam	*3.76	May 19	0030	314	3.08

Minimum discharge, 3.6 ft^3/s, Sept. 4, gage height, 1.30 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.7	15	e13	e10	e16	e16	45	15	82	55	19	7.2
2	11	14	14	e9.0	e17	e15	47	14	90	38	19	6.9
3	11	14	17	e8.0	e18	e18	39	15	103	32	17	6.4
4	12	16	20	e8.0	e20	e25	36	14	107	29	17	6.1
5	12	18	20	e8.0	e22	e25	36	12	161	25	17	4.8
6	13	16	19	e7.0	e21	e22	37	11	124	20	16	5.0
7	13	20	17	e8.0	e21	e20	28	12	157	19	16	5.0
8	15	18	20	e9.0	e21	e18	25	12	120	20	15	6.0
9	14	20	23	e10	e21	e18	22	12	102	19	14	6.9
10	14	26	23	e12	e21	e20	21	13	88	19	14	7.1
11	14	21	22	e15	e22	e20	17	18	80	17	13	7.9
12	14	18	19	e18	e24	e20	17	34	75	17	12	7.7
13	15	18	16	e19	e27	e20	23	41	66	16	12	6.9
14	16	17	e15	e19	e28	e20	27	53	60	19	11	7.1
15	16	16	e14	e18	e28	20	33	64	58	19	11	6.8
16	18	16	e14	e18	e28	20	32	70	52	18	11	6.1
17	16	e15	e14	e18	e30	17	27	96	49	17	11	6.3
18	16	16	e13	e19	e29	24	26	209	44	23	11	6.4
19	17	16	e9.0	e15	e29	45	28	271	47	23	10	6.7
20	16	16	e7.0	e13	e35	43	28	218	124	24	9.7	6.6
21	15	14	e6.0	e14	e45	34	29	190	95	22	8.3	6.4
22	17	17	e7.0	e15	e40	28	29	176	58	19	8.5	6.5
23	16	18	e8.0	e14	e35	24	34	179	53	19	9.0	6.5
24	15	18	e10	e12	e30	19	38	168	59	18	7.3	6.7
25	15	21	e10	e10	e25	17	39	157	54	18	7.0	6.9
26	15	19	e9.0	e11	e25	e16	34	145	48	19	6.6	7.1
27	15	14	e9.0	e13	e25	e15	29	129	46	17	7.1	7.1
28	15	15	e8.0	e12	e22	14	25	147	43	16	12	7.2
29	15	16	e7.0	e9.0	---	15	22	106	43	15	9.0	8.0
30	15	14	e8.0	e10	---	18	18	89	84	14	7.8	7.1
31	15	---	e10	e13	---	32	---	86	---	14	7.5	---
TOTAL	450.7	512	421.0	394.0	725	678	891	2776	2372	660	365.8	199.4
MEAN	14.5	17.1	13.6	12.7	25.9	21.9	29.7	89.5	79.1	21.3	11.8	6.65
MAX	18	26	23	19	45	45	47	271	161	55	19	8.0
MIN	9.7	14	6.0	7.0	16	14	17	11	43	14	6.6	4.8
AC-FT	894	1020	835	781	1440	1340	1770	5510	4700	1310	726	396

CAL YR 1990 TOTAL 14745.5 MEAN 40.4 MAX 294 MIN 6.0 AC-FT 29250
WTR YR 1991 TOTAL 10444.9 MEAN 28.6 MAX 271 MIN 4.8 AC-FT 20720

e Estimated

PEND OREILLE RIVER BASIN

12339450 CLEARWATER RIVER NEAR CLEARWATER, MT

LOCATION.--Lat 47°01'09", long 113°23'12", in NW1/4NW1/4NW1/4 sec.33, T.15 N., R.14 W., Missoula County, Hydrologic Unit 17010203, Clearwater State Forest, on left bank 700 ft upstream from Blanchard Lake, 1.3 mi northwest of Clearwater, and at river mile 5.2.

DRAINAGE AREA.--345 mi^2.

PERIOD OF RECORD.--October 1974 to current year.

GAGE.--Water-stage recorder. Datum of gage is 3,814.23 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Dec. 18 to Jan. 13, Jan. 19 to Feb. 3, Feb. 6-8, 10, 11. Records good except those for estimated daily discharges, which are fair. A few minor diversions for irrigation upstream from station. During summer months Elbow Lake, 1.5 mi upstream, may be regulated for recreational purposes. Several observations of water temperture and specific conductance were made during the year.

AVERAGE DISCHARGE.--17 years, 287 ft^3/s, 11.30 in/yr, 207,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,900 ft^3/s, May 17, 1975, gage height, 7.85 ft; maximum gage height, 7.87 ft, Apr. 24, 1989; minimum discharge, 16 ft^3/s, Sept. 7-19, 21, 1988, gage height, 3.56 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,610 ft^3/s, May 20, gage height, 6.86 ft; minimum, 48 ft^3/s, Oct. 1, Sept. 29,30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	50	87	267	e95	e95	165	193	757	945	662	121	58
2	53	89	248	e100	e95	165	208	708	938	631	120	56
3	54	89	231	e100	e92	176	235	664	985	600	121	55
4	58	95	216	e95	92	194	275	629	1070	577	120	55
5	58	107	205	e95	91	206	338	599	1110	554	117	54
6	57	110	195	e90	e88	210	433	576	1090	513	113	53
7	55	110	182	e90	e88	210	552	570	1110	464	109	53
8	55	112	171	e95	e88	213	633	605	1150	427	106	53
9	54	112	165	e95	88	209	662	688	1120	403	103	55
10	53	140	160	e100	e88	205	661	780	1080	386	101	57
11	53	188	158	e105	e88	200	642	819	1060	376	97	58
12	51	208	156	e110	87	193	610	837	1070	362	91	56
13	52	221	151	e110	88	188	574	899	1050	345	87	56
14	53	225	146	115	90	183	550	966	974	318	85	57
15	56	223	137	119	91	178	542	1030	879	297	83	57
16	59	217	129	121	95	175	575	1060	771	280	80	56
17	58	209	130	121	98	169	583	1100	696	264	77	55
18	59	201	e120	121	102	164	573	1230	645	249	75	55
19	60	192	e110	e120	107	162	561	1470	612	242	73	53
20	60	184	e100	e115	114	160	559	1600	634	227	71	52
21	62	176	e90	e115	125	161	575	1570	749	223	67	51
22	70	170	e85	e110	139	165	622	1480	856	213	66	51
23	74	166	e80	e105	152	168	699	1400	861	202	64	51
24	74	164	e85	e105	162	172	809	1370	863	192	61	51
25	75	179	e90	e105	168	178	930	1320	843	176	59	51
26	76	228	e95	e105	172	184	1010	1260	803	162	56	51
27	75	285	e100	e100	175	185	1010	1180	758	150	53	51
28	76	306	e95	e100	175	185	953	1100	724	140	56	51
29	78	299	e90	e100	---	191	891	1020	698	131	59	50
30	79	286	e85	e95	---	187	818	947	667	120	60	49
31	81	---	e90	e95	---	188	---	939	---	119	60	---
TOTAL	1928	5378	4362	3247	3133	5689	18276	31173	26811	10005	2611	1611
MEAN	62.2	179	141	105	112	184	609	1006	894	323	84.2	53.7
MAX	81	306	267	121	175	213	1010	1600	1150	662	121	58
MIN	50	87	80	90	87	160	193	570	612	119	53	49
AC-FT	3820	10670	8650	6440	6210	11280	36250	61830	53180	19840	5180	3200
CFSM	.18	.52	.41	.30	.32	.53	1.77	2.91	2.59	.94	.24	.16
IN.	.21	.58	.47	.35	.34	.61	1.97	3.36	2.89	1.08	.28	.17

CAL YR 1990 TOTAL 115616 MEAN 317 MAX 1550 MIN 33 AC-FT 229300 CFSM .92 IN. 12.47
WTR YR 1991 TOTAL 114224 MEAN 313 MAX 1600 MIN 49 AC-FT 226600 CFSM .91 IN. 12.32

e Estimated

PEND OREILLE RIVER BASIN

12340000 BLACKFOOT RIVER NEAR BONNER, MT

LOCATION.--Lat 46°53'59", long 113°45'20", in SE1/4SE1/4NW1/4 sec.9, T.13 N., R.17 W., Missoula County, Hydrologic Unit 17010203, Lolo National Forest, on right bank 5.0 mi downstream from Union Creek, 5.6 mi northeast of Bonner, and at river mile 7.9.

DRAINAGE AREA.--2,290 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July to November 1898, March 1899 to September 1901, May 1903 to January 1905, March to October 1905, October 1939 to current year. Monthly discharge only for some periods, published in WSP 1316. Published as "at Bonner" 1898-99 and as Big Blackfoot near Bonner 1903-05.

REVISED RECORDS.--WSP 1216: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,344.76 ft above National Geodetic Vertical Datum of 1929. July 7, 1898 to June 30, 1901, and May 15, 1903, to Oct. 31, 1905, nonrecording gage at site 7 mi downstream at different datum. Oct. 4, 1939, to Sept. 30, 1955, nonrecording gage at site 1.3 mi downstream at datum 21.82 ft lower.

REMARKS.--Estimated daily discharges: Oct. 1-12, Dec. 8, 9, Dec. 19 to Feb. 14. Water-discharge records good except those for Oct. 1-12, which are fair, and those for Dec. 8-9, Dec. 19 to Feb. 14, which are poor. Diversions for irrigation of about 20,000 acres upstream from station.

AVERAGE DISCHARGE.--55 years (water years 1900-01, 1904, 1940-91), 1,606 ft^3/s, 9.52 in/yr, 1,164,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,200 ft^3/s, June 10, 1964, gage height, 10.89 ft; minimum, 156 ft^3/s, Feb. 2, 1989, gage height, 1.20 ft, but may have been less during water year 1989 period of ice effect.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 9,290 ft^3/s, May 20, gage height, 7.96 ft; minimum daily, 200 ft^3/s, Dec. 20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e520	671	852	e530	e500	679	841	2430	5690	3990	982	688
2	e530	672	875	e550	e550	557	989	2320	6050	3740	1030	676
3	e540	659	846	e550	e580	676	1100	2230	6680	3530	1010	659
4	e560	686	792	e550	e600	833	1190	2140	7180	3390	972	650
5	e580	725	794	e540	e600	1120	1330	2050	7130	3270	943	647
6	e590	727	769	e520	e590	1070	1600	2030	7170	3100	930	636
7	e600	663	746	e500	e580	959	1770	2160	7430	2910	920	624
8	e600	695	e700	e520	e570	858	1790	2480	7530	2740	890	652
9	e600	703	e720	e540	e560	801	1750	3100	7000	2580	859	689
10	e610	743	741	e560	e550	792	1700	3410	6570	2440	839	694
11	e610	828	737	e580	e550	779	1630	3530	6540	2340	819	680
12	e610	848	726	e600	e560	758	1590	4050	6510	2210	801	660
13	618	849	690	e620	e570	752	1520	4460	6140	2110	780	648
14	640	853	678	e640	e580	745	1510	4830	5620	2050	773	660
15	648	845	612	e630	607	737	1500	5070	5060	1970	761	674
16	684	832	634	e620	642	734	1500	5370	4600	1860	747	659
17	672	810	669	e600	696	727	1510	5930	4280	1760	729	644
18	657	807	705	e580	699	715	1490	7410	3980	1680	717	641
19	655	801	e300	e560	677	722	1470	8960	3800	1600	718	640
20	646	794	e200	e540	840	760	1480	9160	4200	1520	703	627
21	649	782	e220	e500	1010	790	1530	8710	5180	1440	686	626
22	690	777	e250	e450	939	808	1670	8170	5360	1380	664	609
23	697	789	e300	e500	933	818	1950	8090	5060	1330	655	605
24	678	797	e400	e550	868	808	2450	8070	4880	1240	649	600
25	662	880	e450	e500	814	803	2900	8170	4640	1200	654	597
26	657	975	e500	e420	783	775	3060	7790	4380	1170	658	592
27	654	986	e550	e450	772	765	3040	7150	4130	1130	660	584
28	652	958	e500	e500	764	752	2890	6500	3950	1090	734	581
29	648	933	e450	e400	---	740	2720	5950	3830	1050	773	581
30	650	945	e470	e350	---	738	2580	5590	3880	1020	746	575
31	652	---	e500	e450	---	774	---	5590	---	988	704	---
TOTAL	19459	24033	18376	16400	18984	24345	54050	162900	164450	63828	24506	19098
MEAN	628	801	593	529	678	785	1802	5255	5482	2059	791	637
MAX	697	986	875	640	1010	1120	3060	9160	7530	3990	1030	694
MIN	520	659	200	350	500	557	841	2030	3800	988	649	575
AC-FT	38600	47670	36450	32530	37650	48290	107200	323100	326200	126600	48610	37880
CFSM	.27	.35	.26	.23	.30	.34	.79	2.29	2.39	.90	.35	.28
IN.	.32	.39	.30	.27	.31	.40	.88	2.65	2.67	1.04	.40	.31

CAL YR 1990 TOTAL 636449 MEAN 1744 MAX 7140 MIN 200 AC-FT 1262000 CFSM .76 IN. 10.34
WTR YR 1991 TOTAL 610429 MEAN 1672 MAX 9160 MIN 200 AC-FT 1211000 CFSM .73 IN. 9.92

e Estimated

12340000 BLACKFOOT RIVER NEAR BONNER, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1956-59, 1985 to current year.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: October 1955 to September 1959.
SUSPENDED-SEDIMENT DISCHARGE: July 1986 to April 1987, June 1988 to current year.

REMARKS.--Unpublished records of once-daily water temperatures are available in files of District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE (water years 1956-59): Maximum, 21.0°C, Jul. 23-25, 30, 1956; minimum, 0.0°C on many days during winter periods.
SEDIMENT CONCENTRATION: Maximum daily mean, 335 mg/L, May 19, 1991; minimum daily mean, 1 mg/L on many days.
SEDIMENT LOAD: Maximum daily, 8,100 tons, May 19, 1991; minimum daily, 0.70 ton, Feb. 5, 1989.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATION: Maximum daily mean, 335 mg/L, May 19; minimum daily mean, 1 mg/L, on several days in fall and winter.
SEDIMENT LOAD: Maximum daily, 8,100 tons, May 19; minimum daily, 1.1 ton, Dec. 20.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
12...	1145	608	100	51	274	8.5	6.5	2	3.3	76
26...	1145	660	50	1	270	12.5	5.0	2	3.6	91
NOV										
26...	1530	982	100	71	233	0.5	3.0	6	16	78
JAN										
14...	1315	638	--	--	226	5.0	0.5	--	--	--
16...	1215	620	100	2	--	8.5	0.5	4	6.7	86
FEB										
28...	1130	764	95	13	220	0.0	2.0	5	10	92
MAR										
08...	1130	846	50	1	232	3.5	4.0	10	23	93
APR										
01...	1545	854	50	1	237	22.0	10.0	8	18	93
29...	1315	2710	100	61	--	8.0	6.5	17	124	91
MAY										
20...	1215	9270	100	2	150	17.0	8.0	236	5910	82
24...	1050	8180	--	--	171	15.0	10.0	--	--	--
JUN										
11...	1230	6650	100	2	155	19.0	12.0	57	1020	--
24...	1500	4920	100	13	172	21.5	12.0	26	345	81
AUG										
13...	1130	769	--	--	249	21.0	19.0	--	--	--
15...	1750	757	20	1	240	22.0	19.5	3	6.1	78

DATE	TIME	BICARBONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CARBONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STANDARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)
OCT											
26...	1145	174	0	141	8.3	140	37	12	<1	1	<1
MAR											
08...	1130	138	0	112	8.3	110	30	9.6	1	1	<1
MAY											
20...	1215	89	0	73	8.3	80	21	6.8	3	<1	<1
AUG											
15...	1750	145	7	130	8.7	130	34	12	2	2	<1

DATE	CADMIUM DISSOLVED (UG/L AS CD) (01025)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
OCT											
26...	<1	5	1	50	3	1	<1	10	2	<10	<3
MAR											
08...	<1	4	1	330	33	2	<1	20	3	<10	7
MAY											
20...	<1	16	3	3100	57	7	<1	150	3	20	6
AUG											
15...	<1	1	<1	120	7	3	<1	<10	3	<10	<3

PEND OREILLE RIVER BASIN

12340000 BLACKFOOT RIVER NEAR BONNER, MT--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	3	4.2	2	3.6	2	4.6	2	2.9	3	4.1	4	7.3
2	3	4.3	2	3.6	2	4.7	2	3.0	3	4.5	4	6.0
3	3	4.4	2	3.6	2	4.6	2	3.0	3	4.7	19	35
4	2	3.0	2	3.7	2	4.3	1	1.5	3	4.9	28	63
5	2	3.1	2	3.9	2	4.3	2	2.9	4	6.5	30	91
6	2	3.2	2	3.9	2	4.2	2	2.8	6	9.6	25	72
7	2	3.2	2	3.6	2	4.0	2	2.7	5	7.8	20	52
8	2	3.2	2	3.8	2	3.8	3	4.2	3	4.6	11	25
9	1	1.6	3	5.7	2	3.9	3	4.4	3	4.5	9	19
10	2	3.3	4	8.0	2	4.0	3	4.5	4	5.9	8	17
11	2	3.3	4	8.9	2	4.0	4	6.3	4	5.9	5	11
12	2	3.3	4	9.2	2	3.9	4	6.5	4	6.0	4	8.2
13	2	3.3	4	9.2	2	3.7	8	13	7	11	5	10
14	2	3.5	4	9.2	2	3.7	6	10	10	16	5	10
15	2	3.5	4	9.1	2	3.3	5	8.5	10	16	8	16
16	2	3.7	4	9.0	2	3.4	4	6.7	10	17	6	12
17	2	3.6	4	8.7	2	3.6	3	4.9	15	28	5	9.8
18	2	3.5	4	8.7	2	3.8	3	4.7	26	49	6	12
19	2	3.5	3	6.5	2	1.6	4	6.0	18	33	7	14
20	2	3.5	3	6.4	2	1.1	4	5.8	30	68	6	12
21	2	3.5	3	6.3	3	1.8	4	5.4	32	87	8	17
22	2	3.7	3	6.3	4	2.7	4	4.9	18	46	7	15
23	2	3.8	4	8.5	3	2.4	4	5.4	14	35	8	18
24	2	3.7	4	8.6	2	2.2	4	5.9	12	28	8	17
25	2	3.6	4	9.5	1	1.2	3	4.1	10	22	4	8.7
26	2	3.5	4	11	1	1.4	3	3.4	8	17	4	8.4
27	3	5.3	4	11	1	1.5	2	2.4	8	17	5	10
28	3	5.3	4	10	1	1.4	3	4.1	5	10	4	8.1
29	3	5.2	4	10	1	1.2	3	3.2	---	---	5	10
30	3	5.3	3	7.7	1	1.3	3	2.8	---	---	7	14
31	2	3.5	---	---	1	1.4	3	3.6	---	---	8	17
TOTAL	---	114.6	---	217.2	---	93.0	---	149.5	---	569.0	---	645.5
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	12	27	13	85	55	845	16	172	4	11	3	5.6
2	18	48	11	69	62	1010	14	141	4	11	2	3.7
3	20	59	9	54	92	1660	12	114	4	11	2	3.6
4	22	71	9	52	120	2330	11	101	4	10	2	3.5
5	26	93	8	44	93	1790	10	88	4	10	2	3.5
6	33	143	7	38	87	1680	10	84	4	10	2	3.4
7	31	148	8	47	96	1930	8	63	5	12	2	3.4
8	23	111	13	87	97	1970	7	52	5	12	2	3.5
9	17	80	34	285	72	1360	8	56	5	12	3	5.6
10	14	64	50	460	59	1050	7	46	5	11	3	5.6
11	11	48	48	457	58	1020	8	51	5	11	3	5.5
12	9	39	70	765	49	861	8	48	4	8.7	3	5.3
13	10	41	86	1040	44	729	7	40	3	6.3	3	5.2
14	10	41	100	1300	39	592	6	33	3	6.3	2	3.6
15	9	36	90	1230	35	478	7	37	3	6.2	2	3.6
16	9	36	96	1390	31	385	8	40	4	8.1	2	3.6
17	9	37	114	1830	26	300	7	33	3	5.9	2	3.5
18	9	36	294	5880	22	236	6	27	3	5.8	2	3.5
19	10	40	335	8100	21	215	6	26	3	5.8	2	3.5
20	7	28	245	6060	27	306	6	25	3	5.7	2	3.4
21	8	33	174	4090	56	783	5	19	3	5.6	2	3.4
22	11	50	139	3070	54	781	4	15	3	5.4	2	3.3
23	16	84	137	2990	36	492	5	18	3	5.3	2	3.3
24	34	225	133	2900	27	356	6	20	2	3.5	1	1.6
25	48	376	118	2600	21	263	5	16	2	3.5	1	1.6
26	36	297	109	2290	21	248	4	13	2	3.6	1	1.6
27	31	254	86	1660	17	190	5	15	2	3.6	1	1.6
28	23	179	69	1210	15	160	5	15	3	5.9	1	1.6
29	19	140	68	1090	16	165	5	14	3	6.3	1	1.6
30	17	118	56	845	17	178	4	11	3	6.0	1	1.6
31	---	---	54	815	---	---	4	11	4	7.6	---	---
TOTAL	---	2982	---	52833	---	24363	---	1444	---	236.1	---	103.3

TOTAL LOAD FOR YEAR: 83750.2 TONS.

PEND OREILLE RIVER BASIN

12340500 CLARK FORK ABOVE MISSOULA, MT

LOCATION.--Lat 46°52'38", long 113°55'53", in NW1/4NW1/4NW1/4 sec.19, T.13 N., R.18 W., Missoula County, Hydrologic Unit 17010204, on right bank 0.2 mi downstream from county road bridge, 2.8 mi east of Missoula, 2.8 mi downstream from Milltown Dam, 3.0 mi downstream from Blackfoot River, and at river mile 361.6.

DRAINAGE AREA.--5,999 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1929 to current year. Monthly discharge only for some periods, published in WSP 1316.

REVISED RECORDS.--WSP 1042: 1936. WSP 1152: 1942. WSP 1246: 1929-30, 1935, drainage area. WSP 1316: 1932-33.

GAGE.--Water-stage recorder. Datum of gage is 3,198.30 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to May 27, 1929, nonrecording gage.

REMARKS.--Estimated daily discharges: Dec.18 to Jan. 18, Jan. 22, Jan. 25 to Feb. 3. Water-discharge records good except those estimated daily discharges, which are fair. Diurnal fluctuation caused by powerplant at Milltown. Diversions for irrigation of about 120,000 acres upstream from station.

AVERAGE DISCHARGE.--62 years, 2,975 ft^3/s, 2,155,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,300 ft^3/s, June 21, 1975, gage height, 13.75 ft; minimum, 115 ft^3/s, Oct. 25, 1943, gage height, 0.64 ft, powerplant shutdown; minimum daily, 340 ft^3/s, Sept. 27, 1937.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1908 reached a discharge of 48,000 ft^3/s, provided by The Montana Power Company.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 14,500 ft^3/s, May 20, gage height, 9.01 ft; minimum daily, 400 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1120	1440	1580	e1100	e1150	1370	1490	3240	8130	6190	1500	1130
2	1140	1420	1470	e1200	e1200	1220	1740	3100	8440	5710	1560	1110
3	1160	1410	1430	e1200	e1250	1090	1890	3020	9110	5330	1580	1090
4	1220	1410	1480	e1200	1250	1580	1990	2880	9930	5030	1530	1070
5	1250	1530	1500	e1150	1240	2020	2170	2790	10200	4820	1460	1060
6	1270	1570	1480	e1100	1250	1980	2570	2730	10800	4560	1420	1050
7	1300	1500	1430	e1100	1240	1740	2740	2830	12000	4250	1390	1050
8	1290	1430	1260	e1150	1200	1610	2730	3200	12700	3940	1380	1060
9	1310	1510	1380	e1200	1200	1550	2640	3880	11500	3760	1380	1170
10	1310	1550	1480	e1200	1190	1490	2530	4390	10600	3500	1290	1210
11	1310	1640	1480	e1250	1180	1470	2410	4440	10400	3420	1250	1210
12	1330	1660	1480	e1300	1190	1470	2370	5000	10500	3210	1280	1270
13	1350	1640	1420	e1400	1220	1450	2280	5600	9940	3050	1250	1290
14	1370	1640	1260	e1500	1260	1450	2260	6030	9030	3000	1220	1340
15	1420	1630	1220	e1450	1300	1410	2270	6430	8080	2910	1190	1330
16	1470	1610	1150	e1400	1400	1430	2240	6810	7270	2780	1170	1290
17	1480	1550	1050	e1350	1520	1440	2260	7530	6680	2610	1140	1270
18	1460	1550	e1000	e1350	1540	1400	2230	9580	6200	2530	1120	1260
19	1450	1560	e600	1320	1460	1380	2200	12200	5890	2410	1120	1270
20	1440	1550	e450	1250	1600	1430	2200	13100	6670	2280	1120	1310
21	1440	1550	e400	1130	2120	1500	2270	12400	8280	2190	1090	1310
22	1500	1520	e500	e1050	1910	1520	2400	11800	8360	2090	1060	1240
23	1520	1530	e600	1160	1810	1510	2700	11500	7730	2010	1030	1230
24	1490	1540	e800	1180	1680	1510	3230	11600	7400	1930	1020	1210
25	1460	1600	e900	e1100	1610	1500	3840	11800	7100	1860	1020	1190
26	1440	1710	e1000	e1000	1520	1480	4010	11600	6610	1800	1030	1150
27	1430	1730	e1100	e1050	1500	1440	3970	10600	6290	1800	1020	1160
28	1440	1660	e1100	e1100	1510	1430	3770	9700	5960	1750	1110	1150
29	1430	1600	e1050	e850	---	1420	3570	8880	5770	1630	1220	1150
30	1410	1650	e1000	e750	---	1410	3420	8240	6010	1570	1200	1150
31	1420	---	e1000	e900	---	1410	---	8140	---	1560	1160	---
TOTAL	42430	46890	35050	36440	39500	46110	78390	225040	253580	95480	38310	35780
MEAN	1369	1563	1131	1175	1411	1487	2613	7259	8453	3080	1236	1193
MAX	1520	1730	1580	1500	2120	2020	4010	13100	12700	6190	1580	1340
MIN	1120	1410	400	750	1150	1090	1490	2730	5770	1560	1020	1050
AC-FT	84160	93010	69520	72280	78350	91460	155500	446400	503000	189400	75990	70970

CAL YR 1990 TOTAL 1032235 MEAN 2828 MAX 11600 MIN 400 AC-FT 2047000
WTR YR 1991 TOTAL 973000 MEAN 2666 MAX 13100 MIN 400 AC-FT 1930000

e Estimated

12340500 CLARK FORK ABOVE MISSOULA, MT--Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1969-71, 1977-83, 1986 to current year.
PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: June 1977 to September 1983.
SUSPENDED-SEDIMENT DISCHARGE: July 1986 to April 1987, June 1988 to current year.
REMARKS.--Unpublished records of once daily water temperatures are available in files of District office.
EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE (water years 1977-83): Maximum, 22.5°C, Aug.7, 8, 1983; minimum, 0.0°C on many days during winter periods.
SEDIMENT CONCENTRATION: Maximum daily mean, 370 mg/L, Feb. 1, 1987; minimum daily mean, 1 mg/L, on several days in Feb., Dec., 1990 and Jan. 1991.
SEDIMENT LOAD: Maximum daily, 8,140 tons, May 19, 1991; minimum daily, 3.2 tons, Feb. 7, 1989 and Jan 24, 1991.
EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATION: Maximum daily mean, 247 mg/L, May 19; minimum daily mean, 1 mg/L, Dec. 12-14, Jan. 24.
SEDIMENT LOAD: Maximum daily, 8,140 tons, May 19; minimum daily, 3.2 tons, Jan. 24.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, IN CUBIC FEET PER SECOND (00060)	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT											
09...	1600	--	1310	3	0	--	17.0	8.0	3	11	93
11...	1415	--	1300	--	--	358	17.0	8.0	--	--	--
26...	0920	--	1440	100	51	340	12.0	6.0	2	7.8	97
NOV											
29...	1015	--	1630	80	3	307	-1.0	1.0	4	18	82
JAN											
16...	1300	E1400	--	100	2	--	15.5	0.0	5	E19	94
FEB											
27...	1500	--	1510	30	2	311	10.0	3.5	6	24	94
MAR											
08...	0830	--	1630	50	1	312	-1.5	1.5	10	44	98
APR											
03...	1200	--	1920	20	1	296	15.5	8.0	10	52	94
29...	1430	--	3600	50	1	--	13.5	7.0	14	136	89
MAY											
21...	1610	--	12200	0	0	--	25.0	10.0	144	4740	84
23...	1345	--	11700	--	--	180	23.0	11.0	--	--	--
JUN											
05...	0845	--	10100	100	66	152	10.5	10.5	68	1850	85
07...	0845	--	13100	20	1	158	12.5	11.0	116	4100	77
11...	1400	--	10600	90	2	160	19.5	13.5	54	1550	86
27...	1345	--	6270	35	1	201	21.0	14.0	12	203	89
AUG											
13...	1415	--	1230	--	--	282	37.0	20.0	--	--	--
16...	0845	--	1180	0	0	270	20.0	19.5	5	16	82

DATE	TIME	BICARBONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CARBONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STANDARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)
OCT											
26...	0920	175	0	142	8.3	170	46	13	3	3	<1
MAR											
08...	0830	147	0	118	8.3	150	40	11	5	3	<1
JUN											
05...	0845	87	0	72	8.0	82	22	6.5	3	2	<1
07...	0845	88	0	71	8.2	82	22	6.6	6	3	<1
AUG											
16...	0845	144	5	127	8.6	140	37	12	3	3	<1

DATE	CADMIUM DISSOLVED (UG/L AS CD) (01025)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
OCT											
26...	<1	5	2	100	4	2	1	20	11	20	6
MAR											
08...	<1	8	2	360	23	2	<1	30	10	10	6
JUN											
05...	<1	11	2	920	25	8	<1	50	10	<10	<3
07...	<1	31	3	1700	39	11	1	130	9	30	12
AUG											
16...	<1	4	2	110	12	1	<1	20	14	10	<3

PEND OREILLE RIVER BASIN

12340500 CLARK FORK ABOVE MISSOULA, MT--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	4	12	2	7.8	2	8.5	2	5.9	5	16	6	22
2	4	12	2	7.7	2	7.9	2	6.5	6	19	4	13
3	4	13	2	7.6	3	12	2	6.5	4	13	4	12
4	4	13	2	7.6	3	12	2	6.5	3	10	9	38
5	4	13	3	12	3	12	2	6.2	3	10	15	82
6	4	14	3	13	2	8.0	2	5.9	3	10	16	86
7	3	11	3	12	2	7.7	2	5.9	3	10	14	66
8	4	14	3	12	2	6.8	2	6.2	2	6.5	11	48
9	2	7.1	3	12	2	7.5	2	6.5	3	9.7	10	42
10	3	11	3	13	2	8.0	2	6.5	4	13	8	32
11	4	14	3	13	2	8.0	2	6.8	4	13	5	20
12	4	14	4	18	1	4.0	4	14	4	13	4	16
13	4	15	3	13	1	3.8	5	19	4	13	4	16
14	4	15	2	8.9	1	3.4	5	20	4	14	4	16
15	3	12	2	8.8	2	6.6	5	20	5	18	4	15
16	4	16	2	8.7	2	6.2	4	15	6	23	5	19
17	4	16	2	8.4	2	5.7	4	15	7	29	4	16
18	4	16	3	13	2	5.4	3	11	8	33	4	15
19	4	16	3	13	3	4.9	2	7.1	5	20	6	22
20	4	16	3	13	5	6.1	3	10	7	30	7	27
21	4	16	4	17	6	6.5	4	12	18	103	7	28
22	4	16	4	16	5	6.8	3	8.5	26	134	6	25
23	4	16	4	17	3	4.9	2	6.3	14	68	7	29
24	4	16	5	21	2	4.3	1	3.2	11	50	8	33
25	4	16	5	22	2	4.9	2	5.9	10	43	6	24
26	3	12	5	23	2	5.4	4	11	9	37	4	16
27	5	19	5	23	2	5.9	6	17	6	24	5	19
28	4	16	4	18	2	5.9	5	15	7	29	6	23
29	4	15	3	13	2	5.7	4	9.2	---	---	5	19
30	3	11	2	8.9	2	5.4	3	6.1	---	---	5	19
31	2	7.7	---	---	2	5.4	3	7.3	---	---	6	23
TOTAL	---	430.8	---	401.4	---	205.6	---	302.0	---	811.2	---	881
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	7	28	11	96	42	922	13	217	8	32	4	12
2	9	42	10	84	42	957	11	170	8	34	4	12
3	10	51	8	65	56	1380	10	144	8	34	4	12
4	10	54	7	54	73	1960	8	109	7	29	4	12
5	12	70	7	53	66	1820	9	117	7	28	4	11
6	13	90	7	52	76	2220	8	98	7	27	3	8.5
7	13	96	9	69	114	3690	7	80	7	26	4	11
8	11	81	9	78	114	3910	6	64	7	26	4	11
9	12	86	18	189	76	2360	7	71	7	26	4	13
10	10	68	28	332	55	1570	8	76	7	24	4	13
11	9	59	27	324	54	1520	7	65	8	27	4	13
12	6	38	38	513	55	1560	5	43	8	28	4	14
13	5	31	47	711	46	1230	5	41	8	27	5	17
14	7	43	62	1010	41	1000	6	49	7	23	4	14
15	7	43	66	1150	32	698	8	63	7	22	4	14
16	7	42	72	1320	34	667	7	53	6	19	4	14
17	8	49	79	1610	27	487	7	49	6	18	4	14
18	9	54	194	5020	22	368	7	48	6	18	4	14
19	8	48	247	8140	19	302	7	46	6	18	4	14
20	6	36	209	7390	28	504	7	43	5	15	4	14
21	7	43	149	4990	48	1070	6	35	4	12	4	14
22	9	58	115	3660	40	903	6	34	4	11	4	13
23	10	73	105	3260	31	647	7	38	4	11	4	13
24	14	122	103	3230	25	499	8	42	4	11	4	13
25	27	280	94	2990	21	403	9	45	4	11	4	13
26	28	303	86	2690	20	357	10	49	4	11	4	12
27	17	182	71	2030	14	238	12	58	4	11	4	13
28	16	163	58	1520	12	193	10	47	5	15	4	12
29	14	135	52	1250	14	218	9	40	4	13	4	12
30	12	111	46	1020	15	243	8	34	4	13	4	12
31	---	---	44	967	---	---	8	34	4	13	---	---
TOTAL	---	2579	---	55867	---	33896	---	2102	---	633	---	384.5

TOTAL LOAD FOR YEAR: 98493.5 TONS.

PEND OREILLE RIVER BASIN

12342500 WEST FORK BITTERROOT RIVER NEAR CONNER, MT

LOCATION.--Lat 45°43'30", long 114°16'50", in SE1/4NE1/4NW1/4 sec.26, T.1 S., R.22 W., Ravalli County, Hydrologic Unit 17010205, on right bank 0.6 mi downstream from Painted Rocks Lake, 6.4 mi upstream from Nez Perce Creek, 16.1 mi southwest of Conner, and at river mile 19.2.

DRAINAGE AREA.--317 mi^2.

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

REVISED RECORDS.--WSP 1246: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 4,581.4 ft above National Geodetic Vertical Datum of 1929 (U.S. Forest Service bench mark).

REMARKS.--Estimated daily discharges: Dec. 28-30, Jan. 4-6, 20-22, 25, 26, 28-31. Records good except those for estimated daily discharges, which are fair. Flow regulated by Painted Rocks Lake (station 12342000). Diversions for irrigation of about 200 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--50 years, 276 ft^3/s, 200,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,060 ft^3/s, May 9, 1947, gage height, 6.18 ft; minimum, 0.2 ft^3/s, Nov. 25, 1952; minimum daily, 0.6 ft^3/s, May 3-7, 1954.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,240 ft^3/s, June 7, gage height, 3.58 ft; minimum daily, 52 ft^3/s, Feb. 16,17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	265	102	62	56	56	61	64	80	683	431	302	302
2	262	101	62	56	54	61	64	80	733	386	302	301
3	259	100	62	57	53	61	64	80	891	359	302	298
4	256	100	62	e56	53	61	65	82	1040	332	302	296
5	253	100	62	e56	53	62	65	82	1130	313	303	293
6	249	100	62	e56	53	62	67	82	1190	290	306	289
7	245	100	62	56	54	62	68	82	1230	272	306	287
8	241	98	62	56	53	62	68	83	1180	257	306	285
9	238	98	62	56	53	62	69	84	1110	243	306	283
10	238	98	62	56	53	62	70	85	1090	241	306	260
11	161	96	62	56	53	62	70	86	1160	229	306	220
12	104	96	62	56	53	62	70	87	1200	215	306	218
13	104	96	62	56	53	62	71	88	1130	203	304	217
14	103	96	62	56	53	62	71	90	1010	195	302	215
15	102	96	62	56	53	62	72	91	883	191	302	213
16	103	96	62	56	52	62	72	93	791	180	302	210
17	102	94	62	56	52	62	72	95	719	168	298	209
18	102	94	62	56	53	62	72	97	658	160	298	207
19	102	94	62	56	53	62	72	99	625	153	296	204
20	102	94	62	e56	53	62	73	101	681	151	313	202
21	103	81	62	e56	53	62	73	102	636	146	320	200
22	102	64	63	e56	54	62	73	104	590	140	319	198
23	102	64	60	56	55	62	74	106	564	136	319	197
24	102	64	59	56	55	62	75	108	537	154	316	194
25	104	64	59	e56	55	62	76	375	509	180	315	193
26	104	64	59	e56	57	62	77	1100	494	171	315	190
27	102	64	59	57	59	62	78	1030	473	254	315	187
28	102	62	e59	e56	60	62	79	888	455	308	312	185
29	102	62	e58	e56	---	62	79	791	442	306	311	184
30	102	62	e57	e56	---	62	80	777	465	306	307	181
31	102	---	57	e56	---	62	---	722	---	302	305	---
TOTAL	4718	2600	1892	1738	1511	1918	2143	7850	24299	7372	9522	6918
MEAN	152	86.7	61.0	56.1	54.0	61.9	71.4	253	810	238	307	231
MAX	265	102	63	57	60	62	80	1100	1230	431	320	302
MIN	102	62	57	56	52	61	64	80	442	136	296	181
AC-FT	9360	5160	3750	3450	3000	3800	4250	15570	48200	14620	18890	13720

CAL YR 1990 TOTAL 65634 MEAN 180 MAX 889 MIN 48 AC-FT 130200
WTR YR 1991 TOTAL 72481 MEAN 199 MAX 1230 MIN 52 AC-FT 143800

e Estimated

PEND OREILLE RIVER BASIN

12344000 BITTERROOT RIVER NEAR DARBY, MT

LOCATION.--Lat 45°58'20", long 114°08'26", in SW1/4SE1/4NE1/4 sec.36, T.3 N., R.21 W., Ravalli County, Hydrologic Unit 17010205, on left bank 50 ft upstream from bridge on U.S. Highway 93, 0.3 mi downstream from Chaffin Creek, 4.1 mi southeast of Darby, and at river mile 77.2.

DRAINAGE AREA.--1,049 mi^2.

PERIOD OF RECORD.--April 1937 to current year. Monthly discharge only for April 1937, published in WSP 1316.

REVISED RECORDS.--WSP 1246: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,942.14 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1987, at datum 1.00 ft higher. Prior to Aug. 2, 1939, nonrecording gage at highway bridge 45 ft upstream at same datum.

REMARKS.--Estimated daily discharges: Dec. 15-31, Jan. 20-22, 25, 26, 29, 30, Aug. 1-7. Records good except those for estimated daily discharges, which are fair. Some regulation by Painted Rocks Lake (station number 12342000). Diversions for irrigation of about 5,000 acres upstream of station. Ditch bypassing station irrigates about 500 acres downstream from station. U.S. Geological Survey satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--54 years, 897 ft^3/s, 649,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,500 ft^3/s, May 9, 1947, gage height, 8.18 ft; maximum gage height, 8.42 ft, June 17, 1974, backwater from log jam; minimum discharge observed, about 71 ft^3/s, Feb. 9, 1939.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,870 ft^3/s, June 7, gage height, 6.23 ft; minimum daily, 100 ft^3/s, Dec. 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	365	369	168	214	195	234	249	479	2220	2000	e550	428
2	370	346	212	210	196	235	311	477	2700	1770	e540	429
3	381	293	237	206	201	263	364	464	3430	1660	e530	420
4	411	343	250	200	201	267	385	449	3690	1650	e520	413
5	425	369	253	191	210	350	463	436	3730	1600	e510	409
6	429	342	228	192	210	276	578	454	4530	1410	e500	400
7	411	290	188	191	199	257	556	515	4520	1270	e490	398
8	404	325	205	196	198	251	483	654	3900	1180	489	405
9	403	321	236	196	201	229	439	1020	3740	1120	478	409
10	401	320	244	196	199	244	406	897	3980	1140	484	399
11	381	322	257	196	202	233	368	814	4300	1070	485	369
12	282	317	227	202	215	219	355	904	4010	968	474	381
13	282	319	205	220	220	229	337	949	3520	934	467	366
14	288	327	194	223	220	220	331	1250	3110	925	460	378
15	289	324	e140	220	232	220	333	1360	2780	862	452	368
16	370	293	e140	216	266	216	332	1410	2570	799	446	363
17	351	292	e150	212	281	214	338	1720	2390	752	435	363
18	318	309	e130	207	262	206	336	2410	2250	713	435	359
19	319	303	e120	205	251	215	337	2540	2280	657	432	350
20	312	295	e110	e170	275	223	361	2220	2690	615	435	342
21	303	282	e100	e150	317	225	418	1990	2540	586	449	327
22	375	267	e110	e160	294	220	515	2260	2320	557	442	318
23	344	262	e120	193	278	216	641	2650	2220	530	441	320
24	322	256	e130	200	272	217	790	2800	2140	551	441	320
25	313	264	e140	e180	257	211	805	2990	1950	564	440	318
26	357	276	e160	e170	253	218	713	3380	1880	549	433	318
27	371	234	e180	183	248	213	637	3060	1770	560	439	316
28	357	234	e160	188	245	210	580	2640	1820	597	486	314
29	368	231	e150	e170	---	209	541	2410	1960	576	480	302
30	360	252	e180	e180	---	208	503	2530	2250	561	452	297
31	360	---	e200	185	---	217	---	2330	---	550	442	---
TOTAL	11022	8977	5524	6022	6598	7165	13805	50462	87190	29276	14557	10899
MEAN	356	299	178	194	236	231	460	1628	2906	944	470	363
MAX	429	369	257	223	317	350	805	3380	4530	2000	550	429
MIN	282	231	100	150	195	206	249	436	1770	530	432	297
AC-FT	21860	17810	10960	11940	13090	14210	27380	100100	172900	58070	28870	21620

CAL YR 1990 TOTAL 249488 MEAN 684 MAX 3300 MIN 100 AC-FT 494900
WTR YR 1991 TOTAL 251497 MEAN 689 MAX 4530 MIN 100 AC-FT 498800

e Estimated

PEND OREILLE RIVER BASIN

12350250 BITTERROOT RIVER AT BELL CROSSING, NEAR VICTOR, MT

LOCATION.--Lat 46°26'36", long 114°07'22", in NW1/4W1/4NE1/4 sec. 20, T.8 N., R.20 W., Ravalli County, Hydrologic Unit 17010205, on right bank 20 ft downstream from highway bridge at Bell Crossing, 1.5 mi northeast of Victor, 2.0 mi upstream from Big Creek, and at river mile 38.3.

DRAINAGE AREA.--1,963 mi^2.

PERIOD OF RECORD.--April 1987 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 3,330 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Apr. 1, 2. Seasonal records fair. Some regulation by Painted Rocks Lake (station number 12342000). Diversions for irrigation of about 80,000 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,300 ft^3/s, June 6, 1991, gage height, 9.23 ft; minimum, 60 ft^3/s, July 16, 17, 1987, gage height, 2.21 ft.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 11,300 ft^3/s, June 6, gage height, 9.23 ft; minimum, 199 ft^3/s, Aug. 23, gage height, 2.40 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1							e350	499	4430	4840	365	283
2							e470	449	5550	4090	370	266
3							588	410	7450	3770	354	257
4							646	380	8230	3700	318	245
5							796	347	7410	3630	291	239
6							1170	324	9870	3090	283	228
7							1220	368	10900	2540	266	222
8							1080	582	8930	2150	267	249
9							940	1450	7720	1910	272	286
10							864	1370	7840	1800	267	289
11							793	1230	8550	1640	286	318
12							736	1530	8590	1370	269	345
13							691	1850	7640	1230	254	340
14							648	2390	6470	1200	238	336
15							631	2730	5210	1160	228	344
16							559	2850	4630	1040	220	339
17							516	3630	4430	921	217	320
18							490	6330	4160	864	214	316
19							456	7070	4140	722	219	319
20							440	6170	5180	567	230	309
21							481	5190	5540	502	280	299
22							581	5770	4860	451	250	291
23							785	6580	4600	406	207	297
24							1070	6890	4490	387	199	302
25							1280	7390	4140	386	207	297
26							1120	6710	3800	415	209	301
27							945	5910	3500	400	218	304
28							785	5060	3570	407	323	326
29							684	4520	4020	423	333	335
30							588	4830	4730	398	310	346
31							---	4680	---	383	305	---
TOTAL							22403	105489	180580	46792	8269	8948
MEAN							747	3403	6019	1509	267	298
MAX							1280	7390	10900	4840	370	346
MIN							350	324	3500	383	199	222
AC-FT							44440	209200	358200	92810	16400	17750

e Estimated

PEND OREILLE RIVER BASIN

12352500 BITTERROOT RIVER NEAR MISSOULA, MT

LOCATION.--Lat 46°49'20", long 114°04'20", in SW1/4NE1/4NE1/4 sec.1, T.12 N., R.20 W., Missoula County, Hydrologic Unit 17010205, on right bank 40 ft downstream from bridge on U.S. Highway 93, 0.5 mi south of Fort Missoula, and at river mile 5.7.

DRAINAGE AREA.--2,814 mi^2.

PERIOD OF RECORD.--July 1898 to November 1901, May 1903 to December 1904, July 1989 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,110 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Jan. 1, 1905, nonrecording gage at site 1.5 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Dec. 18-30, Jan. 29 to Feb. 2. Records good except those for estimated daily discharges, which are fair. Some regulation by Painted Rocks Lake (station number 12342000). Diversions for irrigation of about 111,000 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 38,300 ft^3/s, June 20, 1899, gage height, 11.55 ft, site and datum then in use; minimum observed, 370 ft^3/s, Sept. 16-29, 1904, gage height, 1.12 ft, site and datum then in use.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 15,200 ft^3/s, June 7, gage height, 9.76 ft, from rating curve extended above 10,000 ft^3/s; minimum daily, 400 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	671	1200	907	675	e620	796	749	1310	5740	7890	860	724
2	698	1230	839	718	e670	751	841	1200	6360	6780	884	694
3	753	1160	854	705	703	820	1000	1130	8130	6200	863	684
4	805	1120	894	694	695	982	1130	1070	9710	5950	831	686
5	861	1240	929	679	688	1120	1300	999	9680	5890	788	676
6	921	1260	909	649	697	1100	1740	958	10600	5320	773	670
7	945	1170	834	649	684	1020	2010	990	14600	4540	759	656
8	937	1110	774	656	658	955	1930	1220	14100	3960	759	671
9	932	1100	803	685	653	911	1760	2070	11400	3530	761	721
10	923	1120	867	689	648	898	1630	2550	10700	3260	738	742
11	918	1160	898	716	644	865	1520	2360	11300	3090	740	748
12	915	1160	924	744	656	840	1420	2500	12000	2770	743	794
13	868	1150	860	858	680	838	1350	2930	11100	2490	704	785
14	864	1150	805	986	704	815	1310	3350	9570	2380	684	784
15	875	1160	743	915	713	804	1300	3900	7990	2300	656	787
16	932	1140	655	875	747	792	1250	4090	6800	2110	640	781
17	1010	1090	698	818	822	783	1180	4770	6490	1930	650	755
18	1020	1070	e650	793	852	759	1120	7720	6020	1800	666	732
19	959	1080	e550	776	838	752	1060	10000	5830	1670	672	732
20	950	1060	e450	726	855	753	1040	9520	6880	1470	649	722
21	941	1030	e400	628	963	757	1060	8050	8410	1340	657	705
22	967	1020	e420	591	981	759	1200	7790	7670	1230	650	687
23	1060	997	e450	675	946	747	1400	8610	7290	1140	607	685
24	1070	980	e500	676	920	743	1760	9020	7170	1080	580	680
25	1030	982	e550	646	883	735	2210	9380	6790	1020	570	673
26	1030	1050	e600	594	857	736	2230	9030	6280	1030	589	662
27	1130	1050	e650	599	841	747	2020	7890	5850	1040	605	660
28	1170	977	e640	633	827	743	1800	6830	5670	982	701	659
29	1170	942	e620	e500	---	731	1610	5960	6060	1010	777	675
30	1180	952	e600	e450	---	725	1460	5810	6930	965	765	666
31	1170	---	617	e550	---	726	---	6180	---	903	749	---
TOTAL	29675	32910	21890	21548	21445	25503	43390	149187	253120	87070	22070	21296
MEAN	957	1097	706	695	766	823	1446	4812	8437	2809	712	710
MAX	1180	1260	929	986	981	1120	2230	10000	14600	7890	884	794
MIN	671	942	400	450	620	725	749	958	5670	903	570	656
AC-FT	58860	65280	43420	42740	42540	50590	86060	295900	502100	172700	43780	42240

CAL YR 1990 TOTAL 729247 MEAN 1998 MAX 10100 MIN 400 AC-FT 1446000
WTR YR 1991 TOTAL 729104 MEAN 1998 MAX 14600 MIN 400 AC-FT 1446000

e Estimated

PEND OREILLE RIVER BASIN

12353000 CLARK FORK BELOW MISSOULA, MT
(National stream quality accounting network station)

LOCATION.--Lat 46°52'09", long 114°07'33", in NW1/4NE1/4SE1/4 sec.21, T.13 N., R.20 W., Missoula County, Hydrologic Unit 17010204, on right bank 1.0 mi downstream from Bitterroot River, 4.5 mi west of Missoula, and at river mile 349.5.

DRAINAGE AREA.--9,003 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1929 to current year.

REVISED RECORDS.--WSP 1042: 1931. WSP 1246: Drainage area. WSP 1316: 1932(M), 1935(M), 1946(M).

GAGE.--Water-stage recorder. Datum of gage is 3,083.88 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--Estimated daily discharges: Dec. 18, 19. Water-discharge records excellent. Some diurnal fluctuation at low flow caused by powerplant at Milltown 14.9 mi upstream. Diversions for irrigation of about 235,000 acres upstream from station.

AVERAGE DISCHARGE.--62 years, 5,407 ft^3/s, 3,917,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 52,800 ft^3/s, May 23, 1948, gage height, 12.08 ft; minimum, 388 ft^3/s, Jan. 18, 1933; minimum gage height, -0.05 ft, Feb. 3, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 27,200 ft^3/s, June 8, gage height, 8.46 ft; minimum, 620 ft^3/s, Dec. 21, gage height, 0.12 ft, the result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1800	2690	2610	1810	1880	2380	2320	4900	14300	14200	2470	1910
2	1880	2680	2390	1980	1950	2140	2630	4640	15100	12700	2490	1860
3	1960	2630	2360	1980	2000	2040	2990	4500	17300	11700	2520	1820
4	2060	2590	2450	1930	2020	2580	3260	4290	19700	11100	2440	1800
5	2160	2800	2490	1870	2030	3170	3570	4110	20000	10800	2330	1790
6	2240	2880	2470	1790	2050	3290	4330	4000	21200	10000	2260	1770
7	2290	2740	2350	1790	2040	3020	4890	4070	25800	9010	2230	1760
8	2300	2600	2130	1860	1990	2790	4890	4600	26300	8130	2200	1780
9	2300	2650	2210	1940	1970	2660	4670	6030	23100	7470	2210	1910
10	2300	2710	2410	1980	1950	2580	4440	7120	21400	6900	2130	1990
11	2290	2850	2450	2020	1940	2500	4210	7100	21600	6630	2030	2020
12	2300	2880	2470	2070	1950	2480	4050	7720	22300	6110	2090	2100
13	2280	2850	2370	2240	2010	2450	3890	8760	21100	5670	2020	2170
14	2300	2850	2150	2510	2060	2420	3800	9580	18800	5480	1970	2170
15	2360	2840	2000	2400	2120	2380	3790	10600	16400	5340	1920	2220
16	2430	2810	1800	2310	2260	2340	3730	11200	14400	5060	1880	2170
17	2540	2710	1780	2230	2470	2380	3680	12500	13400	4740	1840	2110
18	2540	2670	e1650	2250	2560	2320	3590	17000	12500	4530	1810	2090
19	2470	2680	e1100	2230	2480	2270	3500	22200	11900	4240	1810	2080
20	2450	2660	776	2100	2580	2300	3460	23300	13300	3920	1790	2090
21	2450	2630	682	1840	3150	2370	3510	21500	16400	3710	1780	2120
22	2530	2590	760	1690	3160	2420	3770	20200	16100	3500	1740	2000
23	2630	2570	903	1910	2980	2400	4200	20500	15200	3330	1690	2000
24	2620	2560	1240	1940	2830	2400	4990	21000	14700	3170	1640	1950
25	2560	2620	1430	1840	2710	2390	6080	21400	14000	3040	1620	1940
26	2520	2810	1630	1600	2590	2360	6410	21000	13100	2950	1630	1900
27	2610	2850	1760	1640	2520	2340	6260	19000	12300	2950	1630	1880
28	2670	2720	1790	1740	2500	2310	5880	17000	11800	2860	1800	1890
29	2650	2630	1710	1390	---	2290	5510	15300	11900	2740	1990	1890
30	2650	2680	1630	1190	---	2260	5200	14500	12900	2610	2000	1890
31	2640	---	1620	1450	---	2260	---	14700	---	2550	1960	---
TOTAL	73780	81430	57571	59520	64750	76290	127500	384320	508300	187140	61920	59070
MEAN	2380	2714	1857	1920	2312	2461	4250	12400	16940	6037	1997	1969
MAX	2670	2880	2610	2510	3160	3290	6410	23300	26300	14200	2520	2220
MIN	1800	2560	682	1190	1880	2040	2320	4000	11800	2550	1620	1760
AC-FT	146300	161500	114200	118100	128400	151300	252900	762300	1008000	371200	122800	117200

CAL YR 1990 TOTAL 1802171 MEAN 4937 MAX 21400 MIN 682 AC-FT 3575000
WTR YR 1991 TOTAL 1741591 MEAN 4771 MAX 26300 MIN 682 AC-FT 3454000

e Estimated

12353000 CLARK FORK BELOW MISSOULA, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1960-64, 1977 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1978 to September 1981.
WATER TEMPERATURE: October 1959 to September 1964, June 1977 to September 1982.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1979-81): Maximum, 351 microsiemems, Jan. 27, 1980; minimum, 119 microsiemens, Jun. 21, 1980.
WATER TEMPERATURE (water years 1960-64, 1977-1982): Maximum, 25.0°C, Aug.19, 22, 24, 1961; minimum, 0.0°C on many days during winter periods.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT												
17...	1425	2520	--	--	290	10.0	7.0	--	--	--	--	--
NOV												
19...	1300	2680	100	3	286	2.0	3.5	672	12.0	103	110	26
JAN												
15...	1530	2470	--	--	260	3.0	1.5	--	--	--	--	--
22...	1400	1710	100	3	302	-4.0	0.0	683	13.3	102	53	900
MAR												
05...	1330	3350	50	2	237	2.0	3.5	672	12.9	110	180	56
APR												
23...	0930	4110	0	2	191	10.0	10.5	678	10.0	101	47	K15
MAY												
23...	1200	19800	25	1	122	20.0	11.0	681	10.9	111	61	51
SEP												
05...	0930	1790	0	0	262	14.0	13.5	682	9.5	102	20	K25

DATE	TIME	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)
NOV												
19...	1300	127	0	104	8.3	1.4	120	34	9.0	6.6	0.3	1.6
JAN												
22...	1400	145	0	116	7.6	1.5	130	37	9.7	7.4	0.3	1.8
MAR												
05...	1330	122	0	100	8.0	5.1	110	31	8.1	6.1	0.3	1.7
APR												
23...	0930	104	0	85	8.1	3.5	88	24	6.9	4.5	0.2	1.3
MAY												
23...	1200	67	0	56	8.0	27	54	15	4.1	2.3	0.1	0.90
SEP												
05...	0930	142	0	115	8.3	1.3	130	35	9.4	6.7	0.3	1.9

DATE	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE TOTAL (MG/L AS N) (00620)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
NOV												
19...	110	23	3.5	0.2	12	145	153	0.20	1050	--	<0.01	<0.01
JAN												
22...	118	29	4.7	0.2	14	145	176	0.20	669	--	<0.01	<0.01
MAR												
05...	100	21	2.3	0.2	11	154	142	0.21	1390	--	<0.01	<0.01
APR												
23...	84	16	2.6	0.2	9.7	120	116	0.16	1330	--	<0.01	<0.01
MAY												
23...	54	6.7	0.3	<0.1	9.3	74	72	0.10	3960	0.075	0.02	<0.01
SEP												
05...	119	21	3.1	0.2	12	144	160	0.20	696	--	<0.01	<0.01

PEND OREILLE RIVER BASIN

12353000 CLARK FORK BELOW MISSOULA, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV											
19...	<0.100	<0.100	0.06	0.06	<0.01	<0.01	<0.01	0.01	4	29	86
JAN											
22...	0.200	0.200	0.11	0.12	0.03	0.02	0.04	0.03	4	18	85
MAR											
05...	0.095	0.068	0.06	0.04	0.05	0.04	<0.01	<0.01	17	154	74
APR											
23...	<0.050	--	0.01	0.01	0.03	<0.01	<0.01	<0.01	12	133	80
MAY											
23...	0.095	0.090	0.04	0.04	0.08	0.07	0.02	<0.01	85	4540	69
SEP											
05...	0.089	0.089	0.02	<0.01	0.02	0.01	<0.01	<0.01	4	19	80

DATE	TIME	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)
NOV											
19...	1300	<10	2	110	<0.5	<1	<1	<3	3	7	1
MAR											
05...	1330	<10	2	92	0.6	<1	<1	<3	3	13	<1
MAY											
23...	1200	50	1	68	<0.5	<1	<1	<3	3	34	<1
SEP											
05...	0930	<10	2	130	<0.5	<1	<1	<3	2	11	<1

DATE	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
NOV										
19...	7	5	0.1	<10	1	<1	<1	140	<6	9
MAR										
05...	6	9	<0.1	<10	1	<1	<1	120	<6	<3
MAY										
23...	<4	9	<0.1	<10	1	<1	<1	53	<6	<3
SEP										
05...	10	4	<0.1	<10	<1	<1	<1	130	<6	<3

PEND OREILLE RIVER BASIN

12353450 FISH CREEK BELOW WEST FORK NEAR TARKIO, MT.

LOCATION.--Lat 46°57'22", long 114°40'12", in NW1/4NW1/4SW1/4 sec. 20, T.14 N., R.24 W., Mineral County, Hydrologic Unit 17010204, on right bank, at bridge on county road, 5.5 miles southeast of Tarkio, 9 miles southwest of Alberton, and at mile 6.5.

DRAINAGE AREA.--242 mi^2.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: July 1985 September 1991 (discontinued).

INSTRUMENTATION.--Temperature recorder since July 20, 1985.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum, 18.0°C, July 27, 1987; minimum, 0.0°C on several days during winter periods most years.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 16.0°C, several days in July and August; minimum, 0.5°C, several days in December and March.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
NOV					
27...	0805	251	150	-2.0	3.0
MAR					
05...	0815	346	148	-1.0	2.0

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	11.5	6.5	8.5	7.0	4.5	6.0	3.0	2.0	2.5	3.0	2.5	2.5
2	10.0	7.5	8.5	5.5	4.0	4.5	3.0	2.0	2.5	3.0	2.5	2.5
3	8.5	7.0	7.5	4.5	3.0	4.0	4.0	2.5	3.0	3.0	2.5	2.5
4	12.0	8.0	9.5	5.5	4.5	5.0	4.0	2.5	3.5	2.5	1.5	2.0
5	10.0	7.5	9.0	6.0	5.0	5.0	4.0	3.0	3.5	2.5	1.0	1.5
6	8.5	6.0	7.0	6.5	4.0	5.0	3.5	2.0	3.0	2.5	1.0	2.0
7	8.5	5.5	7.0	5.0	3.5	4.5	4.0	2.0	2.5	2.5	2.0	2.5
8	10.0	5.5	7.0	6.0	5.0	5.5	4.0	2.0	3.0	4.0	2.5	3.0
9	9.5	5.5	7.5	7.0	5.5	6.0	4.0	2.5	3.0	4.0	2.5	3.0
10	9.5	6.5	8.0	7.5	5.5	6.5	4.5	3.0	4.0	4.0	3.0	3.5
11	9.0	4.5	6.5	6.5	4.5	5.0	4.0	3.5	4.0	4.5	3.0	3.5
12	9.0	6.5	7.5	6.0	3.5	4.5	4.0	2.5	3.5	4.0	3.0	3.5
13	7.5	6.0	7.0	6.0	4.0	5.0	3.0	2.5	3.0	3.0	2.5	3.0
14	7.5	5.5	6.5	6.5	4.5	6.0	3.5	2.5	3.0	3.5	2.5	3.0
15	8.0	6.5	7.0	5.5	4.5	5.0	3.5	1.5	2.5	3.5	3.0	3.0
16	8.5	5.5	7.0	5.0	3.5	4.0	3.5	2.0	3.0	4.0	3.0	3.5
17	8.0	4.5	6.0	5.0	3.0	4.0	3.5	2.5	3.0	5.0	3.5	4.0
18	7.5	5.5	6.5	6.0	4.5	5.0	3.0	1.0	2.5	4.5	3.5	4.0
19	7.0	6.0	6.5	5.5	4.5	5.0	1.0	.5	.5	4.0	2.5	3.0
20	7.5	5.5	6.0	5.0	3.0	4.5	1.0	.5	.5	3.5	1.5	2.5
21	7.0	4.5	6.0	4.0	3.0	3.5	1.5	.5	1.0	3.5	1.5	2.0
22	7.0	5.5	6.0	6.0	4.0	5.0	1.5	.5	1.0	3.5	1.5	2.5
23	8.0	5.0	6.0	6.0	5.0	5.5	2.0	1.0	1.5	3.5	2.0	2.5
24	8.0	4.5	6.0	6.0	5.5	5.5	2.0	1.5	2.0	3.0	2.0	2.5
25	8.5	5.0	6.0	5.5	4.0	5.0	2.5	2.0	2.0	3.0	1.5	2.0
26	8.5	6.0	7.0	4.5	3.5	4.0	2.5	2.0	2.0	3.0	1.0	2.0
27	7.5	4.5	5.5	3.5	2.5	3.0	3.0	2.0	2.5	3.5	2.0	2.5
28	7.0	4.5	5.5	4.0	2.5	3.0	2.5	.5	1.0	2.5	1.0	2.0
29	8.0	5.5	6.5	4.0	2.0	3.0	1.0	.5	.5	2.5	1.0	1.5
30	7.5	5.0	6.0	4.0	2.5	3.0	1.5	1.0	1.5	3.0	1.0	1.5
31	7.5	6.5	7.0	---	---	---	2.5	1.5	2.0	4.0	1.5	2.5
MONTH	12.0	4.5	7.0	7.5	2.0	4.5	4.5	.5	2.5	5.0	1.0	2.5

PEND OREILLE RIVER BASIN

12353450 FISH CREEK BELOW WEST FORK NEAR TARKIO, MT.--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	4.5	2.5	3.0	2.5	1.0	1.5	9.0	3.5	6.0	7.5	3.0	5.5
2	4.5	2.0	3.0	3.0	.5	1.5	6.5	4.5	5.5	7.0	3.0	5.0
3	5.0	3.0	3.5	3.5	2.0	2.5	8.0	3.5	5.5	6.0	4.0	5.0
4	4.5	3.0	3.5	4.0	3.0	3.5	7.0	4.5	5.5	8.0	4.0	5.5
5	5.0	3.0	4.0	4.0	2.5	3.0	6.0	4.0	5.0	8.0	3.5	5.5
6	4.5	2.0	3.0	4.5	2.0	3.0	6.5	3.0	4.5	9.0	4.5	7.0
7	4.5	2.0	3.0	3.5	2.5	3.0	5.0	3.0	3.5	8.0	4.5	6.5
8	4.5	2.0	3.0	5.0	1.5	3.0	6.0	2.5	4.0	6.5	4.5	5.5
9	5.0	2.0	3.0	5.0	1.0	3.0	6.0	3.0	4.0	5.0	4.0	4.5
10	4.5	2.0	3.0	4.5	2.5	3.5	5.0	2.5	3.5	6.5	3.5	5.0
11	4.0	1.5	2.5	5.0	1.5	3.0	5.5	2.5	4.0	8.0	4.5	6.0
12	4.5	2.5	3.5	4.0	1.5	3.0	7.0	3.0	5.0	6.0	4.5	5.5
13	6.0	3.5	4.0	6.0	2.5	3.5	8.0	2.5	5.0	9.0	4.5	6.0
14	5.0	3.5	4.0	5.0	2.0	3.5	6.5	3.5	5.0	7.5	4.5	5.5
15	5.0	3.5	4.5	5.5	2.5	3.5	6.5	4.0	5.5	9.0	3.5	6.0
16	5.0	3.5	4.0	5.0	3.0	4.0	6.5	4.0	5.0	8.0	4.0	6.0
17	4.5	3.0	3.5	6.5	2.0	4.0	6.5	3.5	5.0	7.0	4.5	6.0
18	4.5	2.5	3.5	6.0	1.5	3.5	6.5	4.0	5.0	6.5	4.0	5.5
19	4.5	3.0	4.0	6.5	2.5	4.5	8.5	3.0	5.5	7.0	4.0	5.5
20	4.0	3.5	4.0	6.5	3.5	4.5	10.0	3.0	6.0	6.5	4.0	5.5
21	5.0	3.0	4.0	5.0	2.5	4.0	9.0	3.5	6.0	8.0	4.5	6.0
22	4.0	2.5	3.5	6.0	3.0	4.0	8.5	3.5	6.0	9.0	4.0	6.0
23	4.5	2.0	3.0	5.5	2.5	4.0	9.0	3.5	6.0	8.5	4.0	6.0
24	5.5	3.0	4.0	5.0	2.5	4.0	7.0	4.5	5.5	9.0	4.5	6.5
25	5.5	2.0	3.5	4.0	2.5	3.0	6.0	3.0	4.5	7.0	5.0	6.0
26	5.5	2.0	3.5	5.0	2.0	3.0	6.5	3.0	4.5	7.5	3.5	5.5
27	5.5	2.5	3.5	5.0	2.5	3.5	5.5	3.5	4.5	7.0	3.5	5.5
28	5.5	1.5	3.0	4.5	2.5	3.5	8.0	3.5	5.0	8.5	4.5	6.5
29	---	---	---	5.5	1.5	3.5	7.0	4.0	5.5	8.0	4.0	6.0
30	---	---	---	7.5	3.0	4.5	8.0	4.0	5.5	6.5	5.5	6.0
31	---	---	---	9.0	2.5	5.5	---	---	---	8.0	5.0	6.5
MONTH	6.0	1.5	3.5	9.0	.5	3.5	10.0	2.5	5.0	9.0	3.0	6.0
		JUNE			JULY			AUGUST			SEPTEMBER	
1	10.0	4.5	7.0	11.5	6.5	9.0	14.5	11.0	12.5	13.0	9.0	10.5
2	10.5	5.0	7.5	13.0	7.5	10.0	15.5	9.0	12.0	14.0	8.0	10.5
3	9.0	5.5	7.0	13.5	8.0	10.5	15.5	9.0	12.0	14.0	7.5	10.0
4	6.5	4.5	5.5	14.0	8.5	11.0	15.5	9.5	12.0	14.0	7.5	10.0
5	6.0	5.0	5.5	13.5	8.5	11.0	13.5	10.0	11.5	14.0	8.0	10.5
6	9.0	5.5	7.0	13.0	8.0	10.5	14.5	10.0	12.0	14.0	7.5	10.0
7	7.5	5.0	6.5	13.0	7.5	10.0	15.0	9.5	12.0	13.5	9.0	10.0
8	7.5	5.5	6.5	13.5	8.0	10.5	16.0	10.0	12.5	12.5	8.5	10.0
9	9.5	4.5	7.0	14.0	8.5	11.0	16.0	10.0	12.5	12.5	8.5	10.0
10	10.5	5.5	8.0	13.5	9.0	11.0	15.0	10.5	12.5	12.0	8.0	9.5
11	8.5	6.0	7.0	14.0	8.5	11.0	15.5	10.0	12.5	13.5	7.5	10.0
12	9.0	4.5	7.0	14.5	8.5	11.5	15.0	9.0	11.5	13.5	7.5	10.0
13	7.5	4.5	6.5	15.0	9.5	12.0	15.5	9.0	11.5	10.0	8.0	9.0
14	8.0	4.5	6.5	12.5	10.0	11.0	14.0	9.0	11.5	11.5	8.0	9.0
15	9.0	4.5	6.5	15.0	9.0	11.5	15.0	9.0	11.5	12.5	7.0	9.0
16	8.5	6.0	7.0	15.5	9.5	12.0	15.0	9.0	11.5	12.5	7.0	9.5
17	10.0	5.5	7.5	12.0	10.5	11.0	13.0	9.5	11.0	13.0	8.0	9.5
18	10.5	4.5	7.5	14.0	8.5	11.0	15.5	9.0	11.5	11.0	7.0	8.5
19	8.0	6.0	7.0	14.5	8.5	11.0	14.0	9.5	11.0	12.5	6.5	9.0
20	8.5	6.5	7.5	14.5	8.5	11.5	15.5	9.0	12.0	12.0	6.5	9.0
21	10.5	6.0	8.0	14.5	8.5	11.5	15.5	9.0	12.0	11.5	6.5	8.5
22	11.0	7.0	8.5	15.5	9.0	12.0	15.5	9.0	12.0	10.5	5.5	7.5
23	10.5	6.0	8.5	16.0	9.5	12.5	15.5	9.5	12.0	11.5	6.5	8.5
24	9.0	7.0	8.0	16.0	10.0	13.0	15.0	9.0	11.5	12.0	5.5	8.5
25	9.5	7.0	8.0	15.0	11.0	13.0	15.0	9.5	11.5	12.0	6.5	8.5
26	9.5	6.5	8.0	15.5	10.5	12.5	15.0	8.5	11.0	12.0	6.5	8.5
27	10.5	6.5	8.5	15.5	9.5	12.0	11.5	9.0	10.0	12.0	6.5	8.5
28	10.5	7.5	9.0	15.5	9.5	12.5	13.0	9.0	10.5	9.0	7.0	8.0
29	10.0	7.0	8.5	16.0	9.5	12.5	14.5	8.5	11.0	12.0	7.0	9.0
30	9.0	8.0	8.5	16.0	9.5	12.5	14.5	8.5	11.0	12.0	6.5	8.5
31	---	---	---	15.5	9.5	12.5	13.5	8.5	11.0	---	---	---
MONTH	11.0	4.5	7.5	16.0	6.5	11.5	16.0	8.5	11.5	14.0	5.5	9.5

PEND OREILLE RIVER BASIN

12353650 CLARK FORK AT SUPERIOR, MT

LOCATION.--Lat 47°11'47", long 114°53'22", in NW1/4NW1/4NE1/4 sec.34, T.17 N., R.26 W., Mineral County, Hydrologic Unit 17010204, on left bank, at bridge on River Street in town of Superior and at mile 282.2.

DRAINAGE AREA.--10,210 mi².

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: July 1985 to September 1991 (discontinued).

INSTRUMENTATION.--Temperature recorder since July 19, 1985.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum, 23.5°C, July 27, 29, 1987; minimum, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 22.0°C, Aug. 9; minimum, 0.0°C on many days during winter period.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	14.0	11.5	13.0	7.0	6.0	7.0	1.5	1.0	1.5	.0	0	0
2	13.0	11.5	12.0	6.0	5.0	5.5	1.0	1.0	1.0	.0	0	0
3	11.5	10.5	11.0	4.5	4.0	4.5	1.5	1.0	1.0	.0	0	0
4	12.5	10.5	11.0	4.5	4.0	4.5	2.0	1.0	1.5	.0	0	0
5	12.5	10.5	11.5	4.5	4.0	4.0	2.5	1.5	2.0	.0	0	0
6	11.0	9.5	10.0	5.0	4.0	4.5	2.0	1.5	1.5	.0	0	0
7	10.0	8.0	9.0	4.5	3.5	4.0	1.5	.5	1.0	.0	0	0
8	9.5	7.5	8.5	4.5	4.0	4.0	1.5	.5	1.0	.0	0	0
9	9.5	7.5	8.5	5.0	4.0	4.5	2.0	1.0	1.5	.0	0	0
10	9.5	8.0	9.0	6.0	5.0	5.5	2.5	1.5	2.0	.0	0	0
11	9.5	7.5	8.5	6.0	5.5	5.5	3.0	2.5	2.5	.0	0	0
12	9.5	7.5	8.5	6.0	5.0	5.5	3.0	2.0	2.5	.0	0	0
13	9.0	8.0	8.5	6.0	5.0	5.5	2.5	2.0	2.0	.0	0	0
14	8.5	7.5	8.0	6.0	5.0	5.5	2.0	1.5	2.0	.0	0	0
15	8.0	7.0	7.5	5.5	4.5	5.0	1.0	.5	1.0	.0	0	0
16	8.0	7.0	7.5	4.5	4.0	4.5	.5	.0	.5	.0	0	0
17	8.0	6.5	7.0	4.0	3.5	4.0	1.0	.5	.5	.0	0	0
18	7.5	6.0	7.0	4.5	3.5	4.0	1.0	.0	1.0	.0	0	0
19	7.5	6.5	7.0	4.5	4.0	4.0	.0	.0	.0	.0	0	0
20	7.5	6.0	6.5	4.5	4.0	4.0	.0	.0	.0	.0	0	0
21	6.5	5.5	6.0	4.0	3.5	4.0	.0	.0	.0	.0	0	0
22	7.0	6.0	6.5	4.0	3.5	4.0	.0	.0	.0	.0	0	0
23	7.0	5.5	6.0	5.0	4.0	4.5	.0	.0	.0	.0	0	0
24	7.5	5.5	6.5	5.5	5.0	5.0	.0	.0	.0	.5	0	0
25	7.5	6.0	6.5	5.5	5.5	5.5	.0	.0	.0	.0	0	0
26	8.0	6.5	7.0	5.5	4.5	5.0	.0	.0	.0	.0	0	0
27	7.5	6.0	7.0	4.5	3.5	4.0	.0	.0	.0	.0	0	0
28	7.0	6.0	6.5	3.5	2.5	3.0	.0	.0	.0	.0	0	0
29	7.0	6.5	6.5	2.5	2.0	2.0	.0	.0	.0	.0	0	0
30	7.5	6.0	6.5	2.5	2.0	2.0	.0	.0	.0	.0	0	0
31	7.5	7.0	7.0	---	---	---	.0	.0	.0	.0	0	0
MONTH	14.0	5.5	8.0	7.0	2.0	4.5	3.0	.0	1.0	.5	0	0

PEND OREILLE RIVER BASIN

12353650 CLARK FORK AT SUPERIOR, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	.0	.0	.0	3.5	1.5	3.0	10.0	6.5	8.0	10.0	8.0	9.0
2	.5	.0	.0	1.5	1.0	1.0	10.0	8.0	9.0	9.5	8.5	9.0
3	.5	.5	.5	1.5	1.0	1.0	10.0	8.0	9.0	8.5	8.0	8.5
4	.5	.5	.5	3.0	1.5	2.5	9.5	8.5	9.0	9.5	7.5	8.5
5	1.0	.5	.5	3.5	2.5	3.0	9.5	8.5	9.0	9.5	8.0	9.0
6	1.0	.0	.5	3.5	2.5	3.0	9.0	7.0	8.0	10.5	9.0	9.5
7	1.0	.0	.5	3.5	2.5	3.0	7.0	6.0	7.0	11.0	9.5	10.0
8	1.5	.0	.5	4.0	2.5	3.0	7.0	5.5	6.0	11.0	9.5	10.0
9	1.5	.5	1.0	4.5	2.5	3.0	7.0	5.5	6.0	9.5	8.0	9.0
10	2.0	.5	1.5	4.5	3.0	4.0	6.5	5.5	6.0	9.0	8.0	8.5
11	2.0	.5	1.5	5.0	3.5	4.0	6.0	5.5	5.5	9.5	8.0	8.5
12	2.5	1.0	2.0	4.5	3.0	3.5	7.0	5.0	6.0	9.0	8.5	8.5
13	3.0	2.0	2.5	4.5	3.5	4.0	8.5	5.5	7.0	9.5	8.0	9.0
14	4.0	2.5	3.0	6.0	4.0	5.0	8.0	6.5	7.5	10.0	9.5	9.5
15	4.0	3.5	3.5	6.0	4.0	5.0	8.0	7.0	7.5	10.5	9.0	10.0
16	4.0	3.5	4.0	6.0	4.5	5.0	8.5	7.0	7.5	10.5	10.0	10.5
17	4.0	3.5	4.0	6.5	4.0	5.0	8.0	6.5	7.0	11.0	10.0	10.5
18	4.0	3.0	3.5	7.0	4.0	5.5	8.5	7.0	7.5	10.5	10.0	10.0
19	4.0	3.0	3.5	7.5	4.5	6.0	9.5	6.5	8.0	10.0	9.0	9.5
20	4.5	4.0	4.0	7.5	5.5	6.5	11.0	7.5	9.0	9.5	8.5	9.0
21	4.5	3.5	4.0	7.0	5.5	6.5	11.5	8.5	10.0	9.5	8.0	8.5
22	4.5	3.5	4.0	7.0	5.5	6.0	12.0	9.0	10.5	11.0	9.0	10.0
23	4.0	3.0	3.5	7.0	5.5	6.0	12.0	9.5	10.5	11.5	10.0	11.0
24	4.5	3.0	4.0	6.5	5.0	5.5	10.5	9.5	10.0	11.5	10.0	11.0
25	5.0	3.5	4.0	5.5	4.0	5.0	9.0	7.5	8.5	11.5	10.0	10.5
26	5.0	3.5	4.5	5.5	3.5	4.5	7.5	6.5	7.5	10.5	9.5	9.5
27	5.5	3.5	4.5	5.0	3.5	4.0	7.5	6.5	7.0	9.5	8.5	9.0
28	5.5	3.5	4.5	5.0	4.0	4.5	7.5	6.0	6.5	9.5	8.5	9.0
29	---	---	---	5.5	3.5	4.5	9.0	7.0	7.5	10.5	9.0	9.5
30	---	---	---	6.5	4.5	5.5	9.5	7.5	8.5	10.5	10.0	10.0
31	---	---	---	9.0	5.0	7.0	---	---	---	10.5	9.5	10.0
MONTH	5.5	.0	2.5	9.0	1.0	4.5	12.0	5.0	8.0	11.5	7.5	9.5
		JUNE			JULY			AUGUST			SEPTEMBER	
1	12.0	10.5	11.0	14.0	12.0	13.0	19.5	18.5	19.0	18.5	16.5	17.5
2	13.0	12.0	12.5	15.5	13.5	14.5	20.5	17.5	18.5	18.5	15.5	17.0
3	13.0	12.0	12.5	16.5	15.0	15.5	21.0	16.5	18.5	18.5	14.5	16.5
4	12.5	11.5	12.0	17.0	16.0	16.5	21.0	17.5	19.0	18.5	14.5	16.5
5	11.5	10.0	10.5	17.0	16.0	17.0	21.0	18.0	19.5	19.0	15.0	17.0
6	11.0	9.5	10.0	17.0	16.0	16.5	19.5	18.0	18.5	18.5	15.0	17.0
7	11.5	10.5	11.0	16.5	15.5	16.0	21.0	17.0	19.0	17.5	15.0	16.5
8	11.5	11.0	11.0	17.0	16.0	16.5	21.5	17.5	19.5	17.0	15.5	16.5
9	12.0	10.5	11.0	17.5	16.5	17.0	22.0	17.5	19.5	17.0	15.0	16.0
10	13.5	11.5	12.5	17.5	17.0	17.0	21.5	18.5	20.0	16.5	14.0	15.5
11	13.5	12.5	13.0	18.0	16.5	17.0	21.0	18.0	19.5	17.0	14.0	15.5
12	12.5	11.5	12.0	18.5	17.0	17.5	21.0	17.0	19.0	17.5	13.5	15.5
13	12.0	11.0	11.5	19.0	17.5	18.0	21.0	17.0	19.0	16.5	14.5	15.5
14	11.5	11.0	11.5	18.5	17.0	18.0	20.0	17.0	18.5	16.0	14.0	15.0
15	11.5	10.5	11.0	19.0	16.5	17.5	21.0	16.5	18.5	15.5	12.5	14.0
16	11.5	11.0	11.0	19.5	17.0	18.0	21.0	16.5	19.0	15.5	12.5	14.0
17	12.5	11.0	11.5	18.0	17.0	17.5	21.0	17.0	19.0	16.0	13.0	14.5
18	13.0	11.5	12.5	18.0	16.0	17.0	20.5	17.0	19.0	15.5	12.5	14.0
19	13.0	11.5	12.5	19.0	16.0	17.5	20.5	17.0	19.0	15.5	12.0	13.5
20	12.0	11.5	11.5	19.5	16.5	17.5	21.0	17.0	19.5	15.5	12.0	13.5
21	13.0	12.0	12.5	19.0	16.5	18.0	21.5	17.0	19.5	14.0	12.0	13.0
22	14.0	12.5	13.5	20.0	17.0	18.5	21.5	17.0	19.5	13.5	11.0	12.5
23	14.0	12.5	13.5	21.0	17.5	19.0	21.0	17.5	19.5	13.5	10.5	12.0
24	14.0	12.5	13.0	21.5	18.5	20.0	21.0	16.5	19.0	14.0	10.5	12.5
25	12.5	12.0	12.0	20.5	19.5	20.0	20.0	17.5	19.0	14.5	11.0	13.0
26	13.0	12.0	12.5	21.0	18.5	19.5	19.5	16.0	18.0	15.0	11.5	13.0
27	14.0	12.5	13.0	21.0	18.0	19.5	17.5	15.5	16.5	15.0	11.5	13.5
28	14.5	14.0	14.0	21.0	17.5	19.0	18.5	16.0	17.0	15.0	12.0	13.5
29	14.5	14.0	14.0	20.5	17.5	19.0	19.0	15.0	17.0	14.5	12.5	13.5
30	14.0	12.5	13.0	21.0	18.0	19.5	19.5	15.5	17.5	15.0	11.5	13.5
31	---	---	---	21.5	18.0	19.5	20.0	16.0	18.0	---	---	---
MONTH	14.5	9.5	12.0	21.5	12.0	17.5	22.0	15.0	19.0	19.0	10.5	14.5

PEND OREILLE RIVER BASIN

12354000 ST. REGIS RIVER NEAR ST. REGIS, MT

LOCATION.--Lat 47°17'49", long 115°07'18", near center of NW1/4NE1/4 sec. 26, T.18 N., R.28 W., Mineral County, Hydrologic Unit 17010204, on left bank 50 ft downstream from road bridge, 500 ft upstream from Little Joe Creek, 1.2 mi west of St. Regis, and 1.7 mi upstream from mouth.

DRAINAGE AREA.--303 mi^2.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: July 1985 to September 1991 (discontinued).

INSTRUMENTATION.--Temperature recorder since July 31, 1985.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum, 21.0°C, July 27, 29, 1987; minimum, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 18.5°C, Aug. 7, 8, 9; minimum, 0.5°C on many days from December to March.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT					
17...	0750	185	94	-1.0	6.0
NOV					
27...	1550	1390	65	1.0	3.5
JAN					
03...	0935	270	86	-6.0	0.5
MAY					
21...	1200	3090	54	20.0	6.0

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	11.0	8.5	10.0	7.0	5.0	6.0	3.0	2.0	2.5	.5	.5	.5
2	11.0	8.5	9.5	5.0	4.0	4.5	2.5	2.0	2.5	.5	.5	.5
3	9.0	7.5	8.5	4.0	3.0	3.5	3.5	2.5	3.0	1.0	.5	1.0
4	13.0	9.0	11.0	5.0	4.0	4.5	3.5	3.5	3.5	1.0	.5	.5
5	12.0	9.0	10.5	6.0	5.0	5.0	3.5	3.0	3.5	1.0	.5	.5
6	9.5	6.5	8.0	5.0	4.0	4.5	3.5	2.0	2.5	.5	.5	.5
7	8.5	5.5	7.0	4.5	3.5	4.0	2.0	1.5	1.5	.5	.5	.5
8	8.5	5.5	7.0	5.5	4.5	5.0	2.5	1.0	1.5	2.0	.5	1.0
9	9.5	6.5	8.0	6.5	5.5	6.0	3.5	2.5	3.0	3.0	2.0	2.5
10	10.0	7.5	9.0	6.5	5.5	6.0	4.0	3.5	4.0	3.0	2.0	2.5
11	8.0	5.0	6.5	6.0	1.0	5.0	4.0	3.5	4.0	3.5	2.5	3.0
12	9.0	7.0	7.5	5.0	4.0	4.5	3.5	3.0	3.5	3.0	2.0	3.0
13	8.0	7.0	7.5	5.5	4.0	4.5	2.5	2.0	2.5	3.0	2.0	2.5
14	7.0	6.0	6.5	5.5	4.5	5.5	2.5	2.0	2.5	3.5	2.5	3.0
15	7.5	6.5	7.0	5.0	4.0	4.5	2.0	1.0	1.0	3.5	2.5	3.0
16	7.5	6.5	7.0	4.5	4.0	4.0	2.0	1.0	1.5	3.5	3.0	3.0
17	7.5	5.5	6.5	4.5	3.5	4.0	2.5	2.0	2.5	4.0	3.0	3.5
18	7.0	6.0	6.5	5.5	4.5	5.0	2.5	.5	2.0	4.0	3.5	3.5
19	7.0	6.5	6.5	5.0	4.5	5.0	.5	.5	.5	3.0	1.5	2.0
20	7.0	5.5	6.5	4.5	3.5	4.0	.5	.5	.5	1.5	.5	1.0
21	6.5	5.5	6.0	4.0	3.0	3.5	.5	.5	.5	.5	.5	.5
22	6.5	5.5	6.0	4.5	3.5	4.0	.5	.5	.5	.5	.5	.5
23	7.0	5.5	6.0	5.5	4.5	5.0	.5	.5	.5	1.5	.5	1.0
24	7.0	5.0	6.0	5.5	5.0	5.0	.5	.5	.5	2.0	1.0	1.5
25	7.5	5.5	6.0	5.0	4.0	5.0	.5	.5	.5	1.0	.5	.5
26	8.0	6.5	7.5	4.0	3.5	4.0	.5	.5	.5	.5	.5	.5
27	7.0	5.0	6.0	4.0	3.5	3.5	.5	.5	.5	.5	.5	.5
28	6.5	5.5	6.0	3.5	3.0	3.5	.5	.5	.5	1.0	.5	.5
29	7.5	6.0	6.5	4.0	3.0	3.5	.5	.5	.5	.5	.5	.5
30	7.0	6.0	6.5	3.5	3.0	3.0	.5	.5	.5	.5	.5	.5
31	7.5	7.0	7.0	---	---	---	.5	.5	.5	1.0	.5	.5
MONTH	13.0	5.0	7.5	7.0	1.0	4.5	4.0	.5	1.5	4.0	.5	1.5

PEND OREILLE RIVER BASIN

12354000 ST. REGIS RIVER NEAR ST. REGIS, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	2.5	1.0	2.0	2.5	.5	1.5	7.5	3.5	5.5	7.5	4.0	6.0
2	3.0	2.0	2.5	1.5	.5	1.0	6.0	4.0	5.0	7.0	4.0	5.5
3	4.0	3.0	3.5	2.5	1.5	2.0	6.5	3.0	5.0	6.0	4.5	5.5
4	4.0	3.0	3.5	3.0	2.5	2.5	5.0	4.5	4.5	7.5	4.5	6.0
5	4.0	3.0	3.5	3.0	2.5	3.0	4.5	3.5	4.0	7.0	4.0	6.0
6	4.0	3.0	3.5	3.5	2.0	2.5	5.5	3.0	4.0	8.0	5.5	6.5
7	3.0	2.5	2.5	3.5	2.5	2.5	4.5	3.0	4.0	7.5	5.5	6.5
8	3.5	2.0	2.5	4.0	2.0	3.0	5.5	3.5	4.0	7.0	5.5	6.0
9	3.0	2.0	2.5	3.5	1.5	2.5	4.5	3.5	4.0	5.5	4.0	5.0
10	3.0	1.5	2.5	3.5	2.5	3.0	5.0	3.0	4.0	7.5	4.5	6.0
11	2.5	1.0	2.0	3.0	2.0	2.5	5.5	3.0	4.0	8.0	5.0	6.5
12	4.0	2.5	3.0	3.5	2.0	2.5	6.0	3.5	4.5	7.0	5.5	6.0
13	4.5	3.5	4.0	4.5	3.0	3.5	7.0	3.0	5.0	8.5	5.0	6.5
14	4.5	3.5	4.0	4.0	2.5	3.5	5.5	3.5	4.5	7.5	5.5	6.0
15	4.5	3.5	4.0	4.0	2.5	3.5	6.0	3.5	5.0	9.0	4.5	6.5
16	4.5	3.5	4.0	4.5	3.0	3.5	6.0	4.5	5.0	8.0	4.5	6.5
17	4.0	3.5	3.5	5.5	3.0	4.0	6.0	3.5	5.0	8.0	5.5	6.5
18	4.0	3.0	3.5	4.5	2.0	3.5	6.5	4.0	5.5	8.0	5.5	6.5
19	4.0	3.0	3.5	5.0	3.0	4.0	7.5	3.5	5.5	8.0	5.5	6.5
20	4.0	2.5	3.0	5.5	4.0	4.5	8.0	4.0	6.0	8.5	4.5	6.5
21	4.0	3.0	3.5	5.0	3.0	4.0	8.0	4.0	6.0	7.5	5.5	6.5
22	4.0	3.0	3.5	5.0	3.0	4.0	8.0	4.0	6.0	9.5	4.5	7.0
23	3.5	2.5	3.0	5.0	2.5	4.0	7.5	4.0	6.0	9.0	4.5	7.0
24	4.0	2.5	3.0	4.5	3.0	3.5	6.5	5.0	5.5	9.5	5.0	7.0
25	3.5	2.5	3.0	4.0	2.5	3.5	6.5	3.5	5.0	8.0	5.5	6.5
26	3.5	2.5	3.0	3.0	1.5	2.5	6.5	3.5	4.5	7.5	4.5	6.0
27	4.0	2.5	3.5	3.5	2.0	2.5	5.5	4.0	4.5	7.5	5.0	6.0
28	3.5	2.5	3.0	3.5	2.5	3.0	7.0	3.5	5.0	7.5	5.5	6.5
29	---	---	---	4.5	2.0	3.5	6.5	4.5	5.5	9.0	5.5	7.0
30	---	---	---	6.5	3.0	4.5	8.0	4.5	6.0	8.0	6.5	6.5
31	---	---	---	7.5	3.0	5.0	---	---	---	8.5	5.5	7.0
MONTH	4.5	1.0	3.0	7.5	.5	3.0	8.0	3.0	5.0	9.5	4.0	6.5
		JUNE			JULY			AUGUST			SEPTEMBER	
1	10.5	5.5	8.0	12.5	8.0	10.0	15.5	13.5	14.5	15.0	12.0	13.5
2	11.0	6.0	8.5	14.0	8.5	11.0	17.5	11.5	14.5	15.5	10.0	12.5
3	10.0	6.0	8.0	14.5	9.5	12.0	18.0	12.0	15.0	15.5	10.0	12.5
4	8.5	5.0	7.0	14.5	10.0	12.0	18.0	12.5	15.5	16.0	9.5	13.0
5	7.5	6.5	7.0	14.5	9.5	12.0	15.5	13.0	14.5	16.0	11.0	13.5
6	10.0	6.5	8.0	13.5	9.0	11.5	16.5	13.0	14.5	16.0	10.5	13.0
7	8.5	6.5	7.5	14.0	8.5	11.5	18.5	13.0	15.5	14.0	11.0	12.5
8	8.0	6.5	7.0	14.5	9.5	12.0	18.5	13.0	15.5	14.5	11.0	12.5
9	10.5	6.0	8.0	14.5	9.5	12.0	18.5	13.0	15.5	14.0	11.5	12.5
10	11.5	6.5	9.0	14.0	10.5	12.5	17.5	14.0	15.5	14.0	10.5	12.0
11	10.0	7.5	8.5	15.0	10.0	12.5	16.5	12.5	14.5	15.0	10.5	12.5
12	9.5	5.5	7.5	15.5	10.5	13.0	16.0	11.5	14.0	15.0	10.0	12.5
13	8.5	5.5	7.0	16.5	11.5	14.0	17.0	12.0	14.5	12.5	10.5	11.5
14	7.5	5.5	6.5	14.5	11.5	12.5	15.5	12.0	13.5	13.0	10.0	11.5
15	9.0	5.5	7.0	15.0	10.5	13.0	17.5	11.5	14.0	14.0	9.5	11.5
16	8.5	7.0	8.0	16.0	11.0	13.5	18.0	12.5	15.0	13.5	9.5	11.5
17	10.0	6.0	7.5	14.0	11.5	12.5	16.5	13.0	15.0	14.5	10.5	12.0
18	11.0	6.0	8.5	14.0	10.0	12.0	18.0	12.5	15.0	12.5	9.5	11.0
19	9.5	7.0	8.0	15.0	10.0	12.5	16.0	13.0	14.5	13.5	8.5	11.0
20	10.5	8.0	9.0	16.0	10.5	13.5	18.0	12.5	15.0	14.0	9.5	11.5
21	11.5	7.5	9.5	15.5	11.0	13.5	18.0	12.5	15.0	12.0	9.0	10.0
22	11.0	8.0	9.5	17.0	11.5	14.0	18.0	13.0	15.5	11.5	7.5	9.5
23	11.5	8.0	9.5	17.5	12.0	14.5	18.0	13.0	15.5	12.5	8.0	10.0
24	10.0	8.0	9.0	18.0	13.0	15.5	17.5	11.5	14.5	13.0	8.5	10.5
25	10.0	8.0	9.0	16.0	13.5	14.5	17.0	13.0	14.5	13.5	9.0	11.0
26	11.0	8.0	9.5	16.5	12.0	14.5	16.5	11.0	13.5	13.5	9.0	11.0
27	12.0	8.0	10.0	17.0	12.0	14.5	13.5	11.0	12.0	13.5	9.0	11.0
28	11.5	9.0	10.0	17.5	12.0	14.5	15.0	11.0	13.0	12.0	9.5	10.5
29	11.0	9.0	10.0	17.5	12.0	15.0	16.5	11.0	13.5	14.0	10.0	11.5
30	10.0	8.5	9.0	17.5	12.5	15.0	17.0	11.5	14.0	13.0	9.5	11.0
31	---	---	---	17.5	12.5	15.0	18.0	11.5	14.5	---	---	---
MONTH	12.0	5.0	8.5	18.0	8.0	13.0	18.5	11.0	14.5	16.0	7.5	11.5

PEND OREILLE RIVER BASIN

12354500 CLARK FORK AT ST. REGIS, MT

LOCATION.--Lat 47°18'07", long 115°05'11", in NW1/4SE1/4SW1/4 sec.19, T.18 N., R.27 W., Mineral County, Hydrologic Unit 17010204, on left bank at St. Regis, 0.4 mi downstream from St. Regis River, and at river mile 270.3.

DRAINAGE AREA.--10,709 mi^2.

PERIOD OF RECORD.--October 1910 to current year. Monthly discharge only for some periods, published in WSP 1316.

REVISED RECORDS.--WSP 1246: Drainage area. WSP 1316: 1916-17, 1920, 1929-31(M), 1933(M). The AVERAGE DISCHARGE in acre-ft/yr for 1990 is 5,388,000; the previously published figure has been superceded.

GAGE.--Water-stage recorder. Datum of gage is 2,600.37 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Nov. 29, 1933, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 21 to Jan. 13. Records excellent. Diversions for irrigation of about 244,000 acres upstream from station. Several observations of water temperature and specific conductance were made during the year. Bonneville Power Administration satellite telemeter at station.

AVERAGE DISCHARGE.--81 years, 7,428 ft^3/s, 5,382,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 68,900 ft^3/s, May 24, 1948, gage height, 19.96 ft, from graph based on gage readings; minimum, 732 ft^3/s, Feb. 3, 1989, gage height, 3.29 ft, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 34,800 ft^3/s, May 20, gage height, 14.57 ft; minimum daily, 1,000 ft^3/s, Dec. 22, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2340	3490	4010	e2300	2460	3840	3340	7530	20000	17700	3710	2590
2	2350	3440	3840	e2500	2720	3670	3560	7230	20300	17300	3630	2540
3	2420	3390	3590	e2700	2830	3540	4010	6960	22600	15800	3560	2490
4	2530	3350	3530	e2800	2860	3740	4600	6730	24900	14900	3520	2450
5	2660	3360	3560	e2700	2870	4330	5920	6500	26000	14300	3460	2440
6	2750	3480	3540	e2600	2900	4750	7480	6410	26300	13600	3400	2410
7	2800	3520	3450	e2500	2880	4670	7860	6610	30700	12400	3290	2380
8	2850	3400	3300	e2500	2880	4400	7760	7690	33600	11200	3200	2370
9	2860	3380	3140	e2600	2840	4150	7380	9520	31600	10300	3140	2410
10	2870	3820	3310	e2800	2820	4010	6970	10500	28600	9600	3110	2500
11	2880	3830	3560	e2900	2810	3880	6570	10800	28400	8970	3010	2590
12	2860	3820	3550	e3000	2790	3780	6230	11300	29100	8540	2920	2610
13	2910	3780	3530	e3200	2800	3740	6010	12800	28000	7940	2920	2680
14	2920	3810	3420	3420	2860	3670	5860	14000	25400	7530	2850	2810
15	2940	3770	3170	3580	2940	3590	5770	14800	22400	7350	2800	2820
16	3130	3730	2980	3590	3080	3530	5750	15700	20200	7000	2730	2840
17	3130	3660	2870	3540	3290	3470	5660	16900	18300	6630	2680	2790
18	3150	3560	2900	3470	3490	3470	5610	23000	17000	6290	2630	2720
19	3160	3530	2870	3280	3550	3430	5560	31900	16000	6000	2590	2690
20	3100	3530	1570	3150	4230	3410	5550	34400	16400	5670	2570	2680
21	3080	3500	e1150	2900	4680	3440	5780	32700	19200	5320	2540	2670
22	3170	3490	e1000	2690	5040	3490	6240	30100	21000	5060	2510	2680
23	3220	3580	e1200	2720	4760	3520	6960	29500	20000	4820	2460	2600
24	3260	4110	e1400	2820	4530	3510	8100	29600	19100	4610	2400	2590
25	3240	6830	e1800	2770	4300	3510	9140	29900	18800	4420	2350	2550
26	3210	6010	e2100	2570	4130	3500	9700	29500	17700	4270	2320	2530
27	3190	5030	e2300	2540	3970	3460	9460	26900	16600	4150	2320	2480
28	3250	4580	e2500	2500	3900	3410	8910	24300	15900	4090	2340	2460
29	3290	4260	e2300	2310	---	3350	8390	22000	15600	3960	2460	2450
30	3280	4120	e2100	2100	---	3330	7900	20600	16500	3830	2610	2460
31	3420	---	e2200	2060	---	3310	---	20300	---	3700	2630	---
TOTAL	92220	117160	85740	87110	95210	114900	198030	556680	666200	257250	88660	77280
MEAN	2975	3905	2766	2810	3400	3706	6601	17960	22210	8298	2860	2576
MAX	3420	6830	4010	3590	5040	4750	9700	34400	33600	17700	3710	2840
MIN	2340	3350	1000	2060	2460	3310	3340	6410	15600	3700	2320	2370
AC-FT	182900	232400	170100	172800	188800	227900	392800	1104000	1321000	510300	175900	153300
CFSM	.28	.36	.26	.26	.32	.35	.62	1.68	2.07	.77	.27	.24
IN.	.32	.41	.30	.30	.33	.40	.69	1.93	2.31	.89	.31	.27

CAL YR 1990 TOTAL 2420140 MEAN 6631 MAX 27600 MIN 1000 AC-FT 4800000 CFSM .62 IN. 8.41
WTR YR 1991 TOTAL 2436440 MEAN 6675 MAX 34400 MIN 1000 AC-FT 4833000 CFSM .62 IN. 8.46

e Estimated

PEND OREILLE RIVER BASIN

12354700 CLARK FORK NEAR PARADISE, MT

LOCATION.--Lat 47°19'19", long 114°53'24", in NE1/4SW1/4NE1/4 sec. 15, T.18 N., R.25 W., Sanders County, Hydrologic Unit 17010204, on right bank at bridge on State Highway 461, 6.3 mi southwest of Paradise, 12.5 road miles down stream from St. Regis and at mile 255.5.

DRAINAGE AREA.--10,794 mi^2.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: July 1985 to September 1991 (discontinued).

INSTRUMENTATION.--Temperature recorder since July 31, 1985.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum, 22.5°C, July 27, 30, 1987; minimum, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 21.0°C, July 24, 25; minimum recorded, 0.0°C, on many days during winter.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	14.0	13.0	13.5	7.5	6.5	7.0	2.0	1.5	2.0	.0	0	0
2	13.0	12.0	12.5	6.5	5.5	6.0	1.5	1.0	1.5	.0	0	0
3	12.0	11.0	11.0	5.5	4.5	4.5	1.5	1.0	1.5	.0	0	0
4	12.5	11.0	11.5	4.5	4.5	4.5	2.0	1.5	1.5	.0	0	0
5	12.5	11.0	12.0	4.5	4.5	4.5	2.5	2.0	2.0	.0	0	0
6	11.0	10.0	10.5	4.5	4.0	4.5	2.0	1.5	2.0	.0	0	0
7	10.0	9.0	9.5	4.5	4.0	4.0	1.5	1.0	1.0	.0	0	0
8	9.5	8.5	8.5	4.5	4.0	4.0	1.0	1.0	1.0	.0	0	0
9	9.0	8.5	8.5	5.0	4.5	4.5	2.0	1.0	1.5	.0	0	0
10	9.5	9.0	9.0	6.0	5.0	5.5	2.5	2.0	2.0	.0	0	0
11	8.5	7.5	8.0	6.0	5.5	5.5	2.5	2.5	2.5	.0	0	0
12	8.5	8.5	8.5	5.5	5.0	5.5	2.5	2.5	2.5	.0	0	0
13	8.5	8.0	8.5	5.5	5.0	5.5	2.5	2.0	2.0	.0	0	0
14	8.0	8.0	8.0	6.0	5.5	5.5	2.0	2.0	2.0	.0	0	0
15	8.0	7.5	7.5	5.5	5.0	5.0	2.0	.5	1.0	.0	0	0
16	8.0	8.0	8.0	5.0	4.5	4.5	.5	.5	.5	.0	0	0
17	7.5	7.0	7.5	4.5	4.0	4.0	1.0	.5	1.0	.0	0	0
18	7.5	7.0	7.0	4.5	4.0	4.0	1.5	.0	1.0	.0	0	0
19	7.0	7.0	7.0	4.5	4.0	4.5	.0	.0	.0	.0	0	0
20	7.0	6.5	7.0	4.5	4.0	4.0	.5	.0	.5	.0	0	0
21	6.5	6.0	6.5	4.0	3.5	4.0	.5	.5	.5	.0	0	0
22	6.5	6.0	6.5	4.0	4.0	4.0	.5	.0	.5	.0	0	0
23	6.5	6.0	6.5	5.0	4.0	4.5	.0	.0	.0	.0	0	0
24	6.5	6.0	6.5	5.5	5.0	5.0	.0	.0	.0	.0	0	0
25	7.0	6.5	6.5	5.5	5.0	5.0	.0	.0	.0	.0	0	0
26	7.5	7.0	7.5	5.0	4.5	4.5	.0	.0	.0	.0	0	0
27	7.5	6.5	7.0	4.5	4.0	4.0	.0	.0	.0	.0	0	0
28	7.0	6.5	6.5	4.0	3.0	3.0	.0	.0	.0	.0	0	0
29	7.0	6.5	7.0	3.0	2.5	2.5	.0	.0	.0	.0	0	0
30	7.0	6.5	6.5	2.5	2.0	2.5	.0	.0	.0	.5	0	0
31	7.5	7.0	7.0	---	---	---	.0	.0	.0	.5	0	0
MONTH	14.0	6.0	8.5	7.5	2.0	4.5	2.5	.0	1.0	.5	0	0

12354700 CLARK FORK NEAR PARADISE, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	.0	.0	.0	3.5	2.0	2.5	8.5	7.5	8.0	9.5	7.5	9.0
2	.0	.0	.0	2.0	1.5	1.5	8.5	8.5	8.5	9.0	8.0	8.5
3	.0	.0	.0	1.5	1.5	1.5	9.5	8.0	8.5	9.0	8.0	8.5
4	.0	.0	.0	2.5	1.5	2.0	9.5	8.5	8.5	9.5	7.5	8.5
5	1.0	.0	.5	3.0	2.5	3.0	8.5	7.5	8.0	9.5	8.0	8.5
6	1.0	1.0	1.0	3.5	2.5	3.0	7.5	6.5	7.0	10.5	8.5	9.5
7	1.0	.5	.5	3.5	2.5	3.0	7.0	6.0	6.5	10.5	9.0	10.0
8	1.5	.5	1.0	4.0	2.5	3.0	7.0	5.5	6.0	10.5	9.5	10.0
9	1.5	1.0	1.0	3.5	2.5	3.0	6.5	5.5	6.0	9.5	8.0	8.5
10	1.5	1.0	1.5	4.0	3.5	3.5	6.5	5.0	5.5	9.0	7.5	8.5
11	1.5	1.5	1.5	4.0	3.0	3.5	6.5	5.0	5.5	9.0	8.0	8.5
12	2.5	1.5	2.0	4.0	3.5	3.5	7.0	5.0	6.0	9.0	8.5	8.5
13	3.5	2.5	3.0	5.0	4.0	4.0	8.0	5.5	6.5	10.0	8.0	9.0
14	3.5	3.0	3.5	5.0	4.0	4.5	8.0	6.5	7.5	10.0	9.0	9.5
15	4.0	3.5	4.0	5.5	4.5	5.0	8.0	7.0	7.5	11.0	8.5	9.5
16	4.5	4.0	4.0	5.5	5.0	5.0	8.0	7.0	7.5	11.0	10.0	10.5
17	4.0	4.0	4.0	6.0	5.0	5.5	8.0	6.5	7.5	11.5	10.0	10.5
18	4.0	3.5	4.0	5.5	5.0	5.5	8.5	6.5	7.5	10.5	10.0	10.5
19	4.5	3.5	4.0	6.5	5.5	6.0	9.0	7.0	8.0	10.0	9.0	9.5
20	4.5	4.0	4.0	6.5	6.5	6.5	10.0	7.5	8.5	9.5	9.0	9.0
21	4.0	3.5	4.0	6.5	6.0	6.0	10.5	8.5	9.5	9.5	8.5	9.0
22	4.5	3.5	4.0	6.5	6.0	6.0	10.5	8.5	10.0	10.5	9.0	9.5
23	4.0	3.0	3.5	6.5	5.5	6.0	11.0	9.0	10.0	11.0	10.5	11.0
24	4.5	3.0	3.5	6.5	5.5	6.0	11.0	9.5	10.0	11.0	11.0	11.0
25	4.5	3.5	4.0	5.5	4.5	5.5	9.5	8.0	8.5	11.0	10.5	11.0
26	4.5	4.0	4.0	4.5	4.0	4.0	8.5	6.5	7.5	10.5	9.5	10.0
27	5.0	4.0	4.5	4.0	4.0	4.0	8.0	6.5	7.0	9.5	9.0	9.0
28	5.0	4.0	4.0	4.5	4.0	4.0	7.5	6.0	7.0	9.5	9.0	9.0
29	---	---	---	5.0	4.0	4.5	8.0	7.0	7.5	10.5	9.0	9.5
30	---	---	---	6.0	4.5	5.5	9.5	7.0	8.0	10.5	10.0	10.0
31	---	---	---	7.5	5.5	6.5	---	---	---	11.0	9.5	10.0
MONTH	5.0	.0	2.5	7.5	1.5	4.5	11.0	5.0	7.5	11.5	7.5	9.5
		JUNE			JULY			AUGUST			SEPTEMBER	
1	12.0	10.0	11.0	14.0	12.5	13.0	20.5	19.0	19.5	18.5	17.5	18.0
2	13.5	12.0	12.5	15.5	14.0	14.5	20.0	17.5	18.5	17.5	15.5	16.5
3	13.0	12.5	13.0	17.0	15.0	16.0	19.5	18.0	19.0	17.5	15.5	16.5
4	12.5	11.5	12.0	18.0	16.0	17.0	20.0	19.0	19.5	17.5	15.5	16.5
5	11.5	10.0	11.0	18.0	16.5	17.0	20.0	19.0	19.5	18.0	15.5	17.0
6	11.0	10.0	10.5	17.5	16.5	17.0	20.0	18.5	19.0	18.0	16.0	17.0
7	11.5	10.5	11.0	17.5	15.5	16.5	19.5	18.0	19.0	17.5	16.0	16.5
8	11.5	11.0	11.0	18.0	15.5	17.0	20.5	19.0	19.5	16.5	15.5	16.0
9	12.0	10.5	11.0	18.5	15.5	17.0	20.5	19.0	20.0	16.5	15.0	15.5
10	13.0	12.0	12.5	18.5	16.5	17.5	20.5	20.0	20.0	15.5	14.5	15.5
11	13.0	13.0	13.0	19.0	16.0	17.5	20.0	19.0	19.5	16.0	14.5	15.5
12	13.0	12.0	12.5	19.5	16.5	18.0	19.5	18.0	19.0	16.0	15.0	15.5
13	12.0	11.5	12.0	19.5	17.0	18.5	19.5	18.0	19.0	16.0	14.5	15.5
14	11.5	11.0	11.5	19.5	17.5	18.0	19.0	18.5	18.5	15.0	14.5	14.5
15	11.5	11.0	11.0	19.0	17.0	18.0	19.5	17.5	18.5	15.0	13.5	14.5
16	11.5	11.0	11.5	19.5	17.0	18.0	20.0	18.0	19.0	14.5	13.5	14.0
17	12.5	11.0	11.5	19.0	17.0	18.0	20.0	18.5	19.0	15.0	14.0	14.5
18	13.0	12.0	12.5	18.0	16.5	17.0	20.0	18.0	19.0	14.5	14.0	14.0
19	13.0	12.0	12.5	18.5	16.0	17.5	19.5	18.0	19.0	14.5	13.0	14.0
20	12.5	11.5	12.0	19.0	16.5	18.0	20.0	18.0	19.0	14.5	13.5	14.0
21	13.5	11.5	12.5	19.0	17.0	18.0	20.5	18.5	19.5	14.0	12.5	13.5
22	14.0	13.0	13.5	19.5	17.5	18.5	20.5	18.5	19.5	13.0	12.0	12.5
23	14.0	13.5	14.0	20.5	18.0	19.0	20.5	18.5	19.5	13.0	11.5	12.5
24	14.0	13.0	13.5	21.0	19.0	20.0	19.5	17.5	18.5	13.0	11.5	12.5
25	13.0	12.5	12.5	21.0	19.5	20.0	20.0	18.0	19.0	13.5	12.0	13.0
26	13.5	12.0	12.5	20.5	19.0	19.5	19.0	17.0	18.0	14.0	12.5	13.5
27	14.5	12.5	13.5	20.0	18.5	19.5	18.5	16.5	17.0	14.0	13.0	13.5
28	15.0	14.0	14.5	20.5	18.5	19.5	17.5	15.5	16.5	14.0	13.0	13.5
29	14.5	14.0	14.5	20.0	18.5	19.5	18.0	16.0	17.0	14.5	13.0	13.5
30	14.0	13.0	13.5	20.0	19.0	19.5	18.5	16.5	17.5	14.0	13.0	13.5
31	---	---	---	20.5	19.0	19.5	18.5	17.0	18.0	---	---	---
MONTH	15.0	10.0	12.5	21.0	12.5	18.0	20.5	15.5	19.0	18.5	11.5	15.0

PEND OREILLE RIVER BASIN

12355000 FLATHEAD RIVER AT FLATHEAD, BRITISH COLUMBIA
(National Stream Quality Accounting Network)
(International gaging station)

LOCATION.--Lat 49°00'02", long 114°28'35", Hydrologic Unit 17010206, on right bank 45 ft north of international boundary at Flathead, British Columbia, 1.6 mi upstream from Sage Creek, 6.5 mi northwest of Trail Creek, MT, and at river mile 216.6.

DRAINAGE AREA.--427 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1929 to current year (no winter records prior to 1952). Prior to October 1934, published as Flathead River near Trail Creek, MT. October 1970 to September 1972, published as North Fork Flathead River at Flathead, British Columbia.

REVISED RECORDS.--WSP 1092: 1933 (maximum gage height only).

GAGE.--Water-stage recorder. Datum of gage is 3,968.16 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 1, 1949, nonrecording gage, and Sept. 1, 1949, to Oct. 4, 1964, water-stage recorder, at site 1,200 ft upstream at datum 7.80 ft higher. Oct. 5, 1964, to Aug. 1, 1973, water-stage recorder at site on left bank 155 ft upstream at datum 1.42 ft lower.

REMARKS.--Estimated daily discharges: Dec. 13 to Feb. 15, Mar. 5-10. Water-discharge records good except those for estimated daily discharges, which are poor.

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

AVERAGE DISCHARGE.--40 years (1951-91), 934 ft^3/s, 29.70 in/yr, 676,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,300 ft^3/s, June 8, 1964, gage height, 8.00 ft, in gage well, 8.6 ft, from outside floodmarks, site and datum then in use, from rating curve extended above 8,000 ft^3/s on basis of slope-area measurement of peak flow; minimum daily, 62 ft^3/s, Jan. 2, 1977, but may have been less during periods of no winter record.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 9,360 ft^3/s, May 20, gage height, 6.69 ft; minimum daily, 163 ft^3/s, Mar. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	223	611	556	e325	e283	163	231	1690	5260	3290	805	310
2	229	536	543	e314	e298	173	268	1640	6340	3270	781	307
3	230	470	532	e304	e304	242	288	1530	6800	3280	754	308
4	274	437	514	e285	e303	291	359	1450	6430	3440	722	303
5	436	416	496	e261	e308	e290	799	1520	5340	3290	701	298
6	475	376	472	e261	e317	e277	1050	1670	4640	2910	680	297
7	383	361	467	e263	e317	e260	923	2080	5020	2520	667	296
8	330	361	454	e275	e312	e254	848	2620	5630	2300	643	291
9	306	418	458	e289	e304	e254	757	2980	5300	2160	629	293
10	346	1570	509	e307	e295	e251	687	2670	5320	2230	598	288
11	350	3080	501	e329	e290	245	643	2960	6040	2210	590	283
12	331	2200	463	e341	e284	232	577	3760	6180	2000	575	272
13	327	1650	e434	e341	e281	232	553	5710	4790	1930	548	271
14	313	1400	e424	e335	e278	228	562	5580	3860	1860	544	282
15	297	1190	e431	e332	e275	224	564	5130	3300	1760	532	280
16	308	1000	e434	e331	267	222	567	5100	3080	1640	502	272
17	290	900	e431	e331	270	213	568	5460	3060	1560	481	267
18	289	823	e318	e332	263	208	580	7440	2810	1520	476	264
19	292	739	e268	e329	270	205	647	8730	2860	1400	456	264
20	280	694	e260	e326	289	205	796	8830	3540	1300	437	259
21	278	643	e251	e320	279	205	1060	7740	4620	1230	421	259
22	278	634	e254	e315	273	205	1470	6920	4220	1190	413	262
23	263	668	e268	e311	258	205	1990	6820	3760	1140	402	259
24	260	821	e287	e310	259	205	2460	6140	3710	1100	390	253
25	262	770	e295	e314	255	205	2630	5530	3650	1080	384	243
26	301	744	e296	e305	257	193	2330	5020	3580	1050	371	244
27	342	701	e296	e290	254	193	2060	4480	3540	1010	355	240
28	341	651	e241	e279	241	209	1880	4420	3500	957	351	235
29	344	646	e239	e269	---	201	1840	4710	3360	895	350	233
30	358	596	e283	e268	---	201	1750	5000	3370	848	339	232
31	554	---	e318	e271	---	209	---	5070	---	812	326	---
TOTAL	9890	26106	11993	9463	7884	6900	31737	140400	132910	57182	16223	8165
MEAN	319	870	387	305	282	223	1058	4529	4430	1845	523	272
MAX	554	3080	556	341	317	291	2630	8830	6800	3440	805	310
MIN	223	361	239	261	241	163	231	1450	2810	812	326	232
AC-FT	19620	51780	23790	18770	15640	13690	62950	278500	263600	113400	32180	16200
CFSM	.75	2.04	.91	.71	.66	.52	2.48	10.6	10.4	4.32	1.23	.64
IN.	.86	2.27	1.04	.82	.69	.60	2.76	12.23	11.58	4.98	1.41	.71

CAL YR 1990 TOTAL 426853 MEAN 1169 MAX 6640 MIN 153 AC-FT 846700 CFSM 2.74 IN. 37.19
WTR YR 1991 TOTAL 458853 MEAN 1257 MAX 8830 MIN 163 AC-FT 910100 CFSM 2.94 IN. 39.98

e Estimated

12355000 FLATHEAD RIVER AT FLATHEAD, BRITISH COLUMBIA--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1949-50, 1965, 1970, 1975 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: November 1974 to September 1981.
WATER TEMPERATURE: November 1974 to current year.
SUSPENDED-SEDIMENT DISCHARGE: April 1975 to October 1978, August 1985 to September 1990.

INSTRUMENTATION.--Temperature recorder since Oct. 1, 1975.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1975-81): Maximum, 309 microsiemens, Jan. 12, 28, 1975, Jan. 20, 1980; minimum, 130 microsiemens, May 20, 1976.
WATER TEMPERATURE: Maximum (water years 1975-80, 1982-85), 19.5°C Aug. 2, 1977; minimum, 0.0°C on many days during winter periods.
SEDIMENT CONCENTRATION (water years 1975-78, 1985-90): Maximum daily mean, 1,310 mg/L, June 20, 1975; minimum daily mean, 1 mg/L on many days most years.
SEDIMENT LOAD (water years 1975-78, 1985-90): Maximum daily, 36,100 tons, June 20, 1975; minimum daily, 0.24, ton Feb. 1, 23, 1988.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURES: Maximum, 16.5°C, Aug. 8, 19-22; minimum, 0.0°C on many days during winter period.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRESSURE (MM OF HG) (00025)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	COLIFORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
NOV											
16...	1200	1010	20	1	222	4.0	2.5	657	11.8	100	K10
MAR											
14...	1030	210	2	71	278	3.0	2.0	670	11.9	98	K2
JUN											
13...	1230	5100	95	10	166	11.5	5.5	661	11.1	102	K4
AUG											
22...	1000	397	10	1	255	20.0	11.0	668	9.7	101	K1

DATE	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BICARBONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CARBONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STANDARD UNITS) (00400)	TURBIDITY (NTU) (00076)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)
NOV										
16...	K2	148	0	122	8.6	1.2	120	35	7.5	0.80
MAR										
14...	K1	180	0	147	8.4	0.60	150	43	9.2	1.0
JUN										
13...	K3	109	0	90	8.2	16	88	26	5.5	0.70
AUG										
22...	140	170	0	138	8.2	1.6	140	43	8.7	0.90

DATE	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)
NOV										
16...	0.0	0.20	113	4.8	1.1	<0.10	4.7	117	127	0.16
MAR										
14...	0.0	0.30	143	5.4	1.6	0.10	4.5	147	154	0.20
JUN										
13...	0.0	0.20	87	2.2	0.10	0.10	4.1	76	93	0.10
AUG										
22...	0.0	0.40	137	4.6	0.20	0.10	4.8	138	146	0.19

PEND OREILLE RIVER BASIN

12355000 FLATHEAD RIVER AT FLATHEAD, BRITISH COLUMBIA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)
NOV										
16...	319	<0.01	<0.01	<0.10	<0.10	0.06	0.03	<0.001	<0.001	0.003
MAR										
14...	83.3	<0.01	0.01	<0.05	<0.05	0.04	0.02	<0.001	<0.001	0.003
JUN										
13...	1050	<0.01	<0.01	<0.05	<0.05	0.01	0.01	0.039	0.007	0.008
AUG										
22...	148	0.01	<0.01	<0.05	<0.05	<0.01	<0.01	<0.001	0.002	0.003

DATE	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)
NOV										
16...	10	<1	45	<0.5	<1	<1	<3	1	8	<1
MAR										
14...	<10	<1	54	<0.5	<1	1	<3	2	<3	1
JUN										
13...	20	<1	37	<0.5	<1	<1	<3	2	12	1
AUG										
22...	10	<1	57	<0.5	3	<1	<3	2	<3	<1

DATE	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
NOV										
16...	<4	1	<0.1	<10	<1	<1	<1	51	<6	5
MAR										
14...	<4	<1	<0.1	<10	<1	<1	<1	60	<6	6
JUN										
13...	<4	2	<0.1	<10	3	<1	<1	39	<6	<3
AUG										
22...	<4	<1	<0.1	<10	<1	<1	<1	59	<6	<3

PEND OREILLE RIVER BASIN

12355000 FLATHEAD RIVER AT FLATHEAD, BRITISH COLUMBIA--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	9.0	6.5	8.0	5.0	3.0	4.0	.0	.0	.0	0	0	0
2	8.5	6.5	7.0	3.5	2.5	3.0	.0	.0	.0	0	0	0
3	6.5	5.5	6.0	2.5	2.0	2.0	.0	.0	.0	0	0	0
4	8.0	6.5	7.5	3.0	2.0	2.5	.5	.0	.5	0	0	0
5	8.5	6.5	8.0	3.0	1.0	2.5	1.0	.0	.5	0	0	0
6	6.5	4.5	5.5	1.0	.0	.5	1.0	.5	1.0	0	0	0
7	6.0	3.5	5.0	1.0	.5	1.0	.5	.0	.0	0	0	0
8	7.0	4.0	5.5	3.0	1.0	2.5	1.5	.0	.5	0	0	0
9	7.5	5.5	6.5	2.5	.5	1.5	2.0	1.5	1.5	0	0	0
10	7.0	5.5	6.5	3.0	2.5	2.5	2.0	1.5	1.5	0	0	0
11	6.5	4.5	5.5	4.0	2.5	3.0	2.0	1.0	1.5	0	0	0
12	6.0	4.5	5.0	4.0	2.5	3.0	1.0	.0	.5	0	0	0
13	5.5	4.0	5.0	4.0	3.0	3.5	.0	.0	.0	0	0	0
14	5.0	3.5	4.5	4.0	3.0	3.5	.0	.0	.0	0	0	0
15	5.0	3.5	4.5	3.0	2.5	2.5	.0	.0	.0	0	0	0
16	4.5	3.0	4.0	3.0	2.5	2.5	.0	.0	.0	0	0	0
17	5.0	3.5	4.0	2.5	1.5	2.0	.0	.0	.0	0	0	0
18	4.5	4.0	4.0	2.5	1.5	2.0	.0	.0	.0	0	0	0
19	4.5	3.5	4.0	2.0	1.0	1.5	.0	.0	.0	0	0	0
20	4.5	3.0	4.0	2.0	1.5	2.0	.0	.0	.0	0	0	0
21	3.5	2.0	2.5	1.5	1.0	1.0	.0	.0	.0	0	0	0
22	4.5	2.5	3.5	2.5	.5	1.5	.0	.0	.0	0	0	0
23	4.0	3.0	3.5	3.5	2.5	3.0	.0	.0	.0	0	0	0
24	5.0	2.5	4.0	3.5	.0	2.0	.0	.0	.0	0	0	0
25	6.0	2.5	4.5	.0	.0	.0	.0	.0	.0	0	0	0
26	6.0	4.0	5.0	.0	.0	.0	.0	.0	.0	0	0	0
27	4.5	2.5	3.5	.0	.0	.0	.0	.0	.0	0	0	0
28	5.0	3.0	4.0	.0	.0	.0	.0	.0	.0	0	0	0
29	5.0	4.0	4.5	.5	.0	.0	.0	.0	.0	0	0	0
30	5.0	3.5	4.5	.0	.0	.0	.0	.0	.0	0	0	0
31	5.5	5.0	5.0	---	---	---	.0	.0	.0	0	0	0
MONTH	9.0	2.0	5.0	5.0	.0	2.0	2.0	.0	.0	0	0	0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	.0	.0	.0	.0	.0	.0	7.0	2.5	4.5	6.0	3.0	4.5
2	.0	.0	.0	.0	.0	.0	4.5	2.5	3.5	4.5	2.0	3.5
3	.0	.0	.0	.0	.0	.0	5.0	2.0	3.5	5.0	2.5	3.5
4	.0	.0	.0	.0	.0	.0	3.5	2.0	3.0	6.5	3.0	4.5
5	.0	.0	.0	.0	.0	.0	2.0	1.0	1.5	7.5	3.5	5.5
6	.0	.0	.0	.0	.0	.0	3.0	.5	1.5	7.0	4.0	5.5
7	.0	.0	.0	.0	.0	.0	3.5	.5	2.0	6.5	4.0	5.0
8	.0	.0	.0	.0	.0	.0	4.0	2.0	3.0	5.0	4.0	4.5
9	.0	.0	.0	.0	.0	.0	3.0	1.5	2.5	4.0	2.5	3.5
10	.0	.0	.0	.5	.0	.0	2.0	.0	1.5	7.5	3.0	5.0
11	.0	.0	.0	1.5	.0	.5	2.0	.0	1.0	6.0	3.5	5.0
12	.0	.0	.0	.5	.0	.0	6.0	1.5	3.5	5.0	3.5	4.0
13	.0	.0	.0	3.0	.0	1.0	7.0	1.5	4.5	5.5	2.5	3.5
14	.0	.0	.0	3.0	1.0	2.0	5.0	2.5	4.0	6.0	2.5	4.5
15	1.5	.0	.5	3.5	1.0	2.0	6.0	3.0	4.5	7.0	3.5	5.0
16	2.5	1.5	2.0	4.0	.5	2.0	7.0	3.0	4.5	6.5	3.5	5.0
17	2.5	1.5	2.0	3.0	.0	1.5	7.0	2.5	4.5	7.0	4.0	5.5
18	1.5	.5	1.0	3.5	.0	1.5	7.5	2.0	5.0	6.0	4.0	5.0
19	1.0	.0	.5	4.5	.0	2.5	8.0	2.5	5.5	6.5	4.0	5.0
20	2.0	.0	1.0	3.5	1.5	2.5	8.0	2.5	5.5	8.0	3.0	5.5
21	2.5	1.0	1.5	5.5	2.0	4.0	6.5	3.0	5.0	6.0	4.0	5.0
22	2.0	.0	1.0	5.0	3.0	4.0	7.0	2.5	4.5	8.0	3.5	5.5
23	1.5	.0	.5	5.0	1.0	3.0	5.5	2.0	4.0	7.0	3.5	5.5
24	1.5	.0	.5	4.0	1.5	3.0	4.5	2.5	3.5	6.0	4.5	5.0
25	1.5	.0	.5	2.0	.0	1.0	5.0	2.0	3.5	7.0	4.0	5.5
26	2.0	.0	1.0	1.5	.0	.5	5.0	2.0	3.5	6.5	4.0	5.0
27	3.0	1.0	2.0	2.0	.0	1.0	5.0	2.5	4.0	8.0	3.5	5.5
28	2.0	.0	.5	3.0	1.0	1.5	6.0	2.5	4.5	8.0	4.5	6.0
29	---	---	---	4.0	.0	2.0	5.5	3.0	4.5	8.0	4.5	6.0
30	---	---	---	6.5	2.5	4.0	6.0	2.5	4.0	7.5	4.5	6.0
31	---	---	---	7.0	2.0	4.5	---	---	---	7.5	5.0	6.0
MONTH	3.0	.0	.5	7.0	.0	1.5	8.0	.0	3.5	8.0	2.0	5.0

PEND OREILLE RIVER BASIN

12355000 FLATHEAD RIVER AT FLATHEAD, BRITISH COLUMBIA--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.5	4.5	7.0	11.0	6.5	8.5	13.0	10.0	11.0	13.5	11.0	12.5
2	9.5	5.0	7.0	12.0	7.0	9.5	14.5	9.0	11.5	13.0	9.0	11.0
3	9.0	5.0	7.0	12.5	7.5	10.0	15.5	9.5	12.5	13.0	7.5	10.5
4	8.0	4.0	6.0	12.5	8.0	10.5	16.0	10.0	13.0	13.5	8.0	11.0
5	7.0	5.5	6.0	12.5	8.0	10.0	14.5	10.5	13.0	14.0	9.0	11.5
6	8.0	5.0	6.0	11.5	7.5	9.5	14.0	11.0	12.5	14.0	9.0	11.5
7	8.0	5.5	6.5	12.0	7.0	9.5	16.0	10.5	13.0	12.5	9.0	11.0
8	6.5	5.5	6.0	11.5	7.0	9.5	16.5	11.5	14.5	11.0	9.0	9.5
9	9.0	4.5	6.5	12.5	7.5	10.0	16.0	11.5	14.0	13.0	8.0	10.0
10	10.0	5.5	7.5	10.5	8.5	9.0	15.0	12.0	13.5	12.5	7.5	10.0
11	8.0	5.5	6.5	12.0	7.0	9.5	13.5	11.0	12.5	12.5	8.0	10.5
12	7.0	4.5	5.5	13.5	8.0	10.5	13.5	10.0	12.0	13.0	8.5	11.0
13	8.0	5.0	6.0	12.0	8.5	10.5	13.5	9.5	12.0	11.0	8.5	10.0
14	7.0	5.0	6.0	12.5	9.0	10.5	12.5	9.5	11.0	11.0	8.5	10.0
15	8.0	5.0	6.5	13.0	8.0	10.5	13.5	8.5	11.5	11.5	7.5	9.5
16	8.0	5.5	7.0	12.5	8.5	10.5	15.5	9.5	12.5	10.5	9.0	10.0
17	7.5	5.5	6.5	11.0	9.0	10.0	15.0	11.5	13.5	11.5	7.5	9.5
18	10.0	5.0	7.5	11.5	7.0	9.0	15.5	10.5	13.0	9.5	6.5	8.5
19	8.5	6.5	7.0	12.0	8.0	10.0	16.5	11.0	13.5	11.0	6.0	8.5
20	7.0	6.0	6.5	13.5	8.0	10.5	16.5	11.5	14.0	11.5	7.5	9.5
21	8.5	5.5	7.0	13.5	8.5	11.0	16.5	11.5	14.0	9.5	7.5	8.5
22	8.0	5.5	6.5	15.0	8.5	11.5	16.5	11.5	14.0	9.5	6.0	7.5
23	8.5	6.0	7.0	15.0	9.5	12.5	14.0	11.0	12.5	10.0	6.5	8.5
24	8.0	5.5	7.0	15.5	10.0	12.5	15.0	9.5	12.0	10.5	6.5	8.5
25	8.0	6.0	7.0	13.5	10.5	11.5	13.5	10.5	12.0	11.0	6.5	9.0
26	9.0	6.5	7.5	14.5	9.5	11.5	13.5	8.5	11.0	11.0	7.0	9.5
27	10.0	6.5	8.5	12.0	9.0	11.0	13.0	8.5	11.0	11.5	7.0	9.5
28	8.5	6.5	7.5	13.5	9.5	11.0	13.0	10.0	11.5	11.0	7.5	9.5
29	9.5	6.0	8.0	14.0	9.0	11.5	14.5	10.0	12.5	11.0	8.0	9.5
30	8.5	7.0	7.5	15.0	10.0	12.5	15.0	9.5	12.5	9.5	7.0	8.5
31	---	---	---	15.0	9.5	12.5	15.5	10.0	13.0	---	---	---
MONTH	10.0	4.0	7.0	15.5	6.5	10.5	16.5	8.5	12.5	14.0	6.0	10.0

PEND OREILLE RIVER BASIN

12355500 NORTH FORK FLATHEAD RIVER NEAR COLUMBIA FALLS, MT

LOCATION.--Lat 48°29'44", long 114°07'36", in NE1/4SW1/4NW1/4 sec.35, T.32 N., R.20 W., Flathead County, Hydrologic Unit 17010206, on right bank 1.5 mi downstream from Canyon Creek, 3.8 mi upstream from Middle Fork, 8.8 mi northeast of Columbia Falls, and at river mile 162.1.

DRAINAGE AREA.--1,548 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1910 to September 1917 (no winter records in water years 1913, 1916, 1917), April 1929 to February 1935 (incomplete), June 1935 to current year. Monthly discharge only for some periods, published in WSP 1316. Published as Flathead River near Columbia Falls 1915-17, 1929-70.

REVISED RECORDS.--WSP 1216: Drainage area. WSP 1246: 1911, 1912(M), 1915-17(M), 1929 (M), 1938-39(M), 1946(M). The maximum gage height for water year 1990 is 9.42 ft, June 1; the previously published figure was not the maximum; maximum discharge remains the same.

GAGE.--Water-stage recorder. Datum of gage is 3,145.59 ft above National Geodetic Vertical Datum of 1929. September 1910 to September 1917 and April to August 1929, nonrecording gages, and May 1, 1930, to Sept. 30, 1962, water-stage recorder, all at site 2.7 mi downstream at different datums.

REMARKS.--Estimated daily discharges: Dec. 19 to Feb. 6, Mar. 1-5, July 1-3. Water-discharge records good except those for estimated daily discharges, which are poor. A few small diversions from tributaries for irrigation of hay meadows upstream from station. U. S. Bureau of Reclamation statellite at station.

AVERAGE DISCHARGE.--60 years (1910-12, 1913-15, 1935-91), 2,974 ft^3/s, 26.09 in/yr, 2,155,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 69,100 ft^3/s, June 9, 1964, gage height, 18.60 ft, from floodmark, from rating curve extended above 37,000 ft^3/s on basis of slope-area measurement of peak flow; minimum, 198 ft^3/s, Jan. 8, 1953, gage height, 0.86 ft, site and datum then in use.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 25,800 ft^3/s, May 20, gage height, 11.03 ft; minimum daily, 550 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	794	1910	2250	e1050	e950	e950	1150	5640	12300	e12100	3220	1320
2	796	1910	2130	e1000	e1000	e850	1410	5380	14100	e11400	3250	1290
3	811	1740	1990	e950	e1050	e1000	1580	5090	16500	e11200	3060	1270
4	861	1640	1930	e1000	e1100	e1250	1830	4760	17300	11700	2900	1240
5	981	1570	1870	e1000	e1150	e1200	2970	4560	15500	11800	2790	1220
6	1190	1440	1750	e1000	e1200	1180	4520	4810	13500	10800	2730	1180
7	1190	1370	1630	e1050	1180	1160	4190	5590	13500	9520	2690	1150
8	1100	1340	1560	e1050	1140	1100	3670	6930	15000	8420	2620	1130
9	1050	1460	1620	e1050	1130	1070	3290	8550	15200	7780	2550	1140
10	1080	2550	1920	e1100	1110	1100	3020	8030	14500	7570	2500	1120
11	1140	5220	2220	e1150	1080	1060	2860	7860	16000	7640	2450	1090
12	1140	5260	2040	e1150	1090	1020	2760	9190	18400	6990	2400	1060
13	1120	4340	1840	e1150	1100	1020	2710	15700	15900	6700	2310	1040
14	1100	3910	1750	e1200	1090	997	2790	17500	12700	6610	2220	1060
15	1060	3510	1660	e1250	1080	972	2810	15000	10600	6520	2150	1080
16	1070	3100	1570	e1150	1100	950	2890	13900	9370	6170	2060	1040
17	1060	2810	1560	e1100	1130	919	2940	13700	8820	5890	1970	1030
18	1030	2610	1500	e1100	1120	907	3040	17200	8250	5870	1940	1010
19	1060	2380	e900	e1150	1140	926	3260	22500	7880	5400	1900	988
20	1020	2220	e700	e1000	1390	941	3690	25300	8600	4940	1830	965
21	1010	2080	e550	e900	1440	950	4340	22900	11100	4550	1780	950
22	1020	2050	e650	e950	1380	990	5260	20300	12000	4330	1740	975
23	980	2170	e1000	e950	1300	1020	6590	19100	11600	4170	1720	952
24	944	2840	e950	e900	1260	1030	8160	17800	11500	4030	1680	926
25	923	4380	e1000	e850	1210	1050	9140	16300	11700	3980	1630	908
26	940	3560	e900	e750	1200	1000	8220	14700	12300	3980	1580	890
27	1040	3110	e1000	e800	1200	955	7120	13000	12100	3830	1520	879
28	1100	2690	e900	e800	1180	1000	6370	11800	11900	3660	1480	863
29	1100	2540	e700	e700	---	986	6040	11600	11600	3470	1430	852
30	1120	2420	e800	e750	---	971	5780	11800	11800	3340	1400	840
31	1410	---	e900	e850	---	1020	---	12100	---	3250	1350	---
TOTAL	32240	80130	43740	30850	32500	31544	124400	388590	381520	207610	66850	31458
MEAN	1040	2671	1411	995	1161	1018	4147	12540	12720	6697	2156	1049
MAX	1410	5260	2250	1250	1440	1250	9140	25300	18400	12100	3250	1320
MIN	794	1340	550	700	950	850	1150	4560	7880	3250	1350	840
AC-FT	63950	158900	86760	61190	64460	62570	246700	770800	756700	411800	132600	62400
CFSM	.67	1.73	.91	.64	.75	.66	2.68	8.10	8.22	4.33	1.39	.68
IN.	.77	1.93	1.05	.74	.78	.76	2.99	9.34	9.17	4.99	1.61	.76

CAL YR 1990 TOTAL 1386585 MEAN 3799 MAX 18400 MIN 550 AC-FT 2750000 CFSM 2.45 IN. 33.32
WTR YR 1991 TOTAL 1451432 MEAN 3977 MAX 25300 MIN 550 AC-FT 2879000 CFSM 2.57 IN. 34.88

e Estimated

12355500 NORTH FORK FLATHEAD RIVER NEAR COLUMBIA FALLS, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950, 1965, 1970, 1976 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1975 to October 1978.
WATER TEMPERATURE: October 1975 to current year.
SUSPENDED-SEDIMENT DISCHARGE: October 1975 to November 1978.

INSTRUMENTATION.--Temperature recorder since Oct. 1, 1975.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1976-79): Maximun daily, 246 microsiemens, Dec. 31, 1976; minimum daily, 128 microsiemens, June 30, July 1, 1976.
WATER TEMPERATURE: Maximum, 19.5°C, July 28, 1987; minimum, 0.0°C on many days during winter periods.
SEDIMENT CONCENTRATION (water years 1976-79): Maximum daily mean, 931 mg/L, May 11, 1976; minimum daily mean, 1 mg/L on many days each year.
SEDIMENT LOAD (water years 1976-79): Maximum daily, 56,800 tons, May 11, 1976; minimum daily, 1.1 tons, Mar. 3, 1978.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 17.5°C, Aug. 8, 9, 10, 21; minimum, 0.0°C on many days during winter period.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT					
10...	0800	1100	215	9.0	7.5
MAR					
05...	1140	1190	190	-1.0	0.0
MAY					
20...	1130	25100	155	15.5	5.5
30...	1050	12000	150	11.0	6.5
AUG					
14...	1610	2130	179	18.0	14.0

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	11.0	9.5	10.5	6.0	4.5	5.5	1.0	.0	.5	0	0	0
2	10.5	9.0	9.5	4.5	3.5	4.0	.5	.0	.5	0	0	0
3	9.0	7.5	8.0	3.5	2.5	3.0	1.0	.5	.5	0	0	0
4	9.0	7.5	8.0	3.5	2.5	3.0	1.5	1.0	1.0	0	0	0
5	9.5	8.5	9.0	3.5	3.0	3.5	1.5	1.0	1.5	0	0	0
6	8.0	7.0	7.5	3.0	1.5	2.0	1.5	1.0	1.5	0	0	0
7	6.5	5.0	6.0	1.5	1.5	1.5	1.0	.0	.5	0	0	0
8	7.0	5.5	6.0	3.5	1.5	2.5	1.0	.0	.5	0	0	0
9	8.0	6.0	7.0	3.5	3.0	3.5	2.0	1.0	1.5	0	0	0
10	8.0	7.5	8.0	4.0	3.5	4.0	3.0	2.0	2.5	0	0	0
11	7.0	6.0	6.5	4.5	4.0	4.0	3.0	2.0	2.5	0	0	0
12	7.0	6.0	6.5	4.0	3.5	3.5	2.0	1.0	1.5	0	0	0
13	7.0	6.0	6.5	4.5	3.5	3.5	1.0	.5	1.0	0	0	0
14	6.0	5.0	5.5	4.5	4.0	4.5	1.0	.5	.5	0	0	0
15	5.5	4.5	5.0	4.0	3.5	3.5	1.0	.0	.5	0	0	0
16	5.5	4.5	5.0	3.5	3.0	3.0	.5	.0	.5	0	0	0
17	5.0	4.5	5.0	3.0	2.5	2.5	.5	.0	.0	0	0	0
18	5.0	4.5	5.0	3.0	2.5	3.0	.0	.0	.0	0	0	0
19	5.5	4.5	5.0	2.5	2.0	2.0	.0	.0	.0	0	0	0
20	5.0	4.5	5.0	2.5	2.0	2.5	.0	.0	.0	0	0	0
21	4.5	3.5	4.0	2.0	1.5	1.5	.0	.0	.0	0	0	0
22	4.5	4.0	4.0	3.0	1.0	2.0	.0	.0	.0	0	0	0
23	5.0	4.0	4.5	4.0	3.0	3.5	.0	.0	.0	0	0	0
24	5.0	3.5	4.5	4.0	3.5	4.0	.0	.0	.0	0	0	0
25	5.5	4.0	4.5	3.0	.0	1.0	.0	.0	.0	0	0	0
26	7.0	5.5	6.0	1.0	.5	1.0	.0	.0	.0	0	0	0
27	5.5	4.5	5.0	1.5	.5	1.0	.0	.0	.0	0	0	0
28	4.5	4.0	4.0	1.0	.5	.5	.0	.0	.0	0	0	0
29	5.5	4.5	5.0	2.0	.5	1.0	.0	.0	.0	0	0	0
30	5.0	4.5	4.5	2.0	1.0	1.5	.0	.0	.0	0	0	0
31	6.0	5.0	6.0	---	---	---	.0	.0	.0	0	0	0
MONTH	11.0	3.5	6.0	6.0	.0	2.5	3.0	.0	.5	0	0	0

12355500 NORTH FORK FLATHEAD RIVER NEAR COLUMBIA FALLS, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	.0	.0	.0	.0	.0	.0	6.5	4.0	5.5	6.0	5.0	5.5
2	.0	.0	.0	.0	.0	.0	5.5	4.0	4.5	6.0	3.5	5.0
3	.0	.0	.0	.0	.0	.0	4.5	3.0	4.0	5.5	4.5	5.0
4	.0	.0	.0	.0	.0	.0	4.5	4.0	4.0	6.0	4.0	5.0
5	.0	.0	.0	.5	.0	.0	4.0	2.5	3.0	7.0	5.0	6.0
6	.0	.0	.0	2.0	.5	1.0	3.0	1.5	2.5	7.5	6.0	7.0
7	.0	.0	.0	1.5	.5	1.0	3.5	1.5	2.5	7.0	6.0	6.5
8	.5	.0	.0	1.5	.0	1.0	4.0	2.5	3.0	6.5	5.5	6.0
9	1.0	.5	.5	2.0	.0	1.0	3.5	2.0	3.0	5.5	4.0	4.5
10	1.0	.5	1.0	2.0	1.5	2.0	3.5	2.5	3.0	7.5	4.0	5.5
11	1.0	.0	.5	2.0	1.0	1.5	4.0	2.0	3.0	7.5	6.0	6.5
12	1.5	.5	1.0	1.5	.5	1.0	5.5	3.0	4.0	6.0	5.0	5.5
13	2.0	1.5	1.5	2.0	1.0	1.5	6.0	3.5	5.0	5.5	4.0	4.5
14	2.0	1.0	1.5	3.0	1.5	2.5	6.0	4.0	5.0	6.5	4.5	5.0
15	2.0	1.5	2.0	4.0	2.0	3.0	5.5	4.0	4.5	7.0	5.0	6.0
16	2.0	2.0	2.0	3.5	2.0	3.0	6.5	3.5	5.0	6.5	5.0	6.0
17	2.0	1.5	2.0	4.0	1.5	3.0	6.0	4.0	5.5	8.0	6.0	6.5
18	2.0	1.0	1.5	3.5	1.5	3.0	7.0	4.0	5.5	7.5	6.0	6.5
19	1.5	1.0	1.5	4.0	2.0	3.5	7.0	4.0	5.5	7.5	6.0	6.5
20	2.0	1.5	1.5	4.0	3.5	4.0	7.5	4.5	6.0	7.5	5.0	6.5
21	2.5	1.5	2.0	5.0	3.0	4.0	7.0	4.5	5.5	7.5	6.0	6.5
22	2.5	1.5	2.0	5.0	4.0	4.5	7.0	4.0	5.5	8.0	5.0	6.5
23	2.0	1.0	1.5	5.0	3.0	4.0	6.5	4.0	5.5	7.0	5.5	6.5
24	2.0	1.0	1.5	4.5	3.0	4.0	6.0	4.5	5.0	7.5	6.0	6.5
25	2.0	.5	1.5	4.0	1.5	3.0	5.0	3.5	4.0	7.0	6.0	6.5
26	2.0	1.0	1.5	2.0	.5	1.5	4.5	3.5	4.0	6.5	5.5	6.0
27	2.5	2.0	2.0	2.0	.5	1.5	5.0	4.0	4.5	8.0	5.0	6.5
28	2.5	.0	1.5	2.0	1.5	2.0	6.0	4.0	5.0	8.0	6.5	7.0
29	---	---	---	4.0	1.0	3.0	6.5	5.0	5.5	8.5	6.5	7.5
30	---	---	---	5.5	3.5	4.5	6.5	4.0	5.5	8.0	6.5	7.0
31	---	---	---	6.0	3.5	5.0	---	---	---	8.0	6.5	7.0
MONTH	2.5	.0	1.0	6.0	.0	2.0	7.5	1.5	4.5	8.5	3.5	6.0
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.5	6.5	8.0	11.5	8.0	9.5	15.5	13.5	14.5	15.5	13.5	15.0
2	9.5	7.5	8.5	12.0	9.0	10.5	15.5	12.5	13.5	14.0	12.0	13.0
3	9.0	7.5	8.5	12.5	10.0	11.0	16.0	13.5	15.0	13.5	11.0	12.5
4	8.5	6.5	7.5	12.5	10.5	11.5	16.5	14.0	15.5	13.5	11.0	12.5
5	8.0	7.0	7.5	12.5	10.0	11.0	16.5	15.0	15.5	14.0	11.5	13.0
6	8.5	6.5	7.0	12.0	10.0	11.0	16.5	14.5	15.5	14.5	12.0	13.5
7	8.0	7.5	8.0	12.5	9.5	11.0	16.5	14.5	15.5	14.0	12.5	13.0
8	8.0	6.5	7.5	12.5	10.0	11.5	17.5	15.5	16.5	12.5	10.5	11.5
9	9.0	6.0	7.5	13.0	10.0	11.5	17.5	15.5	16.5	12.5	10.0	11.5
10	10.0	7.5	8.5	12.5	10.0	11.0	17.5	16.0	17.0	12.5	10.5	12.0
11	9.5	7.5	8.0	12.5	9.5	10.5	17.0	15.0	16.0	13.0	10.5	12.0
12	7.5	6.0	7.0	14.0	11.0	12.5	16.0	14.0	15.0	13.0	11.0	12.5
13	8.0	6.0	7.0	14.0	12.0	13.0	16.0	14.0	15.0	13.0	11.5	12.0
14	7.0	6.5	7.0	13.0	11.5	12.5	15.5	14.0	14.5	12.0	11.0	11.5
15	8.5	6.0	7.5	13.5	11.0	12.0	15.5	12.5	14.0	12.5	10.0	11.0
16	9.0	7.5	8.0	14.0	11.5	12.5	16.0	13.5	15.0	12.0	10.5	11.5
17	8.0	6.5	7.5	13.5	11.5	12.5	17.0	14.5	15.5	12.0	10.0	11.0
18	10.0	6.5	8.0	12.5	10.0	11.0	16.5	14.0	15.5	11.0	9.0	10.0
19	10.0	8.5	9.0	12.5	10.0	11.5	16.5	15.0	16.0	10.5	8.0	9.5
20	8.5	7.5	8.0	14.0	10.5	12.0	17.0	15.0	16.0	11.5	9.0	10.5
21	9.5	7.5	8.5	14.5	12.0	13.0	17.5	15.0	16.5	11.5	9.0	10.0
22	9.0	7.5	8.5	15.0	11.5	13.5	17.0	15.0	16.5	9.5	8.0	9.0
23	9.5	7.5	8.5	16.0	13.0	14.5	16.0	15.0	15.5	10.5	8.0	9.5
24	9.0	8.0	8.5	16.5	13.5	15.0	15.5	13.5	14.5	10.5	8.5	10.0
25	9.0	8.0	8.5	16.0	14.0	14.5	15.5	14.0	15.0	11.0	9.0	10.5
26	10.0	8.0	9.0	15.0	12.5	13.5	14.5	12.5	13.5	11.5	9.5	10.5
27	11.0	8.5	9.5	14.5	12.5	13.5	13.5	12.0	13.0	11.5	9.5	10.5
28	11.0	9.0	10.0	15.0	12.5	14.0	14.0	13.0	13.5	11.5	9.5	11.0
29	10.5	8.5	9.5	15.5	13.0	14.5	14.5	12.0	13.5	12.0	10.5	11.5
30	10.5	8.5	9.5	16.0	13.5	14.5	15.0	13.0	14.0	11.5	10.0	10.5
31	---	---	---	15.5	13.5	15.0	16.0	13.5	15.0	---	---	---
MONTH	11.0	6.0	8.0	16.5	8.0	12.5	17.5	12.0	15.0	15.5	8.0	11.5

PEND OREILLE RIVER BASIN

12358500 MIDDLE FORK FLATHEAD RIVER NEAR WEST GLACIER, MT

LOCATION.--Lat 48°29'43", long 114°00'33", in S1/2SW1/4NE1/4 sec.34, T.32 N., R.19 W., Flathead County, Hydrologic Unit 17010207, on left bank 0.8 mi downstream from McDonald Creek, 1.3 mi west of West Glacier, and at river mile 3.8.

DRAINAGE AREA.--1,128 mi^2.

PERIOD OF RECORD.--October 1939 to current year. Prior to October 1947, published as "near Belton."

REVISED RECORDS.--WSP 1216: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,128.72 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 22, 1950, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Dec. 19 to Jan. 8. Records excellent except those for estimated daily discharges, which are fair. U.S. Bureau of Reclamation satellite at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--52 years, 2,922 ft^3/s, 35.18 in/yr , 2,117,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 140,000 ft^3/s, June 9, 1964, gage height, 36.46 ft, from floodmarks, from rating curve extended above 31,000 ft^3/s, on basis of contracted opening measurement at gage height, 19.42 ft and flood volume-hydrographic comparison; minimum, less than 173 ft^3/s, Nov. 27, 1952 (stage below intake pipe).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 35,000 ft^3/s, May 19, gage height, 12.41 ft, from highwater mark in well; minimum, 559 ft^3/s, Oct. 1, gage height, 1.63 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	566	3070	2830	e1000	891	1180	947	3870	12700	14200	2810	924
2	600	2830	2620	e950	824	1140	1080	3680	15500	12500	2780	903
3	606	2490	2390	e900	811	1150	1260	3480	17800	12300	2510	863
4	722	2280	2250	e950	845	1200	1500	3290	17800	12900	2380	832
5	2210	2130	2150	e900	914	1170	3240	3130	15600	12900	2310	830
6	2100	1890	1990	e920	988	1110	6290	3140	15200	11400	2270	830
7	1550	1720	1870	e950	984	1070	5350	3690	15400	9880	2190	821
8	1270	1660	1770	e950	968	1040	4260	4830	15800	8810	2120	820
9	1130	1920	1730	960	955	1010	3620	6650	15100	8210	2070	820
10	1140	5800	1980	1040	949	1000	3220	6500	15200	7940	2000	820
11	1210	7940	2270	1030	954	978	2960	6310	18000	7290	1960	813
12	1150	6380	2200	1030	973	948	2690	8800	19900	6780	1990	810
13	1130	5240	2060	1130	993	933	2560	12800	15300	6840	1910	796
14	1090	4680	1930	1100	980	913	2480	13800	12200	6820	1760	782
15	1070	4110	1840	1120	975	892	2420	12700	10100	6470	1640	782
16	1090	3620	1730	1080	1010	883	2350	12900	8960	6170	1520	775
17	1110	3260	1730	1050	1100	862	2270	13800	8510	5820	1460	768
18	1060	3000	1690	1040	1110	853	2190	18700	7730	5390	1440	740
19	1080	2760	e1100	1050	1140	849	2160	29700	7510	4750	1420	704
20	1060	2590	e800	939	1430	866	2300	26900	9430	4340	1390	676
21	1040	2390	e650	878	1550	888	2740	20900	14000	4150	1360	651
22	1140	2330	e700	872	1510	942	3490	18700	14600	3990	1330	647
23	1140	2530	e1100	885	1440	959	4780	18800	13600	3840	1290	637
24	1070	3030	e1050	859	1370	961	6590	17800	12900	3790	1230	623
25	1030	6180	e1100	862	1310	977	7250	18100	12200	3690	1190	606
26	1320	6450	e1050	813	1270	951	6430	16200	11800	3540	1130	597
27	1860	4900	e1100	834	1240	927	5500	13500	11500	3370	1060	589
28	1800	3970	e1000	835	1220	924	4850	12100	11700	3170	1020	582
29	1760	3430	e800	786	---	917	4440	11500	11300	3060	989	582
30	1700	3150	e900	790	---	898	4110	11900	12900	2960	957	581
31	2180	---	e950	871	---	902	---	12400	---	2830	938	---
TOTAL	38984	107730	49330	29374	30704	30293	105327	370570	400240	210100	52424	22204
MEAN	1258	3591	1591	948	1097	977	3511	11950	13340	6777	1691	740
MAX	2210	7940	2830	1130	1550	1200	7250	29700	19900	14200	2810	924
MIN	566	1660	650	786	811	849	947	3130	7510	2830	938	581
AC-FT	77320	213700	97850	58260	60900	60090	208900	735000	793900	416700	104000	44040
CFSM	1.11	3.18	1.41	.84	.97	.87	3.11	10.6	11.8	6.01	1.50	.66
IN.	1.29	3.55	1.63	.97	1.01	1.00	3.47	12.22	13.20	6.93	1.73	.73

CAL YR 1990 TOTAL 1312345 MEAN 3595 MAX 17600 MIN 566 AC-FT 2603000 CFSM 3.19 IN. 43.28
WTR YR 1991 TOTAL 1447280 MEAN 3965 MAX 29700 MIN 566 AC-FT 2871000 CFSM 3.52 IN. 47.73

e Estimated

12359800 SOUTH FORK FLATHEAD RIVER ABOVE TWIN CREEK, NEAR HUNGRY HORSE, MT

LOCATION.--Lat 47°58'45", long 113°33'36", in NE1/4NW1/4NE1/4 sec.36, T.26 N., R.16 W., Flathead County, Hydrologic Unit 17010209, Flathead National Forest, on left bank 0.1 mi downstream from Tin Creek, 0.4 mi upstream from Twin Creek, 36.3 mi southeast of Hungry Horse, and at river mile 42.2.

DRAINAGE AREA.--1,160 mi^2.

PERIOD OF RECORD.--October 1964 to September 1982, October 1984 to current year (no winter records).

GAGE.--Water-stage recorder. Elevation of gage is 3,575 ft, from river-profile map.

REMARKS.--No estimated daily discharges this year. Seasonal records good except those for Apr. 23 to May 16, which are fair. No known regulation or diversions upstream of station. Several observations of water temperature and specific conductance were made during the year. U.S. Bureau of Reclamation satellite telemeter at station.

AVERAGE DISCHARGE.--18 years (water years, 1965-82), 2,310 ft^3/s, 27.05 in/yr, 1,674,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,200 ft^3/s, June 16, 1974, gage height, 15.20 ft; minimum, 127 ft^3/s, Nov. 30, 1979, gage height, 4.13 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 8, 1964, reached a stage of 20.87 ft, from high-water profile; discharge, 50,900 ft^3/s, by slope-area measurement of peak flow.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 23,100 ft^3/s, May 19, gage height, 13.85 ft; minimum daily, 337 ft^3/s, Oct. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	337	1230					665	2580	10200	12900	1830	615
2	374	1180					898	2450	12600	10600	1840	597
3	385	1080					1020	2340	15200	10000	1690	581
4	460	1030					1160	2220	15400	10700	1570	566
5	648	1010					1840	2140	13200	10900	1510	552
6	708	925					2980	2210	12800	9560	1490	538
7	618	849					2760	2590	14400	8040	1420	523
8	558	832					2390	3270	14100	7070	1340	534
9	515	1040					2140	4910	12700	6520	1280	611
10	548	1990					1950	4810	13100	6230	1240	594
11	579	2370					1820	4600	14600	5900	1200	553
12	556	2230					1680	6080	14500	5460	1160	527
13	566	2060					1600	7650	11600	5230	1100	518
14	562	2020					1580	8360	9500	5130	1050	564
15	554	1870					1560	8070	7710	4770	1000	576
16	692	1700					1500	8730	6870	4390	958	548
17	688	1560					1440	10200	6550	4130	922	537
18	634	1470					1400	15600	6090	3810	900	518
19	667	1360					1400	21600	6380	3410	868	500
20	659	1290					1540	17900	7960	3110	836	483
21	641	1200					1940	14500	13300	2890	808	471
22	737	1180					2370	13300	12900	2740	784	468
23	733	1210					3210	14100	12100	2610	761	452
24	684	1690					4160	13800	11800	2520	741	439
25	682	3480					4460	14400	10600	2430	717	430
26	954	3560					4020	12200	10100	2310	691	420
27	1140	2790					3540	10100	9630	2180	672	411
28	1070	2280					3190	8940	9590	2050	698	403
29	1050	1960					2930	8190	9630	1940	718	395
30	1000	1790					2720	8460	12900	1860	671	387
31	1050	---					---	9000	---	1770	639	---
TOTAL	21049	50236					65863	265300	338010	163160	33104	15311
MEAN	679	1675					2195	8558	11270	5263	1068	510
MAX	1140	3560					4460	21600	15400	12900	1840	615
MIN	337	832					665	2140	6090	1770	639	387
AC-FT	41750	99640					130600	526200	670400	323600	65660	30370
CFSM	.59	1.44					1.89	7.38	9.71	4.54	.92	.44
IN.	.68	1.61					2.11	8.51	10.84	5.23	1.06	.49

PEND OREILLE RIVER BASIN

12362000 HUNGRY HORSE RESERVOIR NEAR HUNGRY HORSE, MT

LOCATION.--Lat 48°20'28", long 114°00'48", in NE1/4NE1/4NW1/4 sec.27, T.30 N., R.19 W., Flathead County, Hydrologic Unit 17010209, in block 14 of Hungry Horse Dam on South Fork Flathead River, 3.8 mi southeast of Hungry Horse, and at river mile 5.3.

DRAINAGE AREA.--1,654 mi^2.

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

GAGE.--Water-stage recorder equipped with remote indicator in power house. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation). During construction and prior to May 1, 1953, various types of nonrecording gages were used.

REMARKS.--Reservoir and flow completely controlled by concrete arch-gravity dam; construction began in 1948; completed in 1952. Storage began Sept. 21, 1951. Usable capacity, 3,451,000 acre-ft, top of 1.0 ft flashboards; 3,427,000 acre-ft between elevations 3,196 ft, lowest outlet, and 3,560 ft, controlled spillway elevation. Dead storage, 39,730 acre-ft below elevation 3,196 ft. Minimum operating level, 445,400 acre-ft, elevation, 3,336 ft for on-site power generation. Water is used for power production, flood control, irrigation and recreation. Controlled spillway is an adjustable ring gate with 1.0 ft flashboards. Figures given herein represent usable contents. Capacity table in use is dated August 1969.

COOPERATION.--Capacity table and daily elevations provided by U.S. Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 3,461,000 acre-ft, July 3, 4, 1955, Aug. 6, 1956; maximum elevation observed, 3,561.40 ft, July 3, 4, 1955; minimum contents observed since normal low operating level reached in May 1952, 607,700 acre-ft, Jan. 13, 1953, elevation, 3,362.50 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 3,448,000 acre-ft, Aug. 4, elevation, 3,560.86 ft; minimum, 1,576,000 acre-ft, Apr. 20, elevation, 3,460.72 ft.

Capacity table (elevation, in feet, and contents, in acre-ft)

3,460	1,566,000		
3,480	1,858,000	3,565	3,547,000

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY OBSERVATION AT 23:59 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3545.98	3530.85	3535.36	3533.26	3512.87	3493.73	3469.73	3466.10	3509.28	3551.15	3560.51	3558.00
2	3545.43	3530.32	3535.56	3532.61	3512.17	3492.96	3468.85	3466.16	3511.33	3552.03	3560.54	3557.95
3	3544.90	3529.84	3535.78	3532.01	3511.42	3492.23	3468.00	3466.16	3513.32	3552.97	3560.69	3557.53
4	3544.43	3529.41	3535.94	3531.38	3510.71	3491.79	3467.32	3466.75	3515.29	3554.25	3560.86	3557.03
5	3543.91	3528.90	3535.99	3530.76	3509.97	3491.40	3467.08	3467.30	3516.90	3555.16	3560.78	3556.48
6	3543.37	3528.53	3536.03	3530.11	3509.26	3491.10	3466.97	3467.28	3518.20	3555.85	3560.71	3555.90
7	3542.80	3528.10	3535.98	3529.48	3508.55	3490.80	3466.64	3467.37	3519.93	3556.45	3560.51	3555.30
8	3542.25	3527.54	3536.15	3528.93	3507.81	3490.36	3466.14	3467.65	3521.39	3556.84	3560.45	3554.90
9	3541.67	3527.25	3536.32	3528.32	3507.08	3489.77	3465.72	3468.30	3523.11	3557.32	3560.30	3554.48
10	3541.19	3527.90	3536.60	3527.65	3506.33	3489.15	3465.05	3468.76	3524.42	3557.70	3560.25	3554.13
11	3540.61	3528.42	3536.93	3527.04	3505.57	3488.49	3464.65	3469.15	3526.35	3558.12	3560.36	3553.71
12	3540.06	3528.86	3537.14	3526.45	3504.87	3487.72	3464.28	3470.89	3528.50	3558.48	3560.24	3553.14
13	3539.58	3529.10	3537.22	3525.87	3504.15	3486.85	3463.88	3472.72	3529.80	3559.06	3560.22	3552.59
14	3539.03	3529.46	3537.32	3525.25	3503.42	3485.97	3464.33	3474.36	3530.62	3559.54	3560.29	3551.93
15	3538.93	3529.76	3537.47	3524.66	3502.65	3485.09	3463.96	3475.60	3531.70	3559.88	3560.38	3551.25
16	3538.72	3529.99	3537.60	3524.01	3501.95	3484.21	3463.16	3476.82	3532.66	3560.14	3560.43	3550.55
17	3538.36	3530.22	3537.76	3523.38	3501.23	3483.31	3462.43	3478.28	3533.12	3560.18	3560.41	3550.00
18	3537.81	3530.45	3537.47	3522.73	3500.68	3482.41	3461.69	3481.65	3533.96	3560.21	3560.49	3549.30
19	3537.27	3530.65	3537.30	3522.10	3500.05	3481.51	3461.00	3485.82	3534.78	3560.19	3560.41	3548.47
20	3536.74	3530.75	3536.91	3521.43	3499.44	3480.63	3460.72	3489.20	3535.51	3560.50	3560.22	3547.54
21	3536.28	3530.92	3536.43	3520.73	3498.80	3479.74	3461.36	3491.85	3537.35	3560.79	3560.28	3546.87
22	3535.76	3531.19	3536.26	3520.10	3498.15	3478.81	3461.36	3494.25	3539.04	3560.71	3560.31	3545.95
23	3535.24	3531.43	3536.10	3519.35	3497.75	3477.92	3461.79	3496.56	3540.66	3560.42	3560.33	3545.08
24	3534.77	3531.98	3536.04	3518.67	3497.33	3477.04	3462.55	3498.65	3542.07	3560.25	3560.40	3544.31
25	3534.23	3532.93	3535.93	3517.98	3496.83	3476.11	3463.34	3501.09	3543.46	3560.13	3560.45	3543.57
26	3533.73	3533.59	3535.88	3517.24	3496.05	3475.20	3463.90	3502.97	3544.75	3560.13	3560.10	3542.86
27	3533.21	3534.11	3535.85	3516.51	3495.31	3474.26	3464.90	3504.34	3546.00	3560.34	3559.61	3542.16
28	3532.71	3534.46	3535.64	3515.82	3494.54	3473.36	3465.74	3505.16	3547.20	3560.55	3559.05	3541.41
29	3532.21	3534.76	3534.98	3515.07	---	3472.39	3465.90	3505.93	3548.20	3560.53	3558.52	3540.68
30	3531.72	3535.05	3534.35	3514.32	---	3471.45	3466.02	3506.82	3549.90	3560.50	3558.04	3540.02
31	3531.30	---	3533.80	3513.60	---	3470.51	---	3507.70	---	3560.48	3558.00	---
MAX	3545.98	3535.05	3537.76	3533.26	3512.87	3493.73	3469.73	3507.70	3549.90	3560.79	3560.86	3558.00
MIN	3531.30	3527.25	3533.80	3513.60	3494.54	3470.51	3460.72	3466.10	3509.28	3551.15	3558.00	3540.02

CAL YR 1990 TOTAL 1289263.01 MEAN 3532.23 MAX 3560.90 MIN 3495.77
WTR YR 1991 TOTAL 1285560.02 MEAN 3522.08 MAX 3560.86 MIN 3460.72

†	2788	2866	2840	2435	2092	1714	1649	2324	3193	3439	3380	2973
††	-328000	+78000	-26000	-405000	-343000	-378000	-65000	+675000	+869000	+246000	-59000	-407000

CAL YR 1990 . . . . . †† +316,000
WTR YR 1991 . . . . . †† -143,000

† Contents, in thousands of acre-feet, at end of month.
††Change in contents, in acre-feet.

PEND OREILLE RIVER BASIN
12362500 SOUTH FORK FLATHEAD RIVER NEAR COLUMBIA FALLS, MT

LOCATION.--Lat 48°21'24", long 114°02'12", in SW1/4SE1/4SW1/4 sec.16, T.30 N., R.19 W., Flathead County, Hydrologic Unit 17010209, on right bank 1.7 mi downstream from Hungry Horse Dam, 6.8 mi east of Columbia Falls, and at river mile 3.5.
DRAINAGE AREA.--1,663 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1910 to January 1911 (discharge measurements only), February 1911 to September 1913 (no winter records), October 1913 to August 1916 (scattered daily discharge only), water years 1917-22 (annual maximum), April 1923 to November 1924 (no winter records), July to October 1925, May to November 1927, May 1928 to current year. Monthly discharge only for some periods, published in WSP 1316.
REVISED RECORDS.--WSP 1216: Drainage area. WSP 1316: 1923-24(M), 1926-27(M), 1932(M), 1935-36(M). WSP 1636: 1958 (adjusted runoff).
GAGE.--Water-stage recorder. Elevation of gage is 3,040 ft above National Geodetic Vertical Datum of 1929 (levels by the U.S. Bureau of Reclamation). September 1910 to September 1916, nonrecording gage, Apr. 23, 1923, to Sept. 30, 1928, water-stage recorder at site 3 mi downstream at different datum. Oct. 1, 1928, to Sept. 30, 1952, water-stage recorder at site 1.5 mi downstream at different datum. U.S. Bureau of Reclamation satellite telemeter at station.
REMARKS.--No estimated daily discharges this year. Water-discharge records excellent. Flow regulated by Hungry Horse Reservoir since Sept. 21, 1951 (see preceding page).
AVERAGE DISCHARGE.--63 years (water years, 1929-91), 3,560 ft^3/s, 29.07 in/yr, 2,579,000 acre-ft/yr, adjusted for change in contents in Hungry Horse Reservoir since Oct. 1, 1951.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 46,200 ft^3/s, June 19, 1916, gage height, 16.6 ft, site and datum then in use, from rating curve extended above 20,000 ft^3/s; minimum observed, 7.3 ft^3/s, Sept. 24, 1951, gage height, 0.52 ft, dam closure, site and datum then in use; minimum daily, 7.3 ft^3/s, Sept. 24, 1951.
EXTREMES FOR CURRENT YEAR.--Maximum discharge, 14,300 ft^3/s, Sept. 3, gage height, 12.06 ft; minimum daily, 144 ft^3/s, Dec. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7140	7310	226	7860	8140	8390	7070	4270	749	4210	2680	801
2	7150	7330	222	7910	8180	8430	8440	4230	328	4720	2220	874
3	7150	7330	144	7890	8170	8400	8450	4220	3620	3820	185	5670
4	7140	7320	1120	7890	8180	6020	8070	190	3760	345	185	6970
5	7140	7330	1120	7900	8190	4770	8460	175	3910	3710	2670	7370
6	7160	5690	1460	7920	8190	4510	8490	4220	5980	4820	2910	7700
7	7180	5800	2080	7940	8190	4120	8550	5320	5810	3440	4610	7710
8	7180	7340	209	7960	8190	4810	8550	5680	4880	5020	2330	6310
9	7190	7360	219	7960	8210	6580	7920	5980	1630	3360	3770	5600
10	7230	801	226	7970	8250	6570	8530	6110	5750	3990	1610	4700
11	7230	236	225	7980	8240	6590	6240	6110	3550	2840	179	5930
12	7260	215	218	8000	8250	8330	6070	331	368	2800	3040	7490
13	6390	1740	1130	8010	8130	8420	6070	5480	3810	167	1860	7470
14	7230	270	819	8010	7770	8420	375	4490	5720	167	202	8840
15	2140	330	260	8020	8250	8420	5950	6170	407	2990	194	8670
16	4160	478	841	8030	8260	8430	8440	6150	299	2640	718	8630
17	5380	423	1260	8030	8280	8420	8430	6190	5580	4620	1410	7900
18	7230	218	4780	8040	6490	8400	8190	391	362	4720	199	8430
19	7240	212	3940	8040	8310	8410	8230	239	1210	4740	2060	10500
20	7270	1430	4800	8070	8290	8390	5630	230	4560	318	3140	10900
21	7260	732	6110	8060	8320	8380	168	280	300	183	310	8460
22	7260	210	2820	8080	8350	8370	5640	293	315	4560	799	10900
23	7260	209	3360	8110	5590	8450	4380	1620	704	6940	537	10900
24	6220	220	2410	8100	5790	8440	4240	2040	312	5590	187	9630
25	7270	226	2420	8080	6470	8430	4220	323	301	4750	273	8750
26	7270	218	2420	8100	8370	8410	4250	1620	267	2660	5340	8750
27	7310	219	2420	8100	8380	8400	193	2580	229	241	7260	8760
28	7270	207	3690	8000	8370	8390	176	5430	232	165	7620	8760
29	7310	247	7840	8140	---	8380	4210	5860	1670	2880	7370	8750
30	7310	240	7890	8140	---	8370	4220	5500	396	2530	6740	8350
31	7310	---	7870	8140	---	8360	---	5840	---	2530	1160	---
TOTAL	212240	71891	74549	248480	221800	237210	177852	107562	67009	96466	73768	230475
MEAN	6846	2396	2405	8015	7921	7652	5928	3470	2234	3112	2380	7682
MAX	7310	7360	7890	8140	8380	8450	8550	6190	5980	6940	7620	10900
MIN	2140	207	144	7860	5590	4120	168	175	229	165	179	801
AC-FT	421000	142600	147900	492900	439900	470500	352800	213300	132900	191300	146300	457100
CFSM	4.12	1.44	1.45	4.82	4.76	4.60	3.56	2.09	1.34	1.87	1.43	4.62
IN.	4.75	1.61	1.67	5.56	4.96	5.31	3.98	2.41	1.50	2.16	1.65	5.16
MEAN †	1512	3707	1982	1430	1745	1504	4837	14450	16840	7112	1420	842
CFSM †	.91	2.23	1.19	.86	1.05	.90	2.91	8.69	10.13	4.28	.85	.51
IN †	1.05	2.49	1.37	.99	1.09	1.04	3.24	10.02	11.30	4.93	.98	.56
AC-FT †	93000	220600	121900	87900	96900	92500	287800	888300	1001900	437300	87300	50100

OBSERVED

CAL YR 1990	TOTAL	1406574	MEAN	3854	MAX	15100	MIN	144	AC-FT	2790000
WTR YR 1991	TOTAL	1819302	MEAN	4984	MAX	10900	MIN	144	AC-FT	3609000

ADJUSTED

CAL YR 1990	TOTAL	1565929	MEAN	4290	CFSM	2.58	IN	35.02	AC-FT	3106000
WTR YR 1991	TOTAL	1747165	MEAN	4787	CFSM	2.88	IN	39.07	AC-FT	3466000

† Adjusted for change in contents in Hungry Horse Reservoir.

PEND OREILLE RIVER BASIN

12362500 SOUTH FORK FLATHEAD RIVER NEAR COLUMBIA FALLS, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1949-50, 1965-68, 1979 to current year.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: October 1964 to September 1968, March 1979 to current year.

INSTRUMENTATION.--Temperature recorder since Mar. 30, 1979.

REMARKS.-Prior to March 1979, thermograph records furnished by Montana Department of Fish, Wildlife, and Parks. Missing record Dec. 27 to Jan. 26. The 1991 maximum water temperature occured while the USBR was spilling water from the surface of the reservoir during a test of the "glory hole" overflow system.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum, 19.0°C Aug. 9-11, 1966, Aug. 2-6, 1968; minimum (water years 1965-68, 1979-81, 1983-88), 2.0°C on many days during winter periods most years.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 12.0°C, Sept. 3; minimum, 3.0°C on many days in April, May, and June.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT							
10...	1430	7120	--	--	153	6.0	5.0
SEP							
24...	1530	8760	0	0	156	26.0	5.5

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	5.0	5.0	5.0	6.0	5.0	5.0	7.0	6.0	6.5	---	---	---
2	5.0	4.5	5.0	5.5	5.0	5.5	7.0	6.0	6.5	---	---	---
3	5.5	5.0	5.0	5.5	5.0	5.5	8.0	6.5	7.0	---	---	---
4	5.0	4.5	5.0	5.5	5.0	5.5	7.5	6.5	7.0	---	---	---
5	5.0	4.5	5.0	6.0	5.0	5.0	7.0	5.5	6.5	---	---	---
6	5.5	5.0	5.0	6.0	5.0	5.5	6.5	5.5	6.0	---	---	---
7	5.5	5.0	5.0	6.0	5.5	6.0	6.5	5.5	6.0	---	---	---
8	5.5	5.0	5.5	5.5	5.0	5.0	7.0	5.5	6.5	---	---	---
9	5.5	5.0	5.0	5.5	4.5	5.0	7.5	6.5	7.0	---	---	---
10	5.0	5.0	5.0	6.0	5.5	6.0	7.5	7.0	7.5	---	---	---
11	5.5	5.0	5.0	6.5	6.0	6.5	8.0	6.0	7.0	---	---	---
12	5.5	5.0	5.0	6.5	5.5	6.0	8.0	6.0	7.0	---	---	---
13	5.5	5.0	5.0	6.5	5.5	6.0	7.5	6.0	7.0	---	3.5	---
14	6.0	5.0	5.5	7.0	6.0	6.5	7.0	5.5	6.5	---	3.5	---
15	6.0	5.0	5.5	7.0	5.5	6.0	7.5	5.5	6.5	---	3.5	---
16	6.0	5.0	5.5	7.0	5.5	6.0	7.0	6.0	6.5	---	3.5	---
17	5.5	5.0	5.0	7.0	6.0	6.5	7.0	5.5	6.5	---	3.5	---
18	5.5	5.0	5.5	7.5	6.0	6.5	6.5	5.5	6.0	---	3.5	---
19	5.5	5.0	5.0	7.0	5.5	6.5	5.5	5.0	5.5	---	3.5	---
20	5.5	5.0	5.5	6.5	5.0	6.0	5.5	5.0	5.0	---	3.5	---
21	5.5	5.5	5.5	6.5	5.5	6.0	5.5	5.0	5.5	---	3.5	---
22	6.0	5.0	5.5	7.0	5.5	6.5	6.0	4.5	5.0	---	3.5	---
23	5.0	5.0	5.0	7.5	6.5	7.0	6.0	4.5	5.5	---	3.5	---
24	5.5	5.0	5.5	7.5	6.5	7.0	5.5	4.5	5.0	---	3.5	---
25	5.5	5.0	5.0	7.5	6.0	7.0	5.0	4.5	4.5	---	3.5	---
26	5.0	5.0	5.0	6.5	5.5	6.0	5.0	4.5	4.5	3.5	3.5	3.5
27	6.0	4.5	5.0	6.5	5.0	5.5	---	---	---	3.5	3.5	3.5
28	6.0	5.0	5.5	5.5	5.0	5.5	---	---	---	3.5	3.5	3.5
29	5.0	5.0	5.0	6.5	5.5	6.0	---	---	---	3.5	3.5	3.5
30	5.5	5.0	5.5	6.5	5.5	6.0	---	---	---	3.5	3.5	3.5
31	5.5	5.0	5.0	---	---	---	---	---	---	3.5	3.5	3.5
MONTH	6.0	4.5	5.0	7.5	4.5	6.0	---	---	---	---	---	---

12362500 SOUTH FORK FLATHEAD RIVER NEAR COLUMBIA FALLS, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	3.5	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	3.5	3.0	3.5
2	3.5	3.5	3.5	4.0	3.5	3.5	3.5	3.5	3.5	4.0	3.0	3.5
3	3.5	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	4.0
4	3.5	3.5	3.5	4.0	3.5	3.5	3.5	3.5	3.5	5.0	4.0	4.5
5	4.0	3.5	3.5	4.0	3.5	3.5	3.5	3.5	3.5	5.0	4.0	4.5
6	4.0	3.5	3.5	4.0	3.5	3.5	3.5	3.5	3.5	5.0	3.5	4.0
7	3.5	3.5	3.5	4.0	3.5	4.0	3.5	3.5	3.5	4.0	3.5	3.5
8	4.0	3.5	3.5	4.0	3.5	3.5	3.5	3.5	3.5	4.0	3.5	3.5
9	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	3.5	3.0	3.5
10	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.0	3.5
11	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.0	3.0
12	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.0	3.5
13	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.5	3.5
14	3.5	3.5	3.5	3.5	3.5	3.5	4.5	3.0	4.0	3.5	3.0	3.5
15	3.5	3.5	3.5	3.5	3.5	3.5	4.0	3.0	3.5	3.5	3.0	3.0
16	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.0	3.0
17	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.0	3.5
18	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	5.5	3.5	4.5
19	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	6.0	4.5	5.0
20	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	5.5	4.0	4.5
21	3.5	3.5	3.5	4.0	3.5	3.5	5.0	3.0	4.0	5.0	4.0	4.5
22	3.5	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	5.5	4.0	4.5
23	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.0	3.0	3.5
24	3.5	3.5	3.5	3.5	3.5	3.5	4.0	3.5	3.5	3.5	3.0	3.5
25	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	5.0	3.0	4.0
26	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5	3.0	3.5
27	3.5	3.5	3.5	3.5	3.5	3.5	4.5	3.5	4.0	4.5	3.0	3.5
28	4.0	3.5	3.5	4.0	3.5	3.5	5.0	4.0	4.5	4.0	3.5	3.5
29	---	---	---	3.5	3.5	3.5	4.5	3.5	4.0	3.5	3.5	3.5
30	---	---	---	4.0	3.5	3.5	3.5	3.0	3.5	4.0	3.5	3.5
31	---	---	---	3.5	3.5	3.5	---	---	---	4.0	3.5	3.5
MONTH	4.0	3.5	3.5	4.0	3.5	3.5	5.0	3.0	3.5	6.0	3.0	3.5
		JUNE			JULY			AUGUST			SEPTEMBER	
1	6.0	3.5	4.5	5.0	3.5	4.0	5.0	4.0	4.5	5.0	4.0	4.5
2	6.0	4.0	4.5	4.5	3.5	4.0	5.0	4.0	4.0	5.0	4.0	4.5
3	4.5	3.5	4.0	5.0	3.5	4.0	6.5	4.0	5.5	12.0	4.5	5.0
4	4.0	3.0	3.5	7.5	4.0	5.5	6.5	5.0	6.0	5.0	3.5	4.5
5	4.0	3.5	3.5	6.0	3.5	4.5	5.5	4.0	4.5	5.0	4.0	4.5
6	4.0	3.5	3.5	5.0	3.5	4.0	5.0	4.0	4.5	5.0	3.5	4.5
7	4.0	3.5	3.5	5.5	3.5	4.0	4.0	4.0	4.0	5.0	4.0	4.5
8	4.5	3.5	4.0	4.5	3.5	4.0	6.5	4.0	4.5	5.0	4.0	4.5
9	5.5	3.5	4.5	5.0	3.5	4.0	5.0	4.0	4.5	5.0	4.0	4.5
10	4.0	3.5	3.5	5.0	3.5	4.0	6.5	4.0	5.0	5.0	4.0	4.5
11	4.5	3.5	3.5	4.5	4.0	4.0	6.5	4.0	5.5	5.0	4.0	4.5
12	5.5	3.5	4.5	5.0	4.0	4.0	6.0	4.0	4.5	5.0	4.5	4.5
13	4.5	3.0	3.5	7.0	4.0	5.5	5.5	4.5	4.5	5.0	4.5	5.0
14	4.0	3.5	4.0	6.5	6.0	6.0	5.5	4.5	5.0	5.0	4.5	4.5
15	5.5	4.0	4.5	6.0	4.0	4.5	6.5	5.0	5.5	5.0	4.5	4.5
16	5.5	4.5	4.5	5.0	4.0	4.5	6.5	4.5	5.0	5.5	4.5	4.5
17	4.5	3.5	4.0	5.0	4.0	4.0	6.5	4.0	5.0	5.0	4.5	4.5
18	6.0	3.5	4.5	4.5	4.0	4.0	6.5	4.0	5.5	5.0	4.5	5.0
19	4.5	3.5	4.0	4.5	4.0	4.0	5.5	4.0	4.5	5.0	4.5	5.0
20	4.0	3.5	3.5	7.0	4.0	5.5	6.0	4.0	5.0	5.5	5.0	5.0
21	6.0	4.0	5.0	6.5	5.0	6.0	6.5	4.0	5.5	5.0	4.5	5.0
22	6.0	4.5	5.0	6.0	4.0	4.5	6.0	4.5	5.0	5.5	4.5	5.0
23	5.5	3.5	4.5	4.5	3.5	4.0	6.5	4.5	5.0	5.5	4.5	5.0
24	5.0	3.5	4.5	4.5	3.5	4.0	6.5	4.5	5.5	5.5	5.0	5.5
25	5.0	4.5	5.0	5.0	3.5	4.5	5.5	5.0	5.5	5.5	5.0	5.5
26	6.0	4.5	5.0	5.0	4.0	4.5	5.0	4.0	4.5	5.5	5.5	5.5
27	6.5	5.0	5.5	7.0	4.5	5.5	5.0	3.5	4.5	5.5	5.0	5.5
28	5.5	5.0	5.5	7.0	5.5	6.0	4.5	4.0	4.5	5.5	5.5	5.5
29	6.0	3.5	4.5	6.0	4.0	4.5	4.5	4.0	4.5	5.5	5.5	5.5
30	5.0	3.5	4.5	5.0	3.5	4.5	4.5	4.0	4.5	6.0	5.5	5.5
31	---	---	---	5.0	4.0	4.5	5.0	4.5	4.5	---	---	---
MONTH	6.5	3.0	4.5	7.5	3.5	4.5	6.5	3.5	5.0	12.0	3.5	5.0

PEND OREILLE RIVER BASIN

12363000 FLATHEAD RIVER AT COLUMBIA FALLS, MT
(National stream quality accounting network station)

LOCATION.--Lat 48°21'43", long 114°11'02", in NW1/4NW1/4SE1/4 sec.17, T.30 N., R.20 W., Flathead County, Hydrologic Unit 17010208, on right bank 200 ft downstream from county road bridge at Columbia Falls, 5.7 mi downstream from South Fork, and at river mile 143.0.
DRAINAGE AREA.--4,464 mi^2.

WATER DISCHARGE RECORDS

PERIOD OF RECORD.--May 1922 to September 1923 (fragmentary), June 1928 to current year. Monthly discharge only for some periods, published in WSP 1316.
REVISED RECORDS.--WSP 1092: 1923. WSP 1216: Drainage area. WSP 1636: 1958 (adjusted runoff).
GAGE.--Water-stage recorder. Datum of gage is 2,977.67 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Nov. 12, 1928, nonrecording gage on bridge 200 ft upstream at datum 0.19 ft higher.
REMARKS.--No estimated daily discharges this year. Water-discharge records good. South Fork Flathead River, which contributes about one-third of flow, completely regulated by Hungry Horse Reservoir 10.9 mi upstream since Sept. 21, 1951 (see station number 12362000). U.S. Bureau of Reclamation satellite telemeter at station.
AVERAGE DISCHARGE.--63 years, 9,729 ft^3/s, 29.60 in/yr, 7,050,000 acre-ft/yr, adjusted for change in contents in Hungry Horse Reservoir since Oct. 1, 1951.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 176,000 ft^3/s, June 9, 1964, gage height, 25.58 ft, from floodmarks, from rating curve extended above 95,000 ft^3/s on basis of slope-area measurement of peak flow; minimum, 798 ft^3/s, Dec. 8, 1929, gage height, -0.08 ft.
EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1894 reached a stage of 22.7 ft, from floodmarks, discharge 142,000 ft^3/s, from rating curve extended above 95,000 ft^3/s on basis of slope-area measurement of peak flow in 1964.
EXTREMES FOR CURRENT YEAR.--Maximum discharge, 59,500 ft^3/s, May 19, gage height, 14.94 ft; minimum daily, 3,710 ft^3/s, Aug. 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8740	12600	5900	10400	10400	11000	9670	14900	28000	31700	9590	3730
2	8800	12600	5520	10400	10400	10800	11400	14400	31000	30500	9230	3750
3	8840	12000	5040	10200	10400	11100	11900	13900	39200	29200	7020	7810
4	8930	11700	5770	10200	10500	9230	11900	9640	41100	27000	6320	9670
5	10200	11500	5540	10100	10600	7710	14800	8840	37100	29800	8380	10000
6	10900	9610	5600	10100	10800	7300	20200	12600	36500	29100	8470	10300
7	10300	9130	5930	10200	10800	6860	19500	15300	36200	25100	10300	10300
8	9930	10700	3960	10300	10800	7440	17700	18400	37500	23800	7850	8880
9	9700	11000	3900	10300	10800	9080	15900	22200	33800	21100	9020	8410
10	9720	8940	4470	10400	10800	9100	15700	22500	36900	21000	7220	7180
11	9900	13500	5270	10500	10700	9080	13000	21800	38800	19400	5710	8080
12	9870	12800	5050	10600	10800	10600	12300	19600	41300	18000	8110	9830
13	8980	12200	5520	10900	10700	10900	12100	34600	37300	15300	6900	9780
14	9740	9540	5040	11000	10300	10800	7120	38400	32600	14900	4990	11300
15	4730	8690	4240	11000	10800	10800	11300	36500	23700	17100	4750	11100
16	7290	7930	4580	10800	10800	10800	14500	35300	20100	16200	5030	11000
17	7280	7150	4550	10700	11000	10700	14400	35600	23600	17500	5370	10200
18	9630	6430	8380	10700	9240	10600	14200	38000	18300	17400	4460	10500
19	9690	5920	6870	10700	11100	10600	14600	51800	17300	16400	6040	12800
20	9700	6760	6430	10500	11600	10700	12400	55700	23200	11400	6400	13200
21	9670	5750	8190	10300	11900	10700	8430	47100	25900	10100	4820	10700
22	9790	5060	5210	10400	11800	10800	14700	42100	28600	13400	4550	13200
23	9760	5320	5520	10400	9140	10900	16700	41500	27500	16100	4220	13200
24	8590	6060	4830	10400	8950	10900	19900	40200	26500	14500	3760	12000
25	9540	11100	5110	10200	9290	11000	22200	37100	25600	13500	3710	10800
26	9740	11200	5120	10100	11400	10900	20700	34800	25700	11500	7990	10800
27	10500	9160	5140	10100	11400	10800	14800	31300	25200	8830	10500	10800
28	10500	7690	5710	10100	11300	10900	12900	30700	25200	7990	10800	10700
29	10500	6890	10000	9980	---	10800	15700	30400	25800	10000	10500	10700
30	10500	6460	10000	9890	---	10800	15400	30700	26300	9820	9740	10300
31	11000	---	10100	10100	---	10800	---	32000	---	9540	4850	---
TOTAL	292960	275390	182490	321970	298520	314500	436020	917880	895800	557180	216600	301020
MEAN	9450	9180	5887	10390	10660	10150	14530	29610	29860	17970	6987	10030
MAX	11000	13500	10100	11000	11900	11100	22200	55700	41300	31700	10800	13200
MIN	4730	5060	3900	9890	8950	6860	7120	8840	17300	7990	3710	3730
AC-FT	581100	546200	362000	638600	592100	623800	864800	1821000	1777000	1105000	429600	597100
CFSM	2.12	2.06	1.32	2.33	2.39	2.27	3.26	6.63	6.69	4.03	1.57	2.25
IN.	2.44	2.29	1.52	2.68	2.49	2.62	3.63	7.65	7.46	4.64	1.80	2.51
MEAN †	4116	10490	5464	3799	4485	3986	13420	40580	44470	21970	6027	3193
CFSM †	.92	2.35	1.22	.85	1.00	.89	3.01	9.09	9.96	4.92	1.35	.72
IN †	1.06	2.62	1.41	.98	1.05	1.03	3.35	10.48	11.11	5.67	1.56	.80
AC-FT †	253100	624200	336000	233600	249100	245100	798700	2495000	2646000	1351000	370600	190000

OBSERVED

CAL YR 1990	TOTAL	4326590	MEAN	11850	MAX	39700	MIN	3700	AC-FT	8582000
WTR YR 1991	TOTAL	5010330	MEAN	13730	MAX	55700	MIN	3710	AC-FT	9938000

ADJUSTED

CAL YR 1990	TOTAL	4485959	MEAN	12290	CFSM	2.75	IN	37.37	AC-FT	8898000
WTR YR 1991	TOTAL	4936929	MEAN	13530	CFSM	3.03	IN	41.13	AC-FT	9792000

† Adjusted for change in contents in Hungry Horse Reservoir.

12363000 FLATHEAD RIVER AT COLUMBIA FALLS, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1949-50, 1963-67, 1970, 1979 to current year. Water years 1968-69 published as Flathead River near Kalispell (station 12363500) 15 mi downstream. No appreciable inflow or outlfow occurs between the two points.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1964 to September 1967, March 1979 to September 1981.
WATER TEMPERATURE: January 1949 to September 1950, August 1963 to September 1969, March 1979 to current year.
SUSPENDED-SEDIMENT DISCHARGE: July 1965 to September 1969.

INSTRUMENTATION.--Temperature recorder since Mar. 27, 1979.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1965-67, 1979-81): Maximum daily, 290 microsiemens, April 6, 1980; minimum daily, 121 microsiemens, May 28, 1979.
WATER TEMPERATURE: Maximum, 21.0°C, Aug. 23, 1963, Aug. 8, 1968; minimum, 0.0°C on several days during winter periods most years.
SEDIMENT CONCENTRATION (water years 1965-69): Maximum daily, 980 mg/L, May 21, 1967; Minumum daily, 1 mg/L on several days most years.
SEDIMENT LOAD (water years 1965-69): Maximum daily, 140,000 tons, May 23, 1967; minimum daily, 4 tons, March 4-6, 1967.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 18.0°C, Aug. 8; minimum, 0.0°C, Dec. 19, 20, 27, 28.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT												
11...	1200	9940	--	--	176	6.0	6.0	--	--	--	--	--
NOV												
15...	1100	8670	85	2	160	1.0	4.0	680	11.5	98	K1	K5
MAR												
13...	1300	10800	100	3	172	3.0	3.5	684	11.4	96	K2	<1
MAY												
20...	0730	56500	--	--	154	8.0	6.0	--	--	--	--	--
JUN												
14...	0930	32000	100	61	138	9.0	6.5	685	10.8	98	K3	K2
24...	1300	26400	99	2	--	19.0	8.5	--	--	--	--	--
AUG												
23...	1100	3850	20	1	175	26.0	15.5	686	9.1	102	K1	K7

DATE	TIME	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3 (00450)	CAR-BONATE WATER WH IT FIELD MG/L AS CO3 (00447)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)
NOV											
15...	1100	92	0	76	8.5	2.2	84	24	5.7	0.9	<0.1
MAR											
13...	1300	101	0	81	7.7	0.50	84	24	5.8	0.9	<0.1
JUN											
14...	0930	91	0	75	8.2	42	70	20	4.8	1.6	0.1
24...	1300	--	--	--	--	--	--	--	--	--	--
AUG											
23...	1100	113	0	90	8.2	0.30	91	26	6.4	0.9	<0.1

PEND OREILLE RIVER BASIN

12363000 FLATHEAD RIVER AT COLUMBIA FALLS, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRATE TOTAL (MG/L AS N) (00620)
NOV											
15...	0.2	80	4.2	1.2	<0.1	4.6	78	87	0.11	1830	--
MAR											
13...	0.4	82	2.5	0.7	<0.1	4.2	87	89	0.12	2540	--
JUN											
14...	0.3	73	2.4	0.1	0.1	4.0	62	79	0.08	5360	0.067
24...	--	--	--	--	--	--	--	--	--	--	--
AUG											
23...	0.3	89	5.7	0.4	0.1	4.0	95	100	0.13	988	--

DATE	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC DISSOLVED (UG/L AS AS) (01000)
NOV											
15...	<0.01	0.01	0.10	0.10	0.02	<0.01	0.006	0.002	<0.001	10	<1
MAR											
13...	<0.01	<0.01	<0.05	0.05	<0.01	<0.01	<0.001	<0.001	<0.001	20	<1
JUN											
14...	0.01	<0.01	0.08	0.09	0.02	0.02	0.189	0.008	<0.009	20	<1
24...	--	--	--	--	--	--	--	--	--	--	--
AUG											
23...	0.02	<0.01	<0.05	<0.05	0.02	<0.01	<0.001	<0.001	<0.001	20	<1

DATE	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)
NOV											
15...	85	<0.5	<1	1	<3	1	16	<1	<4	1	0.1
MAR											
13...	100	<0.5	<1	10	<3	2	5	1	<4	1	<0.1
JUN											
14...	65	<0.5	<1	<1	<3	1	13	<1	<4	3	<0.1
24...	--	--	--	--	--	--	--	--	--	--	--
AUG											
23...	98	<0.5	<1	<1	<3	<1	5	<1	<4	2	<0.1

DATE	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV										
15...	<10	<1	<1	<1	48	<6	<3	7	164	88
MAR										
13...	<10	<1	<1	<1	38	<6	<3	2	58	77
JUN										
14...	<10	<1	<1	<1	40	<6	3	162	14000	62
24...	--	--	--	--	--	--	--	110	7840	75
AUG										
23...	<10	<1	<1	<1	54	<6	<3	2	21	63

PEND OREILLE RIVER BASIN

12363000 FLATHEAD RIVER AT COLUMBIA FALLS, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	6.5	6.0	6.0	6.0	5.5	5.5	1.5	1.0	1.5	3.0	2.5	3.0
2	6.5	5.5	6.0	5.5	5.0	5.0	1.5	1.0	1.0	2.5	2.0	2.5
3	6.0	5.5	6.0	5.0	4.5	5.0	2.0	1.5	1.5	2.5	2.0	2.5
4	6.0	5.5	6.0	5.0	5.0	5.0	4.5	2.0	2.5	2.5	2.0	2.5
5	7.0	6.0	6.5	5.0	4.5	5.0	4.5	2.0	2.5	2.5	2.0	2.5
6	6.5	5.5	6.0	4.5	4.5	4.5	4.0	2.0	2.5	2.5	2.0	2.5
7	6.0	5.5	5.5	5.0	4.5	4.5	4.0	1.5	2.5	2.5	2.5	2.5
8	6.0	5.5	6.0	5.0	5.0	5.0	3.0	1.5	2.0	2.5	2.5	2.5
9	6.0	5.5	6.0	5.0	5.0	5.0	3.0	1.5	2.5	3.0	2.5	2.5
10	6.0	5.5	6.0	5.0	4.5	4.5	3.5	3.0	3.5	3.0	2.5	2.5
11	6.5	5.5	6.0	5.0	4.5	4.5	3.5	3.0	3.5	3.0	2.5	2.5
12	6.0	5.5	5.5	5.0	4.5	4.5	3.0	2.0	2.5	3.0	2.5	3.0
13	6.0	5.5	5.5	5.0	4.0	4.5	4.0	1.5	2.0	3.0	2.5	3.0
14	6.0	5.5	5.5	5.0	4.5	5.0	3.0	1.5	2.0	3.0	2.5	3.0
15	5.5	5.5	5.5	4.5	4.0	4.0	2.0	1.0	1.5	3.0	2.5	3.0
16	6.0	5.0	5.5	4.0	3.5	4.0	3.0	1.0	1.5	3.0	2.5	3.0
17	5.5	4.5	5.0	4.0	3.0	3.5	3.5	1.0	1.5	3.0	3.0	3.0
18	5.5	5.0	5.5	4.5	3.5	4.0	3.5	1.5	2.0	3.0	2.5	3.0
19	5.5	5.0	5.5	3.5	3.0	3.5	2.5	.0	1.0	3.0	2.0	2.5
20	5.5	5.0	5.5	4.5	3.0	3.5	3.0	.0	1.5	3.0	2.5	2.5
21	5.5	5.5	5.5	3.5	2.5	3.0	3.0	.5	2.5	3.0	2.5	2.5
22	5.5	5.0	5.5	3.5	2.5	3.0	2.5	.5	1.0	3.0	2.5	3.0
23	5.5	5.0	5.0	4.5	3.5	4.0	3.0	1.0	1.5	3.0	2.5	2.5
24	6.5	5.5	5.5	5.0	4.5	4.5	1.5	1.0	1.5	3.0	2.5	3.0
25	6.0	5.5	5.5	4.5	2.0	3.0	1.5	1.5	1.5	3.0	2.5	2.5
26	6.5	5.5	6.0	2.5	2.0	2.0	2.0	1.5	1.5	3.0	2.5	2.5
27	6.0	5.0	5.5	2.0	2.0	2.0	2.0	.0	1.0	3.0	2.5	2.5
28	5.5	5.0	5.5	2.0	1.5	2.0	1.5	.0	.5	3.0	2.0	2.5
29	5.5	5.0	5.5	2.5	2.0	2.5	2.0	2.0	2.0	3.0	2.0	2.5
30	5.5	5.5	5.5	2.5	1.5	2.5	2.5	2.0	2.5	3.0	2.0	2.5
31	6.0	5.5	6.0	---	---	---	3.0	2.5	2.5	3.0	2.5	2.5
MONTH	7.0	4.5	5.5	6.0	1.5	4.0	4.5	.0	2.0	3.0	2.0	2.5
		FEBRUARY			MARCH			APRIL			MAY	
1	3.0	3.0	3.0	---	---	---	5.0	4.0	4.5	6.0	5.0	5.5
2	3.0	2.5	3.0	---	---	---	4.5	3.5	4.0	5.5	4.5	5.0
3	3.5	3.0	3.0	---	---	---	4.5	3.5	4.0	5.5	5.0	5.0
4	3.5	3.0	3.0	---	---	---	4.5	4.0	4.0	6.0	4.5	5.5
5	3.5	3.0	3.0	---	---	---	4.0	3.5	3.5	7.0	5.5	6.0
6	3.5	3.0	3.0	---	---	---	3.5	2.5	3.0	7.0	6.0	6.5
7	3.5	2.5	3.0	---	---	---	3.5	2.5	3.0	7.0	5.5	6.5
8	3.5	3.0	3.0	---	---	---	4.0	3.5	3.5	7.0	5.0	6.0
9	3.5	3.0	3.5	---	---	---	3.5	3.0	3.5	5.5	4.5	5.0
10	3.5	3.0	3.0	---	---	---	4.0	3.5	3.5	6.0	4.5	5.0
11	3.5	3.0	3.0	---	---	---	4.0	3.5	3.5	7.0	5.5	6.0
12	3.5	3.0	3.0	---	---	---	4.5	3.5	4.0	6.5	5.5	6.0
13	4.0	3.0	3.5	3.5	---	---	5.0	4.0	4.5	5.5	4.5	5.0
14	3.5	3.5	3.5	4.0	3.0	3.5	5.5	4.5	5.0	6.0	5.0	5.5
15	4.0	3.5	3.5	4.5	3.5	3.5	5.0	4.0	4.5	6.0	5.5	6.0
16	4.0	3.5	3.5	4.0	3.5	3.5	4.5	4.0	4.0	6.5	5.5	6.0
17	4.0	3.5	3.5	4.5	3.0	3.5	4.5	4.0	4.5	7.0	6.0	6.5
18	3.5	3.0	3.5	4.5	3.0	3.5	5.5	4.0	4.5	7.0	6.5	7.0
19	3.5	3.0	3.5	4.5	3.0	4.0	5.5	4.0	4.5	7.0	6.0	6.5
20	3.5	3.0	3.5	4.0	3.5	4.0	6.0	5.0	5.5	7.0	5.5	6.5
21	---	---	---	4.5	3.5	4.0	7.0	5.0	6.5	7.0	6.0	6.5
22	---	---	---	4.0	3.5	4.0	7.0	5.0	6.0	7.5	5.5	6.5
23	---	---	---	4.5	3.5	4.0	6.5	5.5	6.0	7.5	6.5	6.5
24	---	---	---	4.5	3.5	4.0	6.5	5.0	5.5	7.0	6.5	6.5
25	---	---	---	3.5	3.0	3.5	5.0	4.0	4.5	7.0	6.5	7.0
26	---	---	---	3.5	2.5	3.0	5.0	4.0	4.5	6.5	5.5	6.0
27	---	---	---	3.5	3.0	3.0	5.0	4.5	4.5	7.5	5.5	6.0
28	---	---	---	3.5	3.0	3.0	6.0	4.5	5.0	7.5	6.0	6.5
29	---	---	---	4.0	3.0	3.5	6.0	5.0	5.5	7.5	6.5	7.0
30	---	---	---	4.5	3.5	4.0	5.5	5.0	5.5	7.5	6.0	7.0
31	---	---	---	5.0	3.5	4.0	---	---	---	7.0	6.0	6.5
MONTH	---	---	---	5.0	2.5	3.5	7.0	2.5	4.5	7.5	4.5	6.0

PEND OREILLE RIVER BASIN

12363000 FLATHEAD RIVER AT COLUMBIA FALLS, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.0	6.5	7.5	9.0	8.0	8.5	15.0	10.5	12.5	14.0	12.5	13.0
2	9.5	8.0	8.5	10.0	9.0	9.5	14.5	10.0	12.0	13.0	11.0	12.0
3	9.0	7.5	8.0	11.0	10.0	10.5	16.5	11.0	14.5	11.5	7.0	9.0
4	8.0	6.5	7.0	12.5	11.0	11.5	17.0	14.5	16.0	8.5	6.5	7.5
5	8.0	6.5	7.5	12.0	10.0	11.0	16.0	11.0	13.5	8.0	6.5	7.0
6	7.5	6.5	7.0	11.0	9.5	10.0	15.5	11.0	13.0	8.0	6.5	7.0
7	8.0	7.0	7.5	11.0	9.5	10.5	12.0	10.5	11.0	7.5	6.5	7.0
8	7.0	6.5	7.0	11.5	9.5	10.5	18.0	10.0	14.0	10.0	6.5	7.0
9	8.5	7.0	7.5	12.5	9.5	11.0	16.5	10.0	12.5	9.0	6.0	7.5
10	8.5	7.5	8.0	12.0	9.5	10.5	17.5	10.0	14.5	9.0	7.0	7.5
11	9.0	7.5	8.0	11.0	9.5	10.0	17.0	11.5	15.0	9.0	6.5	7.5
12	7.5	6.5	7.0	12.0	10.5	11.5	16.0	10.0	12.5	8.0	6.5	7.0
13	7.0	6.0	6.5	13.5	11.5	13.0	16.0	9.5	13.0	7.5	6.5	7.0
14	7.0	6.0	6.5	13.5	12.5	13.0	15.5	12.5	14.5	6.5	6.0	6.5
15	8.0	6.0	7.0	12.5	10.5	11.5	16.0	13.0	14.5	7.5	6.0	6.5
16	9.0	8.0	8.5	12.5	10.5	12.0	17.0	11.5	15.0	7.0	6.0	6.5
17	8.5	6.0	7.0	13.5	9.0	11.0	17.5	10.5	15.0	7.5	6.0	6.5
18	10.0	6.0	7.5	11.0	9.0	10.0	17.5	10.5	15.0	7.0	6.0	6.5
19	10.0	8.5	9.5	11.0	9.0	10.0	16.5	10.5	13.5	7.0	5.5	6.0
20	8.0	7.0	7.5	14.0	9.5	12.0	17.0	9.0	13.5	7.0	6.0	6.5
21	9.5	7.5	8.5	14.0	13.0	13.5	17.5	9.0	14.5	8.0	5.5	6.0
22	9.5	8.0	8.5	14.0	10.0	12.0	17.5	11.5	15.5	6.5	5.5	6.0
23	9.5	8.5	9.0	11.5	10.0	10.5	17.0	11.5	15.5	6.5	5.5	6.0
24	9.0	8.5	9.0	14.0	10.5	11.5	16.5	12.0	15.0	7.5	6.0	6.5
25	9.0	8.5	8.5	15.0	10.0	12.0	15.5	14.5	15.0	7.0	6.0	6.5
26	9.5	8.0	9.0	14.0	10.0	12.0	14.5	7.5	10.5	7.0	6.0	6.5
27	11.0	9.0	10.0	14.5	11.0	13.5	8.5	7.0	7.5	7.0	6.0	6.5
28	11.0	9.5	10.0	15.5	13.5	14.5	8.0	7.0	7.5	7.0	6.0	6.5
29	10.0	9.5	9.5	15.0	11.0	13.0	8.5	6.5	7.5	7.5	6.5	6.5
30	10.0	8.5	9.0	15.0	11.0	12.5	9.5	7.0	8.0	7.0	6.0	6.5
31	---	---	---	15.0	11.0	12.5	14.5	7.5	11.5	---	---	---
MONTH	11.0	6.0	8.0	15.5	8.0	11.5	18.0	6.5	13.0	14.0	5.5	7.0

PEND OREILLE RIVER BASIN

12365000 STILLWATER RIVER NEAR WHITEFISH, MT

LOCATION (REVISED).--Lat 48°19'08", long 114°23'11", in NE1/4SW1/4 sec.34, T.30 N., R.22 W., Flathead County, Hydrologic Unit 17010210, on right bank 600 ft downstream from road bridge, 6.2 mi southwest of Whitefish, 14.8 mi upstream from Whitefish River, and at river mile 16.2.

DRAINAGE AREA.--524 mi^2.

PERIOD OF RECORD.--October and November 1930 (monthly discharge only, published in WSP 1316), December 1930 to September 1950, October 1972 to September 1985, April 1986 to current year.

REVISED RECORDS.--WSP 1736: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,953.26 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Dec. 15 to Mar. 14, Mar. 19 to Apr. 30. Records good May to July, otherwise fair except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year. Diversions for irrigation of about 200 acres upstream from station.

AVERAGE DISCHARGE.--38 years (water years 1931-50, 1973-85, 1987-91), 343 ft^3/s, 8.89 in/yr, 248,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,330 ft^3/s, May 26, 1948, gage height, 20.90 ft, from floodmark; minimum, 32 ft^3/s, Sept. 9, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,950 ft^3/s, May 22, gage height, 15.96 ft; minimum daily, 100 ft^3/s, Dec. 22; minimum gage height, Sept. 30, 2.34 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	122	169	390	e160	e165	e250	e400	1620	1510	973	317	195
2	122	178	353	e170	e170	e200	e500	1470	1450	967	325	191
3	122	177	332	e170	e180	e240	e600	1360	1400	950	328	188
4	124	175	302	e160	e190	e280	e700	1290	1360	923	322	182
5	131	177	284	e160	e205	e290	e850	1240	1340	887	317	173
6	143	178	265	e165	e220	e300	e1000	1200	1340	847	307	166
7	150	174	248	e170	e240	e295	e1050	1170	1330	814	303	160
8	149	169	245	e170	e240	e290	e1100	1200	1330	779	307	158
9	147	167	237	e175	e245	e285	e1100	1290	1330	744	300	158
10	148	176	220	e180	e250	e280	e1070	1440	1330	718	289	159
11	150	200	239	e180	e240	e270	e1050	1600	1320	706	281	154
12	151	215	256	e180	e235	e260	e1030	1740	1300	687	275	150
13	151	217	258	e185	e235	e255	e1000	1850	1300	656	262	147
14	152	216	258	e190	e240	e250	e1000	2040	1320	626	257	147
15	155	216	e250	e195	e240	247	e1000	2340	1290	598	254	148
16	159	215	e240	e200	e250	245	e1050	2720	1220	567	251	149
17	162	209	e230	e210	e260	237	e1100	2840	1140	539	249	150
18	167	199	e220	e210	e265	233	e1150	2760	1060	519	246	148
19	169	194	e200	e200	e260	e230	e1200	2690	998	510	243	145
20	170	184	e150	e190	e280	e240	e1300	2760	953	492	241	144
21	169	179	e120	e170	e290	e250	e1400	2890	939	471	240	140
22	174	170	e100	e165	e295	e260	e1500	2940	941	448	233	140
23	178	175	e120	e160	e300	e270	e1650	2880	939	426	225	139
24	179	185	e130	e170	e300	e280	e1750	2730	938	408	226	137
25	177	231	e140	e170	e300	e280	e1900	2530	929	394	217	134
26	173	397	e160	e165	e295	e290	e1950	2340	928	387	210	133
27	170	475	e180	e165	e300	e270	e1950	2160	933	381	207	133
28	171	488	e180	e160	e300	e260	e1900	2000	931	366	205	132
29	168	456	e160	e155	---	e250	e1850	1840	932	353	204	130
30	162	432	e140	e150	---	e250	e1780	1710	941	337	200	129
31	160	---	e150	e155	---	e300	---	1600	---	321	198	---
TOTAL	4825	6993	6757	5405	6990	8137	36880	62240	34972	18794	8039	4559
MEAN	156	233	218	174	250	262	1229	2008	1166	606	259	152
MAX	179	488	390	210	300	300	1950	2940	1510	973	328	195
MIN	122	167	100	150	165	200	400	1170	928	321	198	129
AC-FT	9570	13870	13400	10720	13860	16140	73150	123500	69370	37280	15950	9040
CFSM	.30	.44	.42	.33	.48	.50	2.35	3.83	2.22	1.16	.49	.29
IN.	.34	.50	.48	.38	.50	.58	2.62	4.42	2.48	1.33	.57	.32

CAL YR 1990 TOTAL 209692 MEAN 574 MAX 2550 MIN 100 AC-FT 415900 CFSM 1.10 IN. 14.89
WTR YR 1991 TOTAL 204591 MEAN 561 MAX 2940 MIN 100 AC-FT 405800 CFSM 1.07 IN. 14.52

e Estimated

PEND OREILLE RIVER BASIN

12366000 WHITEFISH RIVER NEAR KALISPELL, MT

LOCATION.--Lat 48°19'13", long 114°16'39", in SW1/4SE1/4NW1/4 sec.34, T.30 N., R.21 W., Flathead County, Hydrologic Unit 17010210, on right bank 160 ft upstream from road bridge, 8.0 mi north of Kalispell, and at river mile 12.8.

DRAINAGE AREA.--170 mi^2.

PERIOD OF RECORD.--July to November 1928, April 1929 to September 1950, annual maximum, water year 1964, October 1972 to September 1985, April 1986 to current year. Prior to 1964, published as Whitefish Creek near Kalispell.

GAGE.--Water-stage recorder. Datum of gage is 2,969.83 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 16, 1930, nonrecording gage at site 200 ft downstream at datum 10.00 ft lower. Oct. 16, 1930, to Sept. 30, 1950, water-stage recorder on left bank at same datum.

REMARKS.--Estimated daily discharges: Dec. 18 to Feb. 17, Mar. 1-5. Records good except those for estimated daily discharges, which are poor. Some regulation by Whitefish Lake. Diversion for irrigation of about 650 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--39 years (1929-50, 1972-85, 1987-91), 192 ft^3/s, 139,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,580 ft^3/s, June 24, 1974, gage height, 4.91 ft; minimum, 4.5 ft^3/s, Oct. 18, 1934, gage height, 0.83 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,130 ft^3/s, May 22, gage height, 4.42 ft; minimum, 52 ft^3/s, Mar. 1, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	71	81	163	e100	e85	e105	188	450	960	678	203	92
2	69	81	161	e100	e90	e90	196	446	939	661	208	90
3	69	80	158	e95	e95	e105	188	443	939	648	200	86
4	71	81	155	e90	e100	e140	191	436	939	627	189	86
5	71	83	155	e90	e105	e135	197	426	939	610	181	83
6	71	84	153	e90	e105	131	207	421	939	593	171	83
7	69	83	148	e95	e100	128	209	438	939	573	166	83
8	69	83	143	e100	e100	126	222	482	949	552	161	83
9	67	87	141	e100	e100	126	227	558	960	537	158	83
10	67	94	157	e110	e100	124	241	556	955	526	155	81
11	67	100	195	e110	e100	124	239	554	965	508	153	79
12	67	101	189	e115	e100	121	238	583	980	483	148	79
13	67	101	184	e120	e100	119	237	796	975	458	143	79
14	67	101	176	e120	e100	119	240	921	960	441	139	81
15	69	102	171	e125	e105	119	246	942	934	421	138	81
16	73	101	168	e130	e105	119	253	955	898	404	133	79
17	75	101	166	e120	e110	119	258	962	873	384	131	79
18	77	101	e160	e115	112	121	266	988	844	371	133	77
19	79	101	e125	e105	112	124	278	1040	805	355	131	77
20	77	101	e85	e100	117	131	296	1070	782	336	126	65
21	79	99	e60	e90	119	138	321	1100	768	317	124	61
22	86	101	e70	e95	124	150	344	1120	763	298	119	61
23	84	103	e110	e95	124	158	377	1100	745	280	117	61
24	82	105	e100	e90	124	163	429	1100	732	265	112	59
25	80	126	e100	e85	121	163	487	1100	718	259	110	59
26	79	163	e95	e80	121	143	485	1090	714	257	107	59
27	78	166	e100	e80	121	141	481	1070	700	248	103	57
28	77	166	e90	e80	119	138	475	1040	687	233	101	56
29	77	166	e75	e75	---	133	466	1020	678	219	99	57
30	76	166	e85	e75	---	141	458	997	683	208	96	67
31	78	---	e90	e80	---	164	---	980	---	200	94	---
TOTAL	2288	3208	4128	3055	3014	4058	8940	25184	25662	12950	4349	2223
MEAN	73.8	107	133	98.5	108	131	298	812	855	418	140	74.1
MAX	86	166	195	130	124	164	487	1120	980	678	208	92
MIN	67	80	60	75	85	90	188	421	678	200	94	56
AC-FT	4540	6360	8190	6060	5980	8050	17730	49950	50900	25690	8630	4410
CFSM	.43	.63	.78	.58	.63	.77	1.75	4.78	5.03	2.46	.83	.44
IN.	.50	.70	.90	.67	.66	.89	1.96	5.51	5.62	2.83	.95	.49

CAL YR 1990 TOTAL 93698 MEAN 257 MAX 1010 MIN 60 AC-FT 185800 CFSM 1.51 IN. 20.50
WTR YR 1991 TOTAL 99059 MEAN 271 MAX 1120 MIN 56 AC-FT 196500 CFSM 1.60 IN. 21.68

e Estimated

PEND OREILLE RIVER BASIN

12369200 SWAN RIVER NEAR CONDON, MT

LOCATION(REVISED).--Lat 47°25'21", long 113°40'12", NE1/4SW1/4NW1/4 sec.8, T.19 N., R.16 W., Missoula County, Hydrologic Unit 17010211, Flathead National Forest, on right bank 25 ft downstream from road bridge, 0.5 mi downstream from Beaver Creek, 4.5 mi downstream from Lindberg Lake, 8.1 mi southeast of Condon, and at river mile 75.5.

DRAINAGE AREA.--69.1 mi^2.

PERIOD OF RECORD.--October 1972 to current year.

REVISED RECORDS.--WDR MT-80-2: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 4,015 ft, by barometer.

REMARKS.--Estimated daily discharges: Dec. 10 to Jan. 16, Jan. 19 to Feb. 4, 6, 7, 11, Mar. 1, 2, 9, 11, 17, 18, 26, 27. Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--19 years, 162 ft^3/s, 31.84 in/yr, 117,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,540 ft^3/s, June 18, 1974, gage height, 4.88 ft; minimum, 17 ft^3/s, Sept. 9, 10, 15, 16, 17, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 720 ft^3/s, May 19, gage height, 3.74 ft; minimum, 33 ft^3/s, gage height, 1.53 ft, Oct. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34	109	137	e56	e45	e95	85	187	417	606	182	61
2	38	108	125	e58	e45	e95	100	174	456	631	186	58
3	39	101	113	e55	e45	98	113	164	536	600	182	56
4	42	104	107	e52	e46	102	138	156	599	594	177	54
5	48	106	100	e49	46	107	200	148	586	607	175	51
6	55	102	92	e47	e45	101	281	157	558	597	169	49
7	55	93	83	e50	e45	96	275	179	628	544	156	48
8	55	92	81	e52	47	95	251	234	658	482	148	50
9	53	93	78	e53	47	e90	228	323	637	436	142	54
10	55	123	e76	e55	48	87	209	316	617	405	138	52
11	57	132	e76	e57	e48	e80	187	298	650	388	132	49
12	56	131	e75	e60	50	77	171	336	676	372	127	47
13	58	127	e73	e62	55	76	161	404	623	357	121	48
14	58	127	e72	e63	55	77	155	443	543	355	115	60
15	60	123	e70	e64	56	72	150	432	463	358	111	60
16	79	114	e67	e64	68	69	145	434	410	349	108	57
17	79	108	e64	64	76	e67	142	476	380	337	104	56
18	75	105	e60	62	79	e65	140	621	347	329	101	54
19	84	99	e56	e60	82	65	141	703	333	311	96	52
20	81	94	e52	e58	112	66	145	680	362	285	91	49
21	82	90	e50	e55	128	66	160	609	462	263	87	47
22	106	87	e47	e54	126	71	180	584	517	246	84	49
23	102	86	e52	e53	121	70	218	584	549	233	81	47
24	95	115	e54	e52	117	70	271	561	578	225	78	45
25	90	254	e56	e48	112	71	318	568	567	222	76	43
26	94	299	e58	e45	109	e70	304	530	530	217	73	42
27	103	255	e62	e45	105	e67	276	471	510	211	73	40
28	103	215	e55	e45	101	69	247	422	493	203	76	39
29	103	184	e45	e43	---	70	222	381	479	194	72	38
30	100	161	e47	e41	---	70	205	396	497	186	68	37
31	101	---	e52	e45	---	74	---	422	---	180	64	---
TOTAL	2240	3937	2235	1667	2059	2448	5818	12393	15661	11323	3593	1492
MEAN	72.3	131	72.1	53.8	73.5	79.0	194	400	522	365	116	49.7
MAX	106	299	137	64	128	107	318	703	676	631	186	61
MIN	34	86	45	41	45	65	85	148	333	180	64	37
AC-FT	4440	7810	4430	3310	4080	4860	11540	24580	31060	22460	7130	2960
CFSM	1.05	1.90	1.04	.78	1.06	1.14	2.81	5.79	7.55	5.29	1.68	.72
IN.	1.21	2.12	1.20	.90	1.11	1.32	3.13	6.67	8.43	6.10	1.93	.80

CAL YR 1990 TOTAL 65040 MEAN 178 MAX 773 MIN 34 AC-FT 129000 CFSM 2.58 IN. 35.01
WTR YR 1991 TOTAL 64866 MEAN 178 MAX 703 MIN 34 AC-FT 128700 CFSM 2.57 IN. 34.92

e Estimated

PEND OREILLE RIVER BASIN

12370000 SWAN RIVER NEAR BIGFORK, MT

LOCATION.--Lat 48°01'28", long 113°58'44", near center of S1/2SW1/4 sec.11, T.26 N., R.19 W., Lake County, Hydrologic Unit 17010211, on left bank 0.2 mi downstream from Johnson Creek, 0.4 mi downstream from Swan Lake, 5.1 mi southeast of Bigfork, and at river mile 14.0.

DRAINAGE AREA.--671 mi^2.

PERIOD OF RECORD.--October 1910 to May 1911 (gage heights only), April 1922 to current year. Monthly discharge only for some periods, published in WSP 1316.

REVISED RECORDS.--WSP 1216: Drainage area. WSP 1246: 1923-24(M), 1930. WSP 1316: 1923.

GAGE.--Water-stage recorder. Datum of gage is 3,062.6 ft above National Geodetic Vertical Datum of 1929 (from river-profile survey). Oct. 10, 1910, to May 22, 1911, nonrecording gage at site 10 mi upstream at different datum. Apr. 28, 1922, to Oct. 14, 1930, nonrecording gage at site 800 ft upstream at datum 1.9 ft higher.

REMARKS.-Estimated daily discharges: Dec. 10-26, 28-31, Jan. 1-7, 29-31. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 360 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--69 years, 1,167 ft^3/s, 23.62 in/yr, 845,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,890 ft^3/s, June 20, 1974, gage height, 7.34 ft; minimum observed, 193 ft^3/s, Jan. 26-29, 1930, gage height, 0.04 ft, site and datum then in use.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,570 ft^3/s, May 21, gage height, 5.31 ft; minimum, 435 ft^3/s, Oct. 1, Sept. 30, but may have been less during a period of no gage-height record; minimum gage height recorded, 2.28 ft, Oct. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	475	702	1430	e550	504	1070	849	1530	2980	3870	1190	573
2	471	722	1280	e580	518	1010	921	1440	3000	4410	1220	561
3	486	731	1180	e570	518	983	1010	1350	3190	4400	1210	548
4	497	736	1080	e560	525	997	1120	1280	3530	4180	1160	536
5	508	739	995	e550	532	1040	1250	1250	3870	4010	1120	533
6	537	762	939	e540	540	1060	1460	1210	3890	3890	1080	523
7	543	761	887	e570	540	1050	1700	1210	3920	3720	1050	512
8	544	729	839	578	540	1020	1790	1290	4140	3440	1020	518
9	541	743	809	579	547	984	1770	1510	4280	3150	981	526
10	560	788	828	582	547	939	1720	1740	4210	2900	935	526
11	574	884	e820	588	540	906	1640	1860	4150	2730	900	526
12	568	967	e800	596	547	876	1560	1930	4250	2590	880	530
13	560	971	e770	618	554	837	1480	2130	4390	2450	863	531
14	568	977	e730	649	554	819	1400	2420	4240	2340	834	533
15	597	995	e700	678	569	800	1340	2620	3870	2270	814	555
16	626	984	e670	696	592	790	1320	2710	3470	2170	803	560
17	673	953	e680	705	639	779	1270	2790	3120	2100	783	543
18	681	914	e650	702	679	770	1240	2990	2850	2030	765	545
19	697	887	e630	698	737	752	1210	3530	2640	1950	745	525
20	703	873	e600	679	852	759	1200	4210	2540	1850	721	518
21	715	850	e584	630	1110	769	1200	4520	2700	1750	697	496
22	734	831	e560	618	1340	799	1250	4420	3120	1650	675	501
23	769	817	e540	615	1420	827	1320	4240	3520	1580	658	491
24	770	811	e560	615	1410	854	1460	4130	3740	1510	644	492
25	744	1060	e580	607	1330	890	1640	4100	3880	1460	639	485
26	713	1650	e600	584	1250	885	1790	4040	3930	1430	629	477
27	709	1940	627	547	1190	878	1830	3870	3830	1370	626	474
28	689	1870	e655	547	1140	862	1790	3550	3660	1320	607	467
29	689	1710	e560	e530	---	847	1700	3240	3520	1270	602	461
30	687	1550	e520	e510	---	831	1620	3010	3550	1220	605	463
31	690	---	e530	e497	---	832	---	2970	---	1180	588	---
TOTAL	19318	29907	23633	18568	21764	27515	42850	83090	107980	76190	26044	15529
MEAN	623	997	762	599	777	888	1428	2680	3599	2458	840	518
MAX	770	1940	1430	705	1420	1070	1830	4520	4390	4410	1220	573
MIN	471	702	520	497	504	752	849	1210	2540	1180	588	461
AC-FT	38320	59320	46880	36830	43170	54580	84990	164800	214200	151100	51660	30800
CFSM	.93	1.49	1.14	.89	1.16	1.32	2.13	3.99	5.36	3.66	1.25	.77
IN.	1.07	1.66	1.31	1.03	1.21	1.53	2.38	4.61	5.99	4.22	1.44	.86

CAL YR 1990 TOTAL 503529 MEAN 1380 MAX 4580 MIN 471 AC-FT 998700 CFSM 2.06 IN. 27.92
WTR YR 1991 TOTAL 492388 MEAN 1349 MAX 4520 MIN 461 AC-FT 976700 CFSM 2.01 IN. 27.30

e Estimated

PEND OREILLE RIVER BASIN

12371500 FLATHEAD LAKE AT SOMERS, MT

LOCATION.--Lat 48°04'22", long 114°13'30", in NE1/4NE1/4SE1/4 sec.26, T.27 N., R.21 W., Flathead County, Hydrologic Unit 17010208, at steamboat dock at Somers.

DRAINAGE AREA.--7,086 mi².

PERIOD OF RECORD.--April to August 1900, daily lake elevations only, at site near Holt, 6 mi east of Somers (datum unknown). August 1908 to November 1909 (fragmentary), January 1910 to current year. Monthend contents only for some periods, published in WSP 1316. Prior to April 1923, published as "at Polson." Oct. 1, 1941, to current year, unpublished daily lake elevations at Polson are available in files of Helena district office.

GAGE.--Water-stage recorder. Datum of gage is at Somers datum. Subtract 1.00 ft to convert Somers datum to National Geodetic Vertical Datum of 1929, supplementary adjustment of 1947. July 1 to Dec. 12, 1923, non-recording gage at same site and datum.

REMARKS.--Natural storage in Flathead Lake increased by construction of Kerr Dam 4 mi downstream from natural lake outlet; storage began Apr. 11, 1938. Usable capacity, 1,791,000 acre-ft at controlled spillway elevation 2,893.00 ft. Dead storage unknown below 2,878 ft, elevation of natural outlet. Minimum operating level, 572,300 acre-ft, elevation, 2,883.00 ft for on-site power generation. Water is used for power production, flood control, recreation, and irrigation. Figures given herein represent usable contents.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 2,208,000 acre-ft, June 19, 1933, elevation, 2,896.26 ft; minimum, 347,000 acre-ft, Dec. 5, 1936, elevation, 2,881.07 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Lake reached an elevation of 2,900 ft during flood in June 1894.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,810,000 acre-ft, July 4, elevation, 2,893.15 ft; minimum, 843,800 acre-ft, Mar. 25, elevation, 2,885.28 ft.

Capacity table (elevation, in feet and contents, in acre-ft)

2,883	572,300	2,890	1,417,000
2,886	930,300	2,892	1,665,000
2,888	1,172,000	2,894	1,917,000

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2892.72	2891.89	2891.11	2888.62	2887.56	2885.99	2885.40	2886.67	2891.02	2893.11	2892.86	2892.85
2	2892.66	2891.90	2890.97	2888.60	2887.53	2886.06	2885.47	2886.65	2891.00	2893.04	2892.89	2892.82
3	2892.64	2891.92	2890.88	2888.57	2887.45	2886.04	2885.47	2886.65	2891.05	2893.07	2892.90	2892.76
4	2892.63	2891.91	2890.85	2888.54	2887.38	2885.97	2885.48	2886.61	2891.18	2893.11	2892.93	2892.78
5	2892.57	2891.90	2890.73	2888.52	2887.33	2885.90	2885.55	2886.53	2891.27	2893.05	2892.98	2892.81
6	2892.54	2891.90	2890.62	2888.48	2887.27	2885.83	2885.64	2886.46	2891.38	2892.90	2892.95	2892.82
7	2892.52	2891.88	2890.54	2888.46	2887.20	2885.73	2885.79	2886.45	2891.45	2892.82	2893.00	2892.85
8	2892.52	2891.87	2890.46	2888.45	2887.13	2885.65	2885.90	2886.55	2891.52	2892.84	2892.97	2892.80
9	2892.50	2891.88	2890.36	2888.45	2887.06	2885.60	2886.06	2886.63	2891.55	2892.93	2892.98	2892.80
10	2892.44	2891.79	2890.33	2888.43	2886.98	2885.55	2886.10	2886.78	2891.60	2892.94	2893.02	2892.82
11	2892.42	2891.80	2890.24	2888.43	2886.92	2885.51	2886.11	2886.92	2891.70	2892.93	2892.94	2892.84
12	2892.42	2891.81	2890.13	2888.42	2886.86	2885.47	2886.13	2887.11	2891.80	2892.92	2892.92	2892.88
13	2892.33	2891.85	2890.04	2888.43	2886.78	2885.46	2886.13	2887.36	2891.88	2892.88	2892.91	2892.93
14	2892.27	2891.87	2889.95	2888.47	2886.70	2885.44	2886.06	2887.86	2891.98	2892.90	2892.85	2892.95
15	2892.22	2891.79	2889.83	2888.44	2886.63	2885.43	2885.99	2888.29	2892.08	2893.00	2892.83	2893.00
16	2892.15	2891.74	2889.73	2888.40	2886.60	2885.42	2886.02	2888.68	2892.08	2893.00	2892.80	2892.97
17	2892.06	2891.72	2889.66	2888.34	2886.53	2885.40	2886.06	2888.99	2892.05	2893.00	2892.75	2892.97
18	2892.06	2891.65	2889.51	2888.27	2886.46	2885.38	2886.13	2889.21	2892.14	2893.09	2892.71	2892.97
19	2892.02	2891.59	2889.44	2888.24	2886.42	2885.36	2886.18	2889.56	2892.29	2892.98	2892.70	2892.99
20	2892.00	2891.55	2889.35	2888.19	2886.38	2885.35	2886.16	2890.08	2892.55	2892.95	2892.67	2893.04
21	2892.02	2891.50	2889.31	2888.14	2886.32	2885.35	2886.14	2890.48	2892.71	2892.94	2892.67	2893.00
22	2891.99	2891.46	2889.23	2888.09	2886.30	2885.34	2886.15	2890.74	2892.86	2892.88	2892.66	2893.02
23	2891.97	2891.48	2889.15	2888.04	2886.20	2885.32	2886.23	2890.88	2893.12	2892.92	2892.65	2893.02
24	2891.96	2891.38	2889.07	2887.97	2886.15	2885.36	2886.38	2891.03	2893.09	2892.93	2892.65	2892.98
25	2891.95	2891.32	2888.97	2887.94	2886.10	2885.37	2886.50	2891.12	2893.04	2892.93	2892.60	2892.94
26	2891.86	2891.36	2888.97	2887.88	2886.09	2885.43	2886.64	2891.13	2892.98	2892.92	2892.61	2892.92
27	2891.87	2891.32	2888.78	2887.84	2886.10	2885.45	2886.70	2891.13	2892.96	2892.90	2892.70	2892.89
28	2891.87	2891.29	2888.69	2887.80	2886.02	2885.43	2886.69	2891.08	2893.01	2892.86	2892.78	2892.88
29	2891.88	2891.25	2888.66	2887.73	---	2885.44	2886.69	2891.04	2893.07	2892.83	2892.80	2892.86
30	2891.88	2891.19	2888.64	2887.69	---	2885.41	2886.67	2891.07	2893.12	2892.82	2892.87	2892.86
31	2891.90	---	2888.67	2887.64	---	2885.40	---	2891.04	---	2892.80	2892.88	---
MAX	2892.72	2891.92	2891.11	2888.62	2887.56	2886.06	2886.70	2891.13	2893.12	2893.11	2893.02	2893.04
MIN	2891.86	2891.19	2888.64	2887.64	2886.02	2885.32	2885.40	2886.45	2891.00	2892.80	2892.60	2892.76
(†)	1653	1565	1254	1128	932.7	858.2	1011	1546	1806	1766	1776	1773
(††)	-105000	-88000	-311000	-126000	-195300	-74500	+152800	+535000	+260000	-40000	+10000	-3000

CAL YR 1990. . . . . †† -104000
WTR YR 1991. . . . . †† +15000

† Contents, in thousands of acre-feet, at end of month.
†† Change in contents, in acre-feet.

12372000 FLATHEAD RIVER NEAR POLSON, MT

LOCATION.--Lat 47°40'49", long 114°14'45", in SW1/4NE1/4SE1/4 sec. 11, T.22 N., R.21 W., Lake County, Hydrologic Unit 17010212, on left bank 0.5 mi downstream from Kerr Dam, 4.0 mi west of Polson, 5.0 mi downstream from Flathead Lake, and at river mile 71.5.
DRAINAGE AREA.--7,096 mi^2.
PERIOD OF RECORD.--July 1907 to current year.
REVISED RECORDS.--WSP 652: 1926. WSP 752: 1932. WSP 1182: 1948. WSP 1216: Drainage area. WSP 1246: 1928(M). WSP 1636: 1958 (adjusted runoff).
GAGE.--Water-stage recorder. Datum of gage is 2,692.70 ft above National Geodetic Vertical Datum of 1929 (levels by The Montana Power Co.). Prior to Oct. 1, 1941, nonrecording gages or water-stage recorder at several sites near highway bridge at old site of Michell's ferry 6 mi downstream from present site, all at datum 2,629.20 ft above National Geodetic Vertical Datum of 1929 (from river-profile survey).
REMARKS.--No estimated daily discharges this year. Records excellent. Flow regulated by Flathead Lake (Kerr Dam) since April 1938 (station number 12371500) and Hungry Horse Reservoir (station number 12362000) since September 1951. Diversions upstream from station for irrigation of about 10,000 acres. Flathead project pumps can divert up to 12,000 acre-ft per month when required for irrigation of lands downstream from station. Several observations of water temperature and specific conductance were made during the year.
AVERAGE DISCHARGE.--84 years, 11,640 ft^3/s, 22.28 in/yr, 8,433,000 acre-ft/yr, adjusted for change in contents in Hungry Horse Reservoir and Flathead Lake.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 82,800 ft^3/s, May 29, 1928, gage height, 17.2 ft, site and datum then in use; minimum probably less than 5.0 ft^3/s, Apr. 13, 1938; minimum daily, 32 ft^3/s, Apr. 12, 1938.
EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1894 reached a stage of about 21 ft, present datum; discharge, about 110,000 ft^3/s, from lake elevation-discharge study.
EXTREMES FOR CURRENT YEAR.--Maximum discharge, 50,300 ft^3/s, June 14, gage height, 16.00 ft; minimum daily, 4,430 ft^3/s, Aug. 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9650	11800	13000	11300	15000	13400	10900	17300	34600	32700	9950	6260
2	11600	11700	13200	11900	14900	13600	11100	17900	34900	38800	6900	4680
3	10200	12300	11900	12500	14200	13800	11400	17900	34600	33100	7580	6700
4	9730	12000	11300	12100	15100	13900	11900	17600	35000	30200	6710	7710
5	9160	11800	11400	12300	14500	13900	12300	17400	35900	35800	6220	8430
6	11800	11600	12200	12600	15000	13700	12700	17700	38100	37100	8970	8510
7	11200	10900	11400	12500	15400	13300	12600	17500	37300	36800	8450	8690
8	11000	12500	11500	11400	15800	13200	13300	17200	36700	25900	10100	9410
9	11100	11700	12500	11800	15700	13200	12600	17700	37500	20800	8770	8500
10	11100	12100	12000	11600	15500	12900	13100	16800	36500	22400	7990	6690
11	12000	12000	12000	11700	15700	12900	14000	15900	37400	23700	8650	6470
12	11200	11800	11500	11700	15500	12900	14800	16700	38400	23100	8480	6770
13	12200	11400	12300	11200	15700	12800	15100	14300	37000	21600	8510	7690
14	12400	11600	12500	10900	15800	12700	14800	12400	32300	17000	8320	8080
15	12100	12200	12000	13100	15700	12400	15000	12800	27500	11300	6320	7750
16	12100	11500	12600	14300	15600	12100	14300	15300	27000	19300	8360	8590
17	11000	10800	12600	14600	15800	12700	13000	22800	27400	19400	6970	10200
18	11600	11300	12600	14200	15600	12600	12900	29100	17800	13900	8790	11500
19	10900	11200	12400	14000	15200	12900	13700	29100	10600	23500	7800	10600
20	11800	11600	12500	14400	15300	12500	15000	29200	11300	18000	6990	11100
21	11100	11400	11100	13800	15200	12800	14800	31900	18300	12400	4820	10200
22	11700	8860	11100	14800	15300	12400	13400	34900	26800	14500	5110	11100
23	11900	7280	11700	14200	15100	11000	14300	36000	15500	13700	4610	13700
24	11100	10500	11300	14200	14900	12400	13900	37500	33900	16600	4430	14600
25	11600	11500	11700	13700	13900	9790	14700	38500	35900	16300	4800	12700
26	11900	11000	10400	13400	13000	7260	15700	38500	33600	13900	5470	12400
27	10000	12000	12600	12600	12900	11600	16900	38200	30000	11300	5810	12500
28	10900	11900	12500	14100	13100	12100	16900	38900	29000	11400	4500	12100
29	9640	11600	12400	12900	---	11900	17700	37400	29300	11900	6190	11600
30	11400	12500	11700	13000	---	12100	17600	36100	29900	12200	5950	11400
31	11800	---	10700	14200	---	12000	---	35900	---	11700	5750	---
TOTAL	346880	342340	370600	401000	420400	386750	420400	776400	910000	650300	218270	286630
MEAN	11190	11410	11950	12940	15010	12480	14010	25050	30330	20980	7041	9554
MAX	12400	12500	13200	14800	15800	13900	17700	38900	38400	38800	10100	14600
MIN	9160	7280	10400	10900	12900	7260	10900	12400	10600	11300	4430	4680
AC-FT	688000	679000	735100	795400	833900	767100	833900	1540000	1805000	1290000	432900	568500
CFSM	1.58	1.61	1.68	1.82	2.12	1.76	1.97	3.53	4.27	2.96	.99	1.35
IN.	1.82	1.79	1.94	2.10	2.20	2.03	2.20	4.07	4.77	3.41	1.14	1.50
†	-433000	-10000	-337000	-531000	-538300	-452500	+87800	+1210000	+1129000	+206000	-49000	-410000
MEAN††	4147	11243	6474	4300	5322	5116	15489	44724	49307	24330	6243	2664
CFSM††	.58	1.58	.91	.61	.75	.72	2.18	6.30	6.95	3.43	.88	.38
IN ††	.67	1.77	1.05	.70	.78	.83	2.44	7.27	7.75	3.95	1.01	.42
AC-FT††	255000	669000	398100	264400	295600	314600	921700	2750000	2934000	1496000	383900	158500

OBSERVED

CAL YR 1990	TOTAL	4978840	MEAN	13640	MAX	41000	MIN	4070	AC-FT	9876000	†+212000
WTR YR 1991	TOTAL	5529970	MEAN	15150	MAX	38900	MIN	4430	AC-FT	10970000	†-128000

ADJUSTED

CAL YR 1990	TOTAL	5085455	MEAN	13930	CFSM	1.96	IN	26.65	AC-FT	10087000
WTR YR 1991	TOTAL	5465490	MEAN	14970	CFSM	2.11	IN	28.64	AC-FT	10840800

† Change in contents, in acre-ft, in Hungry Horse Reservoir and Flathead Lake.
†† Adjusted for change in contents.

12374250 MILL CREEK ABOVE BASSOO CREEK, NEAR NIARADA, MT

LOCATION (REVISED).--Lat 47°49'47", long 114°41'48", in SE1/4NW1/4NE1/4 sec.20, T.24 N., R.24 W., Sanders County, Hydrologic Unit 17010212, Flathead Indian Reservation, on right bank 0.25 mi upstream from Bassoo Creek, and 4.1 mi northwest of Niarada.

DRAINAGE AREA.--19.6 mi^2.

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,000 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Sept. 23, 1987, at site 30 ft downstream at same datum. Prior to July 23, 1991, at site 275 ft downstream at different datum.

REMARKS.--Estimated daily discharges: Dec. 1, 7, 8, Dec. 14 to Apr. 24, July 23, 24. Records good except those greater than 10 ft^3/s, which are fair, and those for estimated daily discharges, which are poor. No known regulation or diversion upstream of station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--9 years, 8.21 ft^3/s, 5.69 in/yr, 5,950 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 113 ft^3/s, May 20, 1991, gage height, 6.83 ft, from rating curve extend above 60 ft^3/s; minimum, 0.85 ft^3/s, Jan. 6, 1988, gage height, 5.00 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 35 ft^3/s and maximums(*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 5	unknown	a50	unknown	May 20	1845	*b113	*6.83
Apr. 25	0800	70	6.46				

a--about.
b--from rating curve extended above 60 ft^3/s.

Minimum daily discharge, 1.5 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.3	3.4	e5.5	e3.0	e3.5	e9.0	e10	32	39	24	7.0	2.9
2	2.4	3.0	4.9	e3.5	e3.5	e8.0	e20	31	36	23	7.0	2.9
3	2.4	2.9	4.9	e3.5	e3.5	e8.0	e30	28	37	23	6.6	2.9
4	2.5	2.9	4.5	e3.5	e4.0	e8.5	e40	28	37	21	6.2	2.9
5	3.3	3.0	4.4	e3.0	e4.5	e9.0	e50	25	38	20	6.6	2.8
6	2.9	3.0	4.0	e3.0	e5.0	e9.0	e45	24	37	20	7.4	2.8
7	2.6	2.9	e3.5	e3.0	e5.0	e9.0	e40	25	42	19	6.2	2.8
8	2.5	2.9	e4.0	e3.0	e5.0	e8.5	e35	32	41	18	5.8	3.3
9	2.5	3.1	4.4	e3.5	e5.0	e8.0	e30	42	40	17	5.8	3.3
10	2.9	3.9	4.9	e4.0	e5.0	e8.0	e25	43	36	15	5.4	3.1
11	3.1	3.4	5.6	e4.5	e5.0	e7.5	e25	42	41	14	4.7	3.1
12	2.8	3.1	5.2	e5.0	e5.0	e7.5	e25	42	41	13	4.7	2.9
13	2.8	3.0	4.9	e5.0	e5.0	e7.5	e25	41	39	13	4.7	2.8
14	2.8	3.1	e4.5	e5.0	e5.0	e7.5	e25	41	38	12	4.4	3.1
15	2.9	3.1	e4.0	e5.0	e5.0	e7.5	e25	43	35	12	4.4	3.1
16	4.4	3.0	e4.0	e5.0	e5.0	e7.0	e25	45	35	11	4.1	2.8
17	3.3	2.9	e3.5	e4.5	e5.5	e7.0	e25	43	31	10	4.1	2.6
18	3.0	2.9	e3.0	e4.5	e6.0	e7.0	e25	55	29	10	4.1	2.6
19	3.0	2.9	e2.5	e4.5	e7.0	e7.0	e25	68	28	9.9	3.8	2.6
20	2.9	2.9	e2.0	e4.5	e10	e7.0	e30	83	28	9.3	3.5	2.4
21	3.0	2.9	e1.5	e4.0	e12	e7.0	e40	74	27	8.8	3.3	2.4
22	3.4	3.2	e2.0	e4.0	e11	e7.0	e50	65	25	8.5	3.3	2.8
23	3.0	4.6	e2.5	e4.0	e10	e7.0	e60	68	25	e8.5	3.3	2.8
24	2.8	5.6	e3.0	e4.0	e10	e7.0	e65	57	26	e8.5	3.1	2.4
25	2.8	16	e4.0	e4.0	e10	e7.5	64	54	26	8.3	3.3	2.4
26	3.0	13	e4.0	e4.0	e10	e7.5	55	54	25	8.3	3.3	2.4
27	3.0	8.1	e3.5	e4.0	e10	e7.5	44	53	24	7.8	3.3	2.3
28	2.8	6.6	e3.0	e4.0	e10	e7.5	44	45	25	7.8	3.1	2.6
29	2.9	6.0	e2.5	e4.0	---	e7.5	42	42	25	7.4	3.1	2.4
30	2.9	5.7	e2.0	e3.5	---	e7.5	35	42	22	7.0	3.1	2.3
31	3.5	---	e2.5	e3.5	---	e8.0	---	40	---	6.6	2.9	---
TOTAL	90.4	133.0	114.7	123.5	185.5	238.5	1079	1407	978	401.7	141.6	82.5
MEAN	2.92	4.43	3.70	3.98	6.62	7.69	36.0	45.4	32.6	13.0	4.57	2.75
MAX	4.4	16	5.6	5.0	12	9.0	65	83	42	24	7.4	3.3
MIN	2.3	2.9	1.5	3.0	3.5	7.0	10	24	22	6.6	2.9	2.3
AC-FT	179	264	228	245	368	473	2140	2790	1940	797	281	164
CFSM	.15	.23	.19	.20	.34	.39	1.84	2.32	1.66	.66	.23	.14
IN.	.17	.25	.22	.23	.35	.45	2.05	2.67	1.86	.76	.27	.16

CAL YR 1990 TOTAL 3746.9 MEAN 10.3 MAX 47 MIN 1.5 AC-FT 7430 CFSM .52 IN. 7.11
WTR YR 1991 TOTAL 4975.4 MEAN 13.6 MAX 83 MIN 1.5 AC-FT 9870 CFSM .70 IN. 9.44

e Estimated

12375800 LITTLE BITTERROOT RIVER NEAR PERMA, MT

LOCATION.-- Lat 47°28'45", long 114°27'17", in NW1/4NW1/4SW1/4 sec.19, T.20 N., R.22 W., Sanders County, Hydrologic Unit 17010212, Flathead Indian Reservation, 7.3 mi east of Camas Prairie, 10 mi northeast of Perma, and 11.1 mi upstream from mouth.

PERIOD OF RECORD.--Water years 1987 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRESSURE (MM OF HG) (00025)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)
NOV										
21...	1400	13	100	71	246	2.0	0.5	686	12.4	96
JAN										
23...	1030	33	100	3	260	-5.0	0.0	696	8.1	61
MAR										
06...	1330	91	100	3	288	4.0	1.0	690	12.1	94
APR										
22...	1230	121	0	0	--	18.0	14.5	689	8.7	--
JUN										
18...	1045	109	20	1	196	16.0	15.0	695	8.3	90
AUG										
20...	1200	25	0	0	254	31.0	24.0	693	7.5	98

DATE	PH (STANDARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)
NOV									
21...	8.3	76	20	6.3	27	1	3.6	117	9.0
JAN									
23...	7.5	75	20	6.1	23	1	8.1	101	19
MAR									
06...	7.8	63	16	5.6	33	2	6.3	94	32
APR									
22...	7.7	58	16	4.4	14	0.8	2.9	75	8.4
JUN									
18...	8.0	63	16	5.5	19	1	2.0	85	12
AUG									
20...	8.1	73	19	6.1	27	1	3.6	116	11

DATE	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRATE TOTAL (MG/L AS N) (00620)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
NOV									
21...	5.3	0.6	18	160	0.22	5.62	--	0.03	<0.10
JAN									
23...	8.0	0.3	21	167	0.23	14.8	0.18	0.02	0.20
MAR									
06...	9.2	0.4	17	176	0.24	43.3	0.12	0.04	0.16
APR									
22...	3.3	0.2	19	113	0.15	37.0	--	0.05	<0.05
JUN									
18...	4.3	0.3	12	122	0.17	36.0	--	0.03	<0.05
AUG									
20...	7.0	0.5	17	161	0.22	10.9	--	<0.01	<0.05

DATE	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV									
21...	0.05	0.45	0.06	0.05	60	82	56	2.0	94
JAN									
23...	0.21	0.99	0.23	0.17	40	430	36	3.2	99
MAR									
06...	0.11	1.7	0.26	0.12	40	330	426	105	99
APR									
22...	0.06	0.64	0.20	0.11	20	58	192	63	99
JUN									
18...	0.05	0.75	0.10	0.10	20	150	106	31	99
AUG									
20...	<0.01	--	0.25	0.10	60	100	119	8.0	99

12375900 SOUTH CROW CREEK NEAR RONAN, MT

LOCATION.--Lat 47°29'30", long 114°01'33", in NW1/4NE1/4SW1/4 sec.16, T.20 N., R.19 W., Lake County, Hydrologic Unit 17010212, Flathead Indian Reservation, on right bank 200 ft upstream of Pablo Feeder Canal, 2.2 mi northeast of Kicking Horse Reservoir, 4.5 mi southeast of Ronan, and at river mile 2.6.

DRAINAGE AREA.--7.57 mi^2.

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,320 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Dec. 18-28 and Mar. 2. Records good except those for estimated daily discharges, which are fair. No known regulation or diversion upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--9 years, 21.3 ft^3/s, 38.21 in/yr, 15,430 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 498 ft^3/s, June 30, 1991, gage height, 3.67 ft, from rating curve extended above 380 ft^3/s; minimum, 4.8 ft^3/s, Feb. 4, 1989, gage height, 1.66 ft, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 175 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 30	1430	*a498	*3.67	No other peak greater than peak base this year.			

a from rating curve extended above 380 ft^3/s.

Minimum daily discharge, 5.5 ft^3/s, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.0	11	8.0	6.2	6.2	6.7	6.1	11	44	255	26	11
2	7.9	9.9	7.8	6.2	6.0	e6.5	8.0	11	50	104	26	11
3	7.6	9.3	7.5	6.2	6.0	6.9	9.9	11	61	80	24	11
4	8.1	9.3	7.5	6.2	6.0	7.4	9.2	11	67	76	23	10
5	8.3	9.7	7.4	6.2	6.1	7.5	9.9	10	67	77	22	10
6	8.3	10	7.3	6.0	6.2	7.4	13	11	68	77	22	9.9
7	7.9	9.7	7.3	6.0	6.2	7.3	12	15	85	70	21	9.8
8	8.9	9.3	7.1	6.4	6.2	7.1	10	28	84	63	19	9.8
9	9.0	9.3	7.1	6.4	6.3	6.9	9.6	34	78	57	19	9.8
10	8.5	11	7.2	6.4	6.4	6.9	8.4	22	77	55	18	10
11	8.2	13	8.4	6.4	6.4	6.9	8.3	20	85	54	18	9.7
12	8.0	12	8.4	6.4	6.4	6.9	8.3	27	87	53	17	9.3
13	7.9	11	8.1	6.4	6.4	6.9	8.3	36	74	51	17	9.6
14	7.8	11	7.7	6.4	6.3	6.9	7.8	33	65	50	16	10
15	8.0	10	7.3	6.4	6.2	6.9	8.0	31	61	50	16	9.8
16	9.8	9.9	6.9	6.4	6.4	6.6	7.8	34	58	47	16	9.5
17	8.6	9.6	6.9	6.2	7.0	6.3	7.4	45	56	45	15	9.1
18	8.5	9.5	e6.5	6.2	7.1	6.2	7.2	63	52	43	15	8.8
19	9.7	9.1	e6.0	6.4	7.1	6.2	6.9	72	52	40	15	8.8
20	9.2	9.0	e6.0	6.4	8.1	6.2	7.1	65	59	36	14	8.8
21	9.1	9.0	e5.5	6.4	8.5	6.2	9.9	57	80	34	14	8.9
22	10	9.0	e6.0	6.4	8.6	6.2	13	54	84	32	14	9.1
23	9.8	8.6	e6.0	6.4	8.8	6.2	16	55	86	30	14	8.5
24	9.1	8.5	e6.0	6.4	8.1	6.2	22	60	86	29	13	8.1
25	8.8	8.6	e6.0	6.4	7.5	6.2	20	64	85	28	13	8.0
26	8.9	8.8	e6.0	6.4	7.3	6.2	17	56	83	28	13	8.0
27	9.0	8.8	e6.0	6.4	7.3	6.2	15	50	75	27	12	8.0
28	9.0	8.6	e6.0	6.3	7.3	6.2	14	45	71	26	12	7.8
29	9.0	8.5	6.1	6.1	---	6.2	12	43	68	24	12	7.8
30	9.0	8.4	6.2	6.2	---	6.0	12	46	225	24	12	7.8
31	9.4	---	6.2	6.2	---	6.0	---	48	---	23	11	---
TOTAL	269.3	289.4	212.4	195.4	192.4	204.4	324.1	1168	2273	1688	519	277.7
MEAN	8.69	9.65	6.85	6.30	6.87	6.59	10.8	37.7	75.8	54.5	16.7	9.26
MAX	10	13	8.4	6.4	8.8	7.5	22	72	225	255	26	11
MIN	7.6	8.4	5.5	6.0	6.0	6.0	6.1	10	44	23	11	7.8
AC-FT	534	574	421	388	382	405	643	2320	4510	3350	1030	551
CFSM	1.15	1.27	.91	.83	.91	.87	1.43	4.98	10.0	7.19	2.21	1.22
IN.	1.32	1.42	1.04	.96	.95	1.00	1.59	5.74	11.17	8.30	2.55	1.36

CAL YR 1990 TOTAL 8168.7 MEAN 22.4 MAX 177 MIN 5.5 AC-FT 16200 CFSM 2.96 IN. 40.14
WTR YR 1991 TOTAL 7613.1 MEAN 20.9 MAX 255 MIN 5.5 AC-FT 15100 CFSM 2.76 IN. 37.41

e Estimated

PEND OREILLE RIVER BASIN

12376900 CROW CREEK AT MOUTH NEAR RONAN, MT

LOCATION.--Lat 47°28'14", long 114°16'41", in NE1/4NE1/4NW1/4 sec.28, T.20 N., R.21 W., Lake County, Hydrologic Unit 17010212, Flathead Indian Reservation, 0.2 mi upstream from mouth, 7.9 mi southwest of Ronan on Moiese Valley Road.

PERIOD OF RECORD.--Water years 1987 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)
OCT												
18...	1305	28	--	--	277	10.0	8.5	--	--	--	--	--
NOV												
21...	0930	84	100	3	264	-1.0	4.5	689	11.6	99	8.4	130
JAN												
23...	1230	50	100	3	332	0.0	2.0	698	12.9	102	8.1	150
MAR												
06...	1700	49	100	3	335	2.0	5.0	693	12.0	103	8.5	150
APR												
22...	1500	24	25	1	286	23.0	13.5	690	9.8	104	8.4	140
JUN												
18...	1500	28	20	1	172	22.0	18.0	697	9.7	112	9.1	84
AUG												
20...	1530	30	0	0	194	36.0	25.5	694	8.0	108	9.0	92

DATE	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)
OCT												
18...	--	--	--	--	--	--	--	--	--	--	--	--
NOV												
21...	35	9.4	7.0	0.3	2.1	3.4	3.1	0.3	4.0	146	0.20	33.1
JAN												
23...	43	11	10	0.4	3.3	6.1	5.9	<0.1	9.3	188	0.26	25.3
MAR												
06...	41	12	15	0.5	3.7	9.7	4.7	<0.1	9.7	198	0.27	26.2
APR												
22...	36	11	9.3	0.3	2.5	3.4	3.0	<0.1	7.5	161	0.22	10.4
JUN												
18...	23	6.5	5.7	0.3	1.5	3.0	2.6	0.1	3.6	101	0.14	7.65
AUG												
20...	26	6.5	5.6	0.3	1.4	2.9	0.90	<0.1	6.9	112	0.15	9.07

DATE	NITRO-GEN, NITRATE TOTAL (MG/L AS N) (00620)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT												
18...	--	--	--	--	--	--	--	--	--	--	--	--
NOV												
21...	0.19	0.01	0.20	0.06	0.24	<0.01	<0.01	<10	14	12	2.7	90
JAN												
23...	0.68	0.02	0.70	0.12	0.68	0.04	0.04	60	27	14	1.9	84
MAR												
06...	0.54	0.01	0.55	0.03	0.47	0.07	0.02	10	19	18	2.4	92
APR												
22...	0.33	0.01	0.34	0.03	0.37	0.04	<0.01	<10	5	24	1.6	95
JUN												
18...	--	0.01	<0.05	0.02	0.58	0.04	0.02	<10	57	8	0.60	98
AUG												
20...	0.07	0.01	0.08	0.02	0.48	0.10	0.05	<10	11	8	0.65	81

PEND OREILLE RIVER BASIN

12377150 MISSION CREEK ABOVE RESERVOIR, NEAR ST. IGNATIUS, MT

LOCATION.--Lat 47°19'23", long 113°58'43", in NW1/4SW1/4NE1/4 sec.14, T.18 N., R.19 W., Lake County, Hydrologic Unit 17010212, Flathead Indian Reservation, on right bank, 0.2 mi southwest of upper BIA campground, 0.5 mi upstream from Mission Reservoir, and 5.3 mi east of St. Ignatius.

DRAINAGE AREA.--12.4 mi^2.

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,460 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Dec. 18-31, Jan. 25-30, and Mar. 1-2. Records good except those for estimated daily discharges, which are fair. Several observations of water temperature and specific conductance were made during the year. No known regulation or diversions upstream from station.

AVERAGE DISCHARGE.--9 years, 49.5 ft^3/s, 54.21 in/yr, 35,860 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 706 ft^3/s, June 30, 1991, gage height, 4.72 ft; maximum gage height, 5.16 ft, backwater from debris dam; minimum discharge, 5.9 ft^3/s, Feb. 18, 1985, gage height, 0.72 ft, but may have been less during period of ice effect.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 300 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 07	1015	393	3.62	June 30	1430	*706	4.72
June 21	0915	308	3.27	June 30	1500	a	*5.16

a--backwater from debris dam.

Minimum daily discharge, 7.5 ft^3/s, Dec. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	23	14	11	8.3	e8.5	8.6	16	100	396	85	33
2	20	22	14	11	8.3	e8.0	9.9	16	132	274	91	32
3	20	20	14	11	8.3	8.6	11	15	204	260	74	31
4	20	22	14	10	8.6	9.0	12	14	211	286	68	29
5	22	23	14	10	9.1	9.2	12	14	178	297	64	28
6	22	23	14	9.9	9.3	8.8	14	14	221	256	62	28
7	20	20	13	9.9	9.0	8.8	14	16	357	203	59	27
8	19	20	13	9.9	8.8	9.0	13	29	237	177	59	27
9	19	20	13	9.9	8.8	9.0	12	46	184	166	58	28
10	19	20	14	9.9	8.6	9.0	12	38	188	172	58	27
11	19	20	14	10	8.3	8.7	11	36	251	165	57	26
12	18	19	14	10	8.4	8.5	11	50	255	153	52	25
13	18	19	13	10	8.5	8.7	11	59	190	158	48	25
14	18	20	13	10	8.6	8.6	10	54	150	176	46	29
15	19	20	12	11	8.7	8.5	10	51	121	152	44	28
16	22	19	12	11	10	8.5	9.9	55	112	147	42	26
17	20	18	12	11	11	8.3	9.7	89	104	147	41	25
18	19	18	e11	11	11	8.0	9.5	207	99	125	41	24
19	20	17	e11	12	11	8.0	9.3	228	103	107	42	23
20	19	17	e10	11	12	8.1	9.3	194	160	101	42	23
21	19	17	e9.5	10	11	8.3	10	152	285	98	42	22
22	21	17	e9.0	9.9	11	8.3	12	139	257	98	41	22
23	19	17	e9.0	9.6	10	8.3	16	153	249	103	40	21
24	18	16	e9.5	9.6	9.6	8.1	21	150	229	112	39	21
25	17	16	e10	e9.5	9.2	8.3	25	160	206	110	37	20
26	19	16	e10	e9.0	8.9	8.1	24	134	206	97	35	20
27	19	16	e10	e8.5	8.9	8.0	22	106	195	89	34	20
28	19	15	e9.0	e8.5	8.9	8.0	20	90	204	84	35	20
29	19	15	e7.5	e8.0	---	8.3	19	79	197	81	33	19
30	19	15	e9.0	e8.5	---	8.3	17	93	449	79	32	19
31	21	---	e10	8.5	---	8.3	---	100	---	76	32	---
TOTAL	603	560	361.5	309.1	262.1	262.1	405.2	2597	6034	4945	1533	748
MEAN	19.5	18.7	11.7	9.97	9.36	8.45	13.5	83.8	201	160	49.5	24.9
MAX	22	23	14	12	12	9.2	25	228	449	396	91	33
MIN	17	15	7.5	8.0	8.3	8.0	8.6	14	99	76	32	19
AC-FT	1200	1110	717	613	520	520	804	5150	11970	9810	3040	1480
CFSM	1.57	1.51	.94	.80	.75	.68	1.09	6.76	16.2	12.9	3.99	2.01
IN.	1.81	1.68	1.08	.93	.79	.79	1.22	7.79	18.10	14.83	4.60	2.24

CAL YR 1990 TOTAL 19952.0 MEAN 54.7 MAX 374 MIN 7.5 AC-FT 39570 CFSM 4.41 IN. 59.86
WTR YR 1991 TOTAL 18620.0 MEAN 51.0 MAX 449 MIN 7.5 AC-FT 36930 CFSM 4.11 IN. 55.86

e Estimated

PEND OREILLE RIVER BASIN

12379600 MISSION CREEK AT NATIONAL BISON RANGE AT MOIESE, MT

LOCATION.--Lat 47°22'11", long 114°14'58", in NW1/4NE1/4NE1/4 sec.34, T.19N., R.21W., Lake County, Hydrologic Unit 17010212, Flathead Indian Reservation, on the National Bison Range, 0.7 mi east of Moiese, and 4.5 mi upstream from mouth.

PERIOD OF RECORD.--Water years 1987 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
NOV										
20...	1400	155	100	3	--	5.0	5.5	683	12.0	--
JAN										
23...	1430	128	100	3	310	-1.0	2.5	698	12.5	100
MAR										
04...	1130	168	100	51	352	8.0	5.5	676	11.5	103
APR										
23...	1600	112	50	2	271	23.0	14.5	686	11.0	120
JUN										
19...	1000	141	100	3	241	14.0	12.5	693	9.4	97
AUG										
19...	1200	201	25	1	237	16.0	14.0	696	10.4	111

DATE	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
NOV									
20...	8.4	150	36	14	7.6	0.3	1.1	157	3.5
JAN									
23...	8.2	150	37	14	8.6	0.3	1.5	162	4.1
MAR									
04...	7.8	150	36	15	14	0.5	2.2	161	8.3
APR									
23...	8.8	150	35	14	7.4	0.3	1.0	153	4.4
JUN									
19...	8.2	130	32	11	6.1	0.2	1.0	130	2.8
AUG									
19...	8.1	110	29	10	5.9	0.2	1.7	126	3.0

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE TOTAL (MG/L AS N) (00620)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
NOV									
20...	2.8	0.2	8.8	168	0.23	70.4	--	<0.01	0.30
JAN									
23...	3.3	<0.1	10	176	0.24	60.7	--	<0.01	0.40
MAR									
04...	4.1	<0.1	9.0	185	0.25	84.0	--	<0.01	0.36
APR									
23...	0.60	<0.1	7.2	161	0.22	48.8	--	<0.01	0.18
JUN									
19...	0.30	0.1	7.1	138	0.19	52.7	0.06	0.01	0.07
AUG									
19...	0.70	<0.1	9.1	135	0.18	73.3	--	<0.01	<0.05

12379600 MISSION CREEK AT NATIONAL BISON RANGE AT MOIESE, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV									
20...	0.04	--	<0.01	<0.01	<10	<3	11	4.6	93
JAN									
23...	0.04	--	0.02	0.02	<10	8	46	16	97
MAR									
04...	0.02	0.58	0.04	<0.01	<10	16	58	26	91
APR									
23...	0.01	0.19	0.01	<0.01	10	5	14	4.2	94
JUN									
19...	0.02	0.38	0.01	0.02	10	20	34	13	94
AUG									
19...	0.01	0.49	0.07	0.01	<10	25	15	8.1	92

PEND OREILLE RIVER BASIN

12381400 SOUTH FORK JOCKO RIVER NEAR ARLEE, MT

LOCATION.--Lat 47°11'44", long 113°50'59", in NE1/4NW1/4NE1/4 sec.35, T.17 N., R.18 W., Lake County, Hydrologic Unit 17010212, Flathead Indian Reservation, on right bank 600 ft upstream from confluence with Jocko River and Twin Campground and 12 mi northeast of Arlee, MT.

DRAINAGE AREA.--56.0 mi^2.

PERIOD OF RECORD.--October 1982 to current year. Records published as "near Jocko" 1912-16 and in WSP 1246, 1316 are not equivalent.

GAGE.--Water-stage recorder. Elevation of gage is 3,970 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Dec. 1 to Feb. 3, Mar. 1-6. Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year. No known regulation or diversion upstream from station.

AVERAGE DISCHARGE.--9 years, 56.7 ft^3/s, 13.75 in/yr, 41,080 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 596 ft^3/s, May 10, 1989, gage height, 3.54 ft; maximum gage height, 4.98 ft, Feb. 15, 1989, backwater from ice; minimum daily discharge, 2.0 ft^3/s, Feb. 4, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 19	0700	*553	*3.41	No other peak greater than base discharge this year.			

Minimum discharge, 2.1 ft^3/s, Mar. 14, gage height, 0.69 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	25	e18	e6.0	e10	e12	13	46	267	157	62	29
2	24	22	e17	e9.0	e11	e10	16	45	284	143	62	29
3	24	20	e16	e11	e12	e11	18	43	311	134	58	28
4	26	21	e15	e11	12	e12	21	42	306	129	55	30
5	29	21	e15	e10	12	e13	27	42	290	127	54	28
6	27	21	e15	e9.0	12	e14	36	48	283	121	55	26
7	24	20	e15	e10	11	14	36	58	350	118	50	27
8	23	20	e15	e11	11	13	33	82	308	114	49	30
9	22	21	e15	e11	11	12	30	121	287	109	48	34
10	24	27	e15	e11	11	13	28	111	276	105	46	30
11	23	26	e15	e11	11	12	26	114	285	103	46	29
12	23	23	e15	e11	12	12	24	142	274	99	45	27
13	23	21	e14	e12	12	12	24	152	249	95	44	29
14	22	22	e12	e12	11	11	24	167	232	94	42	39
15	23	21	e10	e13	11	12	24	187	216	92	42	34
16	26	20	e10	e12	15	11	23	211	208	88	40	30
17	23	19	e10	e12	15	10	23	283	196	85	41	29
18	23	19	e7.0	e13	14	10	23	491	184	85	40	28
19	26	19	e4.5	e14	14	12	23	524	179	82	38	27
20	23	19	e4.0	e14	18	11	24	450	202	78	36	26
21	23	18	e3.5	e13	16	11	29	373	203	75	36	25
22	28	18	e4.0	e12	14	11	36	352	189	73	35	26
23	24	18	e5.0	e11	14	11	48	363	181	71	34	25
24	22	18	e6.0	e10	14	11	63	361	179	69	34	24
25	22	22	e8.0	e10	13	11	69	365	170	67	33	24
26	24	22	e10	e9.0	13	11	66	310	163	67	32	24
27	24	19	e10	e10	13	11	61	273	155	64	33	23
28	22	18	e9.0	e10	13	11	55	251	150	62	39	23
29	22	18	e8.0	e9.0	---	11	51	237	145	61	35	24
30	21	18	e5.0	e10	---	10	48	263	157	59	32	23
31	22	---	e5.0	e10	---	11	---	265	---	58	31	---
TOTAL	732	616	331.0	337.0	356	357	1022	6772	6879	2884	1327	830
MEAN	23.6	20.5	10.7	10.9	12.7	11.5	34.1	218	229	93.0	42.8	27.7
MAX	29	27	18	14	18	14	69	524	350	157	62	39
MIN	20	18	3.5	6.0	10	10	13	42	145	58	31	23
AC-FT	1450	1220	657	668	706	708	2030	13430	13640	5720	2630	1650
CFSM	.42	.37	.19	.19	.23	.21	.61	3.90	4.09	1.66	.76	.49
IN.	.49	.41	.22	.22	.24	.24	.68	4.50	4.57	1.92	.88	.55

CAL YR 1990 TOTAL 22513.0 MEAN 61.7 MAX 305 MIN 3.5 AC-FT 44650 CFSM 1.10 IN. 14.96
WTR YR 1991 TOTAL 22443.0 MEAN 61.5 MAX 524 MIN 3.5 AC-FT 44520 CFSM 1.10 IN. 14.91

e Estimated

PEND OREILLE RIVER BASIN

12383500 BIG KNIFE CREEK NEAR ARLEE, MT

LOCATION.--Lat 47°08'51", long 113°58'24", in NW1/4SW1/4NW/4 sec.14, T.16 N., R.19 W., Lake County, Hydrologic Unit 17020212, Flathead Indian Reservation, on left bank, 150 ft upstream of S Canal, 1 mi upstream of mouth, and 5.5 mi east of Arlee.

DRAINAGE AREA.--6.88 mi^2.

PERIOD OF RECORD.--August 1910 to September 1916 (no winter records), October 1982 to current year. Monthly discharge only for some periods, published in WSP 1316. Published as "near Jocko" 1910-16 and in WSP 916, and as "above Big Knife Canal, near Jocko" in WSP 1246, 1316.

REVISED RECORDS.--WSP 1246: 1916. WSP 1316: 1910-12, 1915-16.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 3,720 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Dec. 19 to Jan. 30, Mar. 1, 2. Records good except those for estimated discharges, which are fair. Several observations of water temperature and specific conductance were made during the year. No known regulation or diversion upstream from station.

AVERAGE DISCHARGE.--9 years, 10.6 ft^3/s, 20.92 in/yr, 7,680 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 78 ft^3/s, June 30, 1916, gage height, 3.65 ft, site and datum then in use; minimum, 1.3 ft^3/s, Feb. 4, 1989, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 32 ft^3/s, June 30, gage height, 1.54 ft; maximum gage height, 2.50 ft, Dec. 24, backwater from ice; minimum discharge, 3.6 ft^3/s, Apr. 12-22, May 6, gage height, 1.03 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.1	7.9	6.1	e6.0	6.1	e4.5	3.9	4.1	18	32	16	11
2	8.5	7.8	6.1	e6.0	6.1	e4.5	4.0	4.1	20	29	15	11
3	8.3	7.3	6.1	e6.0	6.1	4.7	3.9	4.1	24	28	15	11
4	8.3	7.4	6.1	e6.0	5.8	4.8	3.9	4.1	25	26	15	10
5	8.3	7.6	6.1	e5.5	5.6	4.5	3.9	4.1	24	25	14	10
6	8.3	7.6	6.1	e5.5	5.5	4.4	4.0	3.9	25	24	14	10
7	8.3	7.6	5.8	e5.5	5.5	4.4	4.1	4.0	30	23	14	10
8	8.3	7.6	5.8	e5.5	5.5	4.4	4.1	5.3	28	21	14	10
9	8.3	7.6	5.8	e6.0	5.5	4.4	4.1	6.5	26	21	14	10
10	8.3	7.6	5.8	e6.0	5.4	4.4	4.1	8.5	26	20	14	10
11	8.3	7.6	5.8	e6.0	5.2	4.1	4.1	7.8	28	20	14	9.5
12	8.3	7.6	5.8	e6.0	5.2	4.1	3.8	8.1	28	20	13	9.2
13	8.3	7.3	5.8	e6.5	5.2	4.1	3.6	8.8	26	19	13	9.2
14	8.3	7.2	5.8	e6.5	5.2	4.1	3.6	8.8	24	19	13	10
15	8.3	7.2	5.8	e6.5	5.4	4.1	3.6	9.2	22	19	13	9.3
16	8.3	7.2	5.8	e6.5	5.9	4.1	3.6	10	21	19	13	9.2
17	8.3	7.0	5.8	e6.5	5.3	4.1	3.6	13	20	19	13	9.2
18	8.2	6.5	5.9	e6.5	5.2	4.1	3.6	20	19	18	13	9.2
19	7.9	6.5	e5.5	e6.5	5.2	4.1	3.6	24	19	17	13	8.9
20	7.9	6.5	e5.0	e6.0	5.8	4.1	3.6	24	24	17	13	8.8
21	7.9	6.5	e4.5	e6.0	5.6	4.1	3.6	21	26	17	12	8.8
22	7.9	6.5	e4.0	e6.0	5.2	3.9	3.6	21	27	17	12	8.8
23	7.6	6.5	e4.5	e6.0	5.2	3.9	4.0	21	26	17	12	8.8
24	7.6	6.2	e5.0	e6.0	5.2	3.9	4.1	21	27	17	12	8.8
25	7.6	6.5	e5.5	e6.0	4.9	3.9	4.1	22	25	17	12	8.8
26	7.6	6.4	e5.5	e5.5	4.9	3.9	4.1	19	25	17	12	8.8
27	7.6	6.0	e6.0	e6.0	4.9	3.9	4.3	16	24	16	12	8.4
28	7.6	5.9	e5.5	e6.0	4.6	3.9	4.4	14	24	16	12	8.3
29	7.6	6.1	e4.5	e5.5	---	3.9	4.4	13	24	16	12	8.3
30	7.6	6.1	e5.0	e6.0	---	3.9	4.3	15	30	15	11	8.3
31	7.8	---	e5.5	6.1	---	3.9	---	16	---	15	11	---
TOTAL	250.5	209.3	172.3	186.6	151.2	129.1	117.6	381.4	735	616	406	281.6
MEAN	8.08	6.98	5.56	6.02	5.40	4.16	3.92	12.3	24.5	19.9	13.1	9.39
MAX	9.1	7.9	6.1	6.5	6.1	4.8	4.4	24	30	32	16	11
MIN	7.6	5.9	4.0	5.5	4.6	3.9	3.6	3.9	18	15	11	8.3
AC-FT	497	415	342	370	300	256	233	757	1460	1220	805	559
CFSM	1.17	1.01	.81	.87	.78	.61	.57	1.79	3.56	2.89	1.90	1.36
IN.	1.35	1.13	.93	1.01	.82	.70	.64	2.06	3.97	3.33	2.20	1.52

CAL YR 1990 TOTAL 3922.9 MEAN 10.7 MAX 38 MIN 2.9 AC-FT 7780 CFSM 1.56 IN. 21.21
WTR YR 1991 TOTAL 3636.6 MEAN 9.96 MAX 32 MIN 3.6 AC-FT 7210 CFSM 1.45 IN. 19.66

e Estimated

12387450 VALLEY CREEK NEAR ARLEE, MT

LOCATION.--Lat 47°10'13", long 114°13'47", in NE1/4SE1/4SE1/4 sec.3, T.16 N., R.21 W., Sanders County, Hydrologic Unit 17010212, Flathead Indian Reservation, on right bank, 1.4 mi upstream of East Fork, 6.7 mi west of Arlee, and 7.4 mi southwest of Ravalli.

DRAINAGE AREA.--15.3 mi^2.

PERIOD OF RECORD.--October 1982 to current season (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 3,450 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 25-30. Seasonal records good. No known regulation or diversion upstream from station. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 96 ft^3/s, May 19, 1991, gage height, 2.86 ft; maximum gage height, 2.97 ft, May 26, 1983; minimum daily discharge, 5.5 ft^3/s, Apr. 1, 1988.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 96 ft^3/s, May 19, gage height, 2.86 ft; minimum daily, 7.5 ft^3/s, Nov. 27-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.8	8.5					8.5	10	33	23	13	10
2	7.9	8.3					9.2	10	36	21	13	10
3	8.1	8.3					9.2	10	43	21	12	10
4	8.1	8.4					9.6	10	40	20	12	10
5	8.5	8.4					11	10	36	19	12	10
6	8.3	8.1					11	10	37	18	12	10
7	8.3	8.1					11	11	53	18	12	10
8	8.1	8.1					10	16	46	17	12	10
9	8.1	8.3					10	21	40	17	11	10
10	8.3	8.5					9.8	19	39	16	11	10
11	8.1	8.3					9.6	18	42	16	11	10
12	8.3	8.1					9.4	20	36	15	11	10
13	8.4	8.0					9.4	22	31	15	11	10
14	8.3	8.0					9.4	25	28	15	11	11
15	8.5	7.9					9.4	25	26	15	11	10
16	8.7	7.9					9.4	26	26	15	11	10
17	8.4	7.9					8.9	33	24	15	11	9.8
18	8.4	7.9					7.8	77	22	14	11	9.8
19	8.5	7.8					7.9	90	24	14	11	9.8
20	8.4	7.8					8.1	72	29	14	11	9.6
21	8.9	7.8					8.7	63	29	14	11	9.6
22	9.3	8.3					9.4	59	31	13	11	9.6
23	8.6	8.4					10	57	31	13	11	9.4
24	8.6	8.7					12	55	29	13	10	9.4
25	8.5	e8.5					12	54	30	13	10	9.4
26	8.6	e8.0					11	46	28	13	10	9.3
27	8.5	e7.5					11	38	26	13	10	9.3
28	8.4	e7.5					11	32	26	12	10	9.2
29	8.4	e7.5					10	31	25	12	10	9.0
30	8.3	e7.5					10	35	25	12	10	9.0
31	8.5	---					---	32	---	12	10	---
TOTAL	260.1	242.3					293.7	1037	971	478	343	293.2
MEAN	8.39	8.08					9.79	33.5	32.4	15.4	11.1	9.77
MAX	9.3	8.7					12	90	53	23	13	11
MIN	7.8	7.5					7.8	10	22	12	10	9.0
AC-FT	516	481					583	2060	1930	948	680	582
CFSM	.55	.53					.64	2.19	2.12	1.01	.72	.64
IN.	.63	.59					.71	2.52	2.36	1.16	.83	.71

e Estimated

PEND OREILLE RIVER BASIN

12388200 JOCKO RIVER AT DIXON, MT

LOCATION.--Lat 47°18'43", long 114°17'48", in NW1/4NW1/4NE1/4 sec. 20, T.18 N., R.21 W., Sanders County, Hydrologic Unit 17010212, Flathead Indian Reservation, on right bank 38 ft downstream of State Highway 212 bridge, 0.8 mi east of Dixon, and at river mile 0.8.

DRAINAGE AREA.--380 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1990 to current year. Miscellaneous measurements made at this site 1977 and 1987 water years.

GAGE.--Water-stage recorder. Datum of gage is 2,521.87 ft above National Geodetic Vertical Datum of 1933, supplementary adjustment of 1957.

REMARKS.--Estimated daily discharges: Dec. 19 to Jan. 11, Jan. 26 to Feb. 6, Apr. 14-24. Records good except those for estimated daily discharges, which are poor. Some regulation and diversion upstream from gage for irrigation. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,130 ft^3/s, May 19, 1991, gage height, 3.35 ft; minimum daily, 95 ft^3/s, Dec. 30, 1990.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,130 ft^3/s, May 19, gage height, 3.35 ft; minimum daily, 95 ft^3/s, Dec. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	192	216	178	e125	e135	131	124	136	468	675	186	164
2	195	204	178	e135	e135	129	134	126	486	688	192	161
3	198	201	180	e130	e140	141	141	129	566	669	178	159
4	201	204	186	e120	e143	156	143	129	595	669	175	159
5	204	213	183	e115	e140	166	153	124	560	644	172	161
6	210	210	183	e110	e138	153	172	122	566	551	175	159
7	207	204	178	e110	134	148	183	122	715	510	175	161
8	204	204	178	e115	131	146	178	138	656	478	172	169
9	198	201	180	e115	131	143	175	185	586	431	169	175
10	195	207	180	e115	129	141	169	198	554	390	172	175
11	195	216	183	e110	129	136	164	195	589	346	175	175
12	195	213	180	105	129	136	161	216	595	313	175	168
13	201	210	175	124	129	141	159	246	543	290	175	169
14	201	210	175	143	129	138	e160	257	499	278	175	192
15	201	210	169	141	131	137	e150	267	465	275	172	192
16	210	204	166	138	138	134	e145	286	458	257	172	192
17	204	201	172	136	146	131	e140	346	428	243	172	198
18	199	198	178	136	141	129	e135	712	399	243	172	198
19	201	195	e180	138	138	131	e130	1030	386	233	168	195
20	201	194	e170	134	148	134	e130	928	443	213	168	192
21	198	189	e150	131	151	134	e140	735	510	207	169	186
22	207	186	e130	124	146	131	e150	675	502	204	169	195
23	204	186	e110	129	143	129	e155	678	494	186	164	192
24	198	186	e120	131	141	129	e165	669	499	175	161	192
25	195	189	e125	126	138	131	183	669	499	169	164	195
26	198	195	e140	e124	136	131	183	634	494	178	166	192
27	204	189	e130	e124	136	129	175	560	473	172	169	192
28	201	186	e120	e130	134	129	166	504	468	172	180	189
29	198	183	e100	e125	---	129	159	452	465	168	175	189
30	195	183	e95	e130	---	126	148	478	526	166	166	186
31	201	---	e110	e130	---	126	---	488	---	166	164	---
TOTAL	6211	5987	4882	3899	3839	4225	4670	12434	15487	10359	5337	5422
MEAN	200	200	157	126	137	136	156	401	516	334	172	181
MAX	210	216	186	143	151	166	183	1030	715	688	192	198
MIN	192	183	95	105	129	126	124	122	386	166	161	159
AC-FT	12320	11880	9680	7730	7610	8380	9260	24660	30720	20550	10590	10750

WTR YR 1991 TOTAL 82752 MEAN 227 MAX 1030 MIN 95 AC-FT 164100

e Estimated

PEND OREILLE RIVER BASIN

12388200 JOCKO RIVER AT DIXON, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1987 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
OCT										
18...	1140	203	--	--	260	11.0	7.5	--	--	--
NOV										
20...	1130	195	100	3	--	1.0	4.5	683	11.7	--
JAN										
02...	1130	138	--	--	251	-6.0	2.0	--	--	--
24...	0930	131	100	73	239	-1.0	1.5	698	12.5	97
MAR										
04...	1430	156	100	51	249	5.0	6.0	675	11.6	105
15...	1045	140	--	--	238	6.0	5.5	--	--	--
APR										
24...	1100	164	100	3	206	13.0	9.5	687	10.7	104
MAY										
23...	1532	705	--	--	153	--	--	--	--	--
JUN										
19...	0730	381	100	3	178	14.0	10.5	693	10.8	107
JUL										
09...	1530	445	--	--	182	26.0	12.0	--	--	--
AUG										
19...	1530	169	75	2	254	34.0	18.0	696	9.4	109

DATE	TIME	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)
NOV									
20...	1130	8.1	120	33	10	3.7	0.1	1.0	129
JAN									
24...	0930	8.0	130	34	10	3.9	0.2	1.0	132
MAR									
04...	1430	8.1	120	31	9.7	3.7	0.1	1.0	120
APR									
24...	1100	8.3	100	28	8.5	3.4	0.1	1.0	110
JUN									
19...	0730	8.1	100	28	7.4	2.5	0.1	0.8	103
AUG									
19...	1530	8.4	130	34	11	4.0	0.2	1.0	138

DATE	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
NOV									
20...	2.5	2.1	0.3	9.7	140	0.19	73.5	<0.01	0.10
JAN									
24...	2.2	0.2	<0.1	9.8	140	0.19	49.6	<0.01	0.20
MAR									
04...	2.5	2.1	<0.1	9.6	132	0.18	55.4	<0.01	0.13
APR									
24...	2.3	2.0	0.1	9.9	121	0.16	53.7	<0.01	0.07
JUN									
19...	2.1	0.4	0.1	8.6	112	0.15	115	<0.01	<0.05
AUG									
19...	2.8	0.6	<0.1	9.3	145	0.20	66.4	<0.01	<0.05

12388200 JOCKO RIVER AT DIXON, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV									
20...	0.03	--	0.03	0.03	<10	<3	3	1.6	80
JAN									
24...	<0.01	--	<0.01	0.01	<10	7	8	2.8	86
MAR									
04...	<0.01	--	0.01	<0.01	<10	6	9	3.8	86
APR									
24...	0.01	0.19	0.01	<0.01	<10	8	15	6.6	83
JUN									
19...	0.04	0.76	<0.01	<0.01	<10	10	12	12	86
AUG									
19...	<0.01	--	0.01	<0.01	<10	<3	5	2.3	66

PEND OREILLE RIVER BASIN

12388400 REVAIS CREEK BELOW WEST FORK, NEAR DIXON, MT

LOCATION(REVISED).--Lat 47°15'59", long 114°24'21", in SE1/4NE1/4NW1/4 sec.4, T.17 N., R.22 W., Sanders County, Hydrologic Unit 17010212, Flathead Indian Reservation, on right bank, 0.3 mi downstream of West Fork, 7.3 mi southwest of Dixon, and at river mile 5.2.

DRAINAGE AREA.--23.4 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 3,420 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Dec. 15, 16, Dec. 18 to Jan. 12, Mar. 1, 2. Water-discharge records good except those for estimated daily discharges, which are poor. No known regulation or diversion upstream of station.

AVERAGE DISCHARGE.--9 years, 17.5 ft ^{3}/s, 10.16 in/yr, 12,680 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 277 ft^3/s, May 18, 1991, gage height, 4.05 ft, from rating curve extended above 180 ft^3/s; maximum gage height, 6.93 ft, Dec. 5, 1984, backwater from ice; minimum daily discharge, 2.5 ft^3/s, Feb. 4, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 70 ft ^{3}/s and maximums(*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 18	0530	*a277	*4.05	June 7	2000	146	3.64
June 3	0500	131	3.58				

a--from rating curve extended above 180 ft^3/s.

Minimum daily discharge, 3.0 ft ^{3}/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.9	6.3	5.4	e5.0	3.6	e3.5	4.9	15	75	53	13	5.7
2	5.1	5.7	5.4	e5.0	3.6	e4.5	6.4	15	95	52	12	5.7
3	5.1	5.7	5.4	e5.0	3.7	4.8	6.6	15	119	49	11	5.4
4	5.1	5.7	5.4	e5.0	3.8	6.0	7.5	15	104	47	11	5.6
5	5.8	5.7	5.4	e5.0	4.1	5.8	11	14	88	43	11	5.4
6	5.3	5.7	5.2	e5.0	4.4	4.5	15	14	85	39	11	5.1
7	5.1	5.7	5.1	e5.0	4.2	4.2	14	18	138	37	11	5.1
8	5.1	5.7	5.1	e5.0	4.2	4.2	11	41	125	35	10	5.1
9	5.1	5.7	5.1	e5.0	4.2	4.2	11	66	106	31	8.8	5.4
10	5.1	5.7	5.2	e5.0	4.2	4.2	9.9	54	97	31	8.8	5.4
11	5.1	5.7	5.6	e5.0	4.0	4.0	8.4	47	107	30	8.4	5.1
12	5.1	5.7	5.4	e5.0	4.0	4.0	8.1	58	96	28	8.4	5.1
13	5.3	5.7	5.1	4.9	4.0	4.0	7.8	64	76	26	8.1	5.5
14	5.4	5.7	5.1	4.6	4.0	4.0	7.7	71	68	24	8.1	6.8
15	5.6	5.7	e4.5	4.6	4.0	4.0	7.7	70	58	23	8.1	6.2
16	7.3	5.7	e4.5	4.6	4.3	4.0	7.7	70	58	22	8.0	5.4
17	5.8	5.7	4.9	4.6	4.5	3.8	7.7	112	54	21	7.9	5.4
18	5.7	5.7	e5.0	4.6	4.4	3.6	7.7	205	52	19	7.8	5.1
19	5.7	5.7	e4.5	4.6	4.2	3.6	7.8	187	50	19	7.7	5.1
20	5.7	5.7	e4.0	4.5	4.9	3.7	8.3	163	53	18	7.6	5.1
21	5.9	5.5	e3.5	4.4	4.9	3.8	11	141	58	18	7.1	5.1
22	7.0	5.5	e3.0	4.4	4.6	3.8	14	140	61	17	6.6	5.2
23	5.9	5.7	e3.5	4.3	4.5	3.8	17	143	64	15	6.6	5.4
24	5.5	7.5	e4.0	4.2	4.4	3.8	23	138	63	15	6.3	5.1
25	5.4	12	e5.0	4.2	4.3	3.8	25	136	61	14	6.3	5.1
26	5.8	9.1	e5.0	4.0	4.2	3.8	24	108	58	14	6.5	5.1
27	5.9	7.6	e4.5	4.0	4.2	4.4	21	83	56	14	6.3	5.1
28	5.7	6.3	e4.0	4.0	4.2	4.0	19	69	55	13	6.3	5.1
29	5.7	5.8	e3.5	3.6	---	3.8	18	63	56	12	5.7	5.1
30	5.7	5.6	e4.0	3.4	---	3.9	18	70	56	12	5.7	4.9
31	5.9	---	e5.0	3.5	---	4.1	---	76	---	12	5.7	---
TOTAL	172.8	185.2	146.3	141.0	117.6	127.6	366.2	2481	2292	803	256.8	159.9
MEAN	5.57	6.17	4.72	4.55	4.20	4.12	12.2	80.0	76.4	25.9	8.28	5.33
MAX	7.3	12	5.6	5.0	4.9	6.0	25	205	138	53	13	6.8
MIN	4.9	5.5	3.0	3.4	3.6	3.5	4.9	14	50	12	5.7	4.9
AC-FT	343	367	290	280	233	253	726	4920	4550	1590	509	317
CFSM	.24	.26	.20	.19	.18	.18	.52	3.42	3.26	1.11	.35	.23
IN.	.27	.29	.23	.22	.19	.20	.58	3.94	3.64	1.28	.41	.25

CAL YR 1990 TOTAL 6895.0 MEAN 18.9 MAX 130 MIN 3.0 AC-FT 13680 CFSM .81 IN. 10.96
WTR YR 1991 TOTAL 7249.4 MEAN 19.9 MAX 205 MIN 3.0 AC-FT 14380 CFSM .85 IN. 11.52

e Estimated

12388400 REVAIS CREEK BELOW WEST FORK, NEAR DIXON, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1983-85, October 1990 to September 1991.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
OCT										
18...	1017	5.4	--	--	24	4.0	4.0	--	--	--
JAN										
02...	1410	5.0	--	--	24	-7.0	0.5	--	--	--
APR										
22...	0930	15	--	--	23	6.0	4.0	--	--	--
MAY										
01...	1030	16	60	1	26	6.5	3.5	676	11.8	100
21...	1600	136	75	2	13	19.0	6.0	670	10.9	100
JUN										
11...	1200	111	100	61	13	17.0	7.5	668	10.6	101
JUL										
09...	1220	32	--	--	17	20.5	9.0	--	--	--
AUG										
21...	1200	8.4	0	0	22	33.0	15.0	682	9.3	103
SEP										
05...	1530	6.0	0	0	22	25.0	12.0	677	9.6	100
27...	1400	5.1	0	0	21	26.0	9.0	678	10.2	99

DATE	TIME	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)
MAY											
01...	1030	7.9	7	1.7	0.55	2.1	0.4	0.40	10	1.0	0.30
21...	1600	6.6	3	0.93	0.25	1.2	0.3	0.40	5.7	0.70	0.10
JUN											
11...	1200	7.2	4	0.98	0.35	1.1	0.2	0.30	6.0	0.50	0.10
AUG											
21...	1200	7.0	12	4.0	0.53	2.3	0.3	0.40	12	0.80	0.10
SEP											
05...	1530	7.4	7	1.9	0.61	2.3	0.4	0.40	12	0.80	0.10
27...	1400	7.3	7	1.9	0.52	3.0	0.5	0.40	12	1.0	0.30

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)
MAY											
01...	<0.1	13	25	0.03	1.08	<0.01	<0.01	<0.05	<0.05	0.01	<0.01
21...	<0.1	9.6	17	0.02	6.12	<0.01	<0.01	<0.05	<0.05	0.02	0.03
JUN											
11...	0.1	8.5	16	0.02	4.67	<0.01	<0.01	<0.05	<0.05	0.01	<0.01
AUG											
21...	<0.1	13	28	0.04	0.64	0.02	<0.01	<0.05	<0.05	0.03	<0.01
SEP											
05...	<0.1	12	25	0.03	0.41	<0.01	<0.01	<0.05	<0.05	<0.01	<0.01
27...	<0.1	14	28	0.04	0.39	<0.01	<0.01	<0.05	<0.05	0.02	<0.01

PEND OREILLE RIVER BASIN

12388400 REVAIS CREEK BELOW WEST FORK, NEAR DIXON, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)
MAY											
01...	<0.01	<0.01	<0.01	<0.01	<1	<1	<1	1	3	1	50
21...	0.02	0.04	<0.01	<0.01	<1	<1	1	<1	9	4	50
JUN											
11...	<0.01	<0.01	<0.01	<0.01	1	1	1	1	5	8	--
AUG											
21...	0.01	0.02	<0.01	<0.01	<1	1	<1	<1	3	1	60
SEP											
05...	0.01	0.02	<0.01	<0.01	<1	<1	<1	<1	3	2	40
27...	<0.01	0.02	<0.01	0.01	<1	<1	<1	<1	4	2	30

DATE	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAY										
01...	47	5	2	<10	1	<10	9	2	0.09	82
21...	36	5	2	<10	1	<10	<3	4	1.5	81
JUN										
11...	40	4	6	<10	8	<10	--	2	0.60	83
AUG										
21...	20	<1	<1	<10	4	<10	--	2	0.05	84
SEP										
05...	18	1	<1	<10	<1	<10	5	4	0.06	82
27...	16	<1	<1	<10	<1	<10	11	1	0.01	75

PEND OREILLE RIVER BASIN

12388700 FLATHEAD RIVER AT PERMA, MT

LOCATION.--Lat 47°22'03", long 114°35'03", in SE1/4NE1/4NE1/4 sec.36, T.19 N., R.24 W., Sanders County, Hydrologic Unit 17010212, Flathead Indian Reservation, on right bank 0.3 mi north of Perma, 0.4 mi downstream from Camas Creek, and at river mile 10.9.

DRAINAGE AREA.--8,795 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1983 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,469.31 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Dec. 20-31, Jan. 1-13, 30, 31, Feb. 1. Water-discharge records good except those for estimated daily discharges, which are poor. Flow affected by regulation from Hungry Horse Reservoir (station no. 12362000) and by Flathead Lake (station no. 12371500). Diversions for irrigation of about 160,500 acres upstream from station.

AVERAGE DISCHARGE.--8 years, 11,740 ft^3/s, 8,506,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 44,600 ft^3/s, July 3, 1991, gage height, 18.97 ft; maximum gage height, 20.38 ft, Nov. 29, 1985, backwater from ice; minimum daily discharge, 2,670 ft^3/s, May 29, 1984.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 44,600 ft^3/s, July 3, gage height, 18.97 ft; minimum daily, 5,020 ft^3/s, Aug. 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8830	12300	13300	e11500	e15000	13300	12200	17700	37600	33500	12000	6480
2	11400	12700	13300	e12000	15300	13700	10900	18100	37600	38900	9480	6230
3	11600	12300	13400	e12500	15200	14100	11300	18500	38100	42600	7590	5450
4	10200	12700	11700	e13000	14900	14200	12300	18500	38200	30800	7710	7180
5	10100	12600	11900	e12500	15700	14500	12200	17700	37900	37500	7130	8450
6	11700	11800	12200	e13000	14700	14500	12700	18000	41100	40000	6950	8960
7	12100	11500	12400	e13500	16100	14200	13200	18200	42300	40400	9250	9150
8	12000	12700	11900	e13000	15700	13400	13200	17800	41600	35500	9830	9620
9	11300	12700	12200	e12000	16300	13500	13700	18600	41900	25300	10100	9880
10	11300	12400	12600	e12500	16000	13400	13100	18400	41100	22300	9380	8300
11	12500	12500	12500	e12000	15900	13200	13700	16900	40900	24800	8360	7690
12	11900	12800	12500	e12000	15800	13400	14900	16900	41900	23900	9150	6890
13	12400	12200	12100	e12000	16000	13400	15400	18100	42400	24100	9050	7460
14	12600	11600	12600	11800	16200	12900	15500	13800	39800	21500	9360	8470
15	12900	12300	12500	12400	16300	13100	15500	13300	31200	14800	8100	8590
16	12600	12300	12500	14800	16000	12500	15600	14300	29400	13000	7530	8450
17	12400	12200	12700	15000	16200	12700	13700	18700	29100	23900	8090	9930
18	11400	10800	13300	15300	16300	12800	13200	29000	27500	15200	7520	11400
19	12200	12000	12600	14300	15800	13100	13100	32500	13800	19300	9600	11800
20	11800	12100	e12500	14900	15800	13000	14900	33300	12500	23600	8190	11300
21	12200	12100	e12500	14700	15800	12900	15100	33200	13200	15400	7250	11500
22	11600	12000	e12000	14100	15800	13100	14600	37500	25200	13100	5470	10900
23	12700	7870	e11500	14900	15700	12000	14100	39600	26800	16000	5590	11800
24	11500	9440	e12000	14600	15500	12100	14900	40600	21700	14600	5130	16600
25	12500	11800	e12000	14600	15100	12500	14700	42700	38700	17500	5020	13400
26	12100	11700	e12000	13400	13700	8350	15200	43100	38000	16600	5460	13300
27	11900	11500	e12000	13700	13200	8930	17400	42400	35200	12700	5960	12900
28	10900	12800	e13500	13500	13400	12000	17700	42200	30800	11600	6220	13000
29	10700	12300	e13000	15100	---	12400	17700	42200	31100	12400	5340	12300
30	11300	12100	e13000	e14000	---	12300	18800	40300	32000	12900	6970	12400
31	11700	---	e12500	e14000	---	12500	---	39800	---	12500	6140	---
TOTAL	362330	358110	386700	416600	433400	397980	430500	831900	998600	706200	238920	299780
MEAN	11690	11940	12470	13440	15480	12840	14350	26840	33290	22780	7707	9993
MAX	12900	12800	13500	15300	16300	14500	18800	43100	42400	42600	12000	16600
MIN	8830	7870	11500	11500	13200	8350	10900	13300	12500	11600	5020	5450
AC-FT	718700	710300	767000	826300	859600	789400	853900	1650000	1981000	1401000	473900	594600

CAL YR 1990 TOTAL 5162670 MEAN 14140 MAX 40200 MIN 5160 AC-FT 10240000
WTR YR 1991 TOTAL 5861020 MEAN 16060 MAX 43100 MIN 5020 AC-FT 11630000

e Estimated

PEND OREILLE RIVER BASIN

12388700 FLATHEAD RIVER AT PERMA, MT--Continued

WATER QUALITY RECORDS

PERIOD OF RECORD.--Water years 1971-73, 1984 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	CLOUD COVER (PER-CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)
OCT 15...	1340	12300	--	--	171	6.0	9.0	--	--	--	--	--
NOV 20...	0830	12600	100	3	191	1.0	4.0	682	11.2	96	8.2	91
JAN 24...	1130	14700	75	2	171	0.0	1.5	699	12.8	100	8.0	91
MAR 06...	1000	14400	80	2	176	1.0	1.0	693	12.9	100	7.6	90
APR 24...	1200	14000	100	61	176	15.0	9.5	687	10.8	105	8.3	90
JUN 19...	1200	12200	100	3	167	17.0	14.0	694	9.3	99	8.3	93
JUL 11...	1300	24300	--	--	165	27.0	19.0	--	--	--	--	--
AUG 20...	0900	9560	25	1	167	21.0	21.5	697	7.4	92	8.2	88

DATE	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	AD-SORP-TION RATIO (00931)	SODIUM, DIS-SOLVED (MG/L AS K) (00935)	POTAS-SIUM, DIS-SOLVED (MG/L AS SO4) (00945)	SULFATE DIS-SOLVED (MG/L AS CL) (00940)	CHLO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	FLUO-RIDE, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SILICA, CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SUM OF DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)
NOV 20...	26	6.4	1.5	0.1	0.4	3.3	0.7	<0.1	5.1	99	0.13	3370
JAN 24...	26	6.3	1.5	0.1	0.4	3.1	1.4	<0.1	4.5	98	0.13	3880
MAR 06...	26	6.2	1.8	0.1	0.5	3.5	0.5	<0.1	4.5	97	0.13	3770
APR 24...	26	6.1	1.5	0.1	0.4	2.5	1.3	0.1	4.8	97	0.13	3650
JUN 19...	27	6.2	1.7	0.1	0.4	3.5	0.2	0.1	4.7	98	0.13	3220
AUG 20...	25	6.2	1.5	0.1	0.4	3.3	0.4	<0.1	4.5	95	0.13	2440

DATE	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 20...	<0.01	<0.10	0.04	--	<0.01	<0.01	<10	<3	3	102	84
JAN 24...	<0.01	<0.10	<0.01	--	<0.01	<0.01	<10	<3	3	119	87
MAR 06...	<0.01	0.05	<0.01	--	0.01	<0.01	<10	6	10	389	94
APR 24...	<0.01	<0.05	<0.01	--	<0.01	<0.01	<10	6	7	265	89
JUN 19...	<0.01	<0.05	0.01	0.29	<0.01	<0.01	<10	8	9	296	92
AUG 20...	<0.01	<0.05	<0.01	--	<0.01	<0.01	10	4	4	103	78

PEND OREILLE RIVER BASIN

12389000 CLARK FORK NEAR PLAINS, MT

LOCATION.--Lat 47°25'47", long 114°51'18", in E1/2SW1/4 sec.1, T.19 N., R.26 W., Sanders County, Hydrologic Unit 17010213, on right bank 2.4 mi southeast of Plains, 6.0 mi downstream from Flathead River, and at river mile 239.0.

DRAINAGE AREA.--19,958 mi^2.

PERIOD OF RECORD.--October 1910 to current year. Monthly discharge only for some periods, published in WSP 1316.

REVISED RECORDS.--WSP 1246: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,449.11 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Nov. 28, 1911, nonrecording gage at site 50 ft upstream at same datum.

REMARKS.--Estimated daily discharges: Jan. 1-9. Records excellent. Flow partly regulated by Hungry Horse Reservoir (station number 12362000) and by Flathead Lake (station number 12371500). Diversions for irrigation of about 335,000 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--81 years, 19,800 ft^3/s, 14,350,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 134,000 ft^3/s, June 5, 1948, gage height, 19.17 ft; minimum, 3,200 ft^3/s, Feb. 8, 1936, Dec. 10, 1940; minimum gage height, 2.70 ft, from partly estimated gage-height record, Sept. 2, 1958.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 74,100 ft^3/s, June 8, 9, gage height, 13.41 ft; minimum, 6,760 ft^3/s, Aug. 25, gage height, 3.71 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10700	16100	17700	e14500	18400	17800	16100	26300	58200	50200	15900	8330
2	12600	16200	17700	e15000	18300	18000	14600	26100	57700	55800	13800	8770
3	14100	15800	17700	e15800	18500	18200	15500	26200	59700	59700	11100	7420
4	12800	16300	15800	e16300	18100	18500	16800	26000	62000	47100	11200	9150
5	12600	16200	15600	e15500	19000	19100	18100	25100	63300	51300	10500	10300
6	13200	15800	15900	e15500	18300	19800	20500	25000	66300	54100	10000	11000
7	14900	15400	16300	e16000	19200	19500	21700	25400	70800	54000	12500	11100
8	14700	15600	15500	e16000	19200	18600	21600	25600	73500	49000	12300	11400
9	14100	16300	15600	e14700	19600	18300	22100	28300	73200	37200	13400	11900
10	14300	16200	16100	16000	19400	18100	20900	29500	69500	32400	12300	11100
11	15000	16600	16400	15800	19200	17700	21200	28800	67900	33900	11200	9720
12	15000	16700	16500	16400	19100	17700	21800	28800	69800	33100	11800	9230
13	15000	16300	15800	16000	19200	17600	22200	31100	70100	32400	11700	9680
14	15700	15800	16500	15400	19500	17200	22200	28900	65700	29700	11800	10900
15	16100	16100	16300	15800	19700	17200	22100	28700	55200	24100	11200	11100
16	15900	16700	15800	18200	19600	16700	22100	30400	50000	19800	9540	10900
17	15800	15800	16100	18900	19700	16500	20500	34900	47600	29300	11000	11900
18	14600	14600	16500	19100	20200	16900	19600	49000	45600	23900	9910	13400
19	15500	15500	15900	18300	19900	16900	19400	61700	32500	23500	11600	14400
20	14800	15700	13400	18300	20200	17000	20900	66100	29100	29500	10600	13700
21	15500	15800	12800	18000	21000	16700	21600	64900	31500	22500	9700	14000
22	14800	15600	10600	17100	21400	17000	21600	66500	43800	18400	7790	13200
23	15800	12300	10400	18000	21200	16200	21500	68300	48400	20800	7660	14100
24	15200	11900	12100	17700	20800	15700	23300	69300	38800	19300	7250	18000
25	15600	17600	12800	17800	20200	16500	24300	71700	57000	21900	6960	16500
26	15300	18900	14000	16300	18700	13200	25700	72200	56700	21100	7220	15800
27	15400	16900	13800	16200	17800	11600	27300	69900	52500	17800	7920	15300
28	14100	17900	15900	16100	17800	15600	27400	67000	47200	15800	8170	15300
29	14300	17100	15200	18300	---	16100	27100	65100	46800	16200	7260	14800
30	14100	16500	15200	17100	---	15900	27500	61600	48000	16600	8800	14500
31	15100	---	15100	17900	---	16200	---	60200	---	16400	8800	---
TOTAL	452600	480200	471000	518000	543200	528000	647200	1388600	1658400	976800	320880	366900
MEAN	14600	16010	15190	16710	19400	17030	21570	44790	55280	31510	10350	12230
MAX	16100	18900	17700	19100	21400	19800	27500	72200	73500	59700	15900	18000
MIN	10700	11900	10400	14500	17800	11600	14600	25000	29100	15800	6960	7420
AC-FT	897700	952500	934200	1027000	1077000	1047000	1284000	2754000	3289000	1937000	636500	727700
CFSM	.73	.80	.76	.84	.97	.85	1.08	2.24	2.77	1.58	.52	.61
IN.	.84	.90	.88	.97	1.01	.98	1.21	2.59	3.09	1.82	.60	.68

CAL YR 1990 TOTAL 7800170 MEAN 21370 MAX 65100 MIN 7550 AC-FT 15470000 CFSM 1.07 IN. 14.54
WTR YR 1991 TOTAL 8351780 MEAN 22880 MAX 73500 MIN 6960 AC-FT 16570000 CFSM 1.15 IN. 15.57

e Estimated

PEND OREILLE RIVER BASIN

12389500 THOMPSON RIVER NEAR THOMPSON FALLS, MT

LOCATION.--Lat 47°35'31", long 115°13'43", in NW1/4NE1/4SE1/4 sec.7, T.21 N., R.28 W., Sanders County, Hydrologic Unit 17010213, Lolo National Forest, on right bank 1.2 mi upstream from mouth and 5.5 mi east of Thompson Falls.

DRAINAGE AREA.--642 mi^2.

PERIOD OF RECORD.--March to September 1911, October 1911 to September 1916 (occasional gage heights, discharges, and discharge measurements), April 1956 to current year. Records for January and February 1911, published in WSP 916, have been found to be unreliable and should not be used.

REVISED RECORDS.--WSP 1246: 1911. See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Datum of gage is 2,429.97 ft above National Geodetic Vertical Datum of 1929 (Bureau of Public Roads bench mark). October 1911 to September 1916, nonrecording gage at site 0.2 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Dec. 21-31, Jan. 1-5, 7-9. Records good except those for estimated daily discharges, which are poor. Minor diversions upstream from station for irrigation, acreage unknown. Diversion from headwaters of Alder Creek in SW1/4 sec.16, T.23 N., R.25 W., to supplement water supply for storage in Upper Dry Fork Reservoir in Little Bitterroot River basin. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--35 years, 456 ft^3/s, 9.64 in/yr, 330,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,080 ft^3/s, June 9, 1964, gage height, 8.53 ft; minimum, 60 ft^3/s, Nov. 20, 1977, gage height, 1.96 ft, result of freezeup; minimum gage height, 1.01 ft, Dec. 17, 1964, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May to June 1948 reached a discharge of 6,190 ft^3/s, by slope-area measurement of peak flow at site 0.2 mi downstream.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,110 ft^3/s, May 19, gage height, 6.16 ft; minimum daily, 140 ft^3/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	175	229	361	e210	229	460	407	934	1600	1090	366	241
2	178	214	346	e220	229	428	477	903	1640	1020	366	241
3	181	199	323	e200	249	512	554	887	1750	967	351	237
4	199	199	314	e180	261	579	630	860	1730	926	346	237
5	192	203	305	e190	270	579	911	834	1600	887	342	237
6	181	196	287	196	300	536	1280	834	1510	841	346	231
7	178	192	265	e200	300	506	1260	887	1670	796	332	233
8	175	188	249	e210	305	486	1100	1090	1730	760	318	233
9	178	199	287	e210	296	472	991	1400	1620	724	314	237
10	175	229	309	218	300	477	911	1380	1520	674	314	237
11	175	237	381	221	300	460	834	1270	1730	630	309	233
12	175	229	386	237	314	444	789	1420	1930	604	305	229
13	175	225	356	274	314	438	767	1610	1730	579	296	229
14	175	229	346	291	318	428	782	1660	1550	560	296	237
15	181	225	300	300	328	422	789	1650	1380	548	291	233
16	199	218	300	300	366	401	796	1620	1320	524	291	229
17	196	210	323	296	412	391	774	1660	1230	512	283	225
18	185	210	318	296	417	381	767	2430	1150	500	283	221
19	181	210	214	287	417	391	774	3000	1090	483	274	218
20	178	206	171	257	641	407	804	2890	1090	466	270	218
21	188	206	e150	253	841	412	895	2460	1110	455	261	214
22	203	206	e140	237	789	417	1020	2320	1080	438	257	210
23	192	229	e150	245	704	412	1220	2190	1080	422	253	210
24	181	309	e170	261	636	412	1480	2070	1070	412	253	206
25	178	817	e200	237	579	412	1590	2020	1070	407	253	206
26	185	883	e230	203	554	401	1510	1900	1040	407	249	203
27	185	628	e257	229	536	381	1330	1690	1010	386	245	203
28	185	489	e250	233	518	386	1180	1560	1010	371	245	199
29	181	428	e220	185	---	376	1070	1460	1020	366	245	199
30	185	407	e200	206	---	376	1000	1510	1140	356	241	196
31	218	---	e220	225	---	383	---	1620	---	351	241	---
TOTAL	5713	8849	8328	7307	11723	13566	28692	50019	41200	18462	9036	6682
MEAN	184	295	269	236	419	438	956	1614	1373	596	291	223
MAX	218	883	386	300	841	579	1590	3000	1930	1090	366	241
MIN	175	188	140	180	229	376	407	834	1010	351	241	196
AC-FT	11330	17550	16520	14490	23250	26910	56910	99210	81720	36620	17920	13250
CFSM	.29	.46	.42	.37	.65	.68	1.49	2.51	2.14	.93	.45	.35
IN.	.33	.51	.48	.42	.68	.79	1.66	2.90	2.39	1.07	.52	.39

CAL YR 1990 TOTAL 180620 MEAN 495 MAX 1550 MIN 140 AC-FT 358300 CFSM .77 IN. 10.47
WTR YR 1991 TOTAL 209577 MEAN 574 MAX 3000 MIN 140 AC-FT 415700 CFSM .89 IN. 12.14

e Estimated

PEND OREILLE RIVER BASIN

12390700 PROSPECT CREEK AT THOMPSON FALLS, MT

LOCATION.--Lat 47°35'10", long 115°21'15", in lot 12, SE1/4SE1/4SE1/4 sec.7, T.21 N., R.29 W., Sanders County, Hydrologic Unit 17010213, on right bank 500 ft downstream from Dry Creek, 0.5 mi upstream from mouth, and 0.7 mi south of Thompson Falls.

DRAINAGE AREA.--182 mi^2.

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

GAGE.--Water-stage recorder. Datum of gage is 2,382.40 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Dec. 19 to Jan. 4, July 2-10. Records good except those for periods of estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year. No known regulation or diversions upstream from station.

AVERAGE DISCHARGE.--35 years, 247 ft^3/s, 18.43 in/yr, 179,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,490 ft^3/s, Jan. 16, 1974, gage height, 9.86 ft; minimum, 24 ft^3/s, Jan. 4, 5, 1988; minimum gage height, -0.18 ft, Jan. 4, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,870 ft^3/s, Nov. 25, gage height, 5.80 ft; minimum, 51 ft^3/s, Oct. 28-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	56	56	347	e130	167	352	215	427	745	508	134	78
2	56	54	307	e120	166	330	235	416	800	e480	129	77
3	56	53	276	e115	164	355	278	413	890	e450	124	76
4	57	54	260	e120	160	447	328	397	835	e425	121	75
5	58	54	246	124	154	444	583	383	741	e400	121	75
6	55	54	226	124	151	410	1060	381	708	e380	123	75
7	54	54	206	124	151	377	918	413	813	e360	117	75
8	54	54	194	126	157	355	720	538	835	e330	112	75
9	54	57	189	126	172	338	616	711	779	e310	110	75
10	54	57	226	126	189	328	538	688	741	e295	108	74
11	53	99	262	127	199	314	474	627	871	278	108	73
12	54	177	280	128	211	300	427	692	908	262	107	72
13	55	167	282	131	220	288	408	813	753	248	103	72
14	53	167	272	134	233	278	399	844	646	240	102	73
15	55	147	254	142	246	264	383	796	573	233	101	72
16	58	134	242	148	274	256	370	774	576	218	99	71
17	53	126	239	160	307	248	365	801	538	213	98	69
18	53	120	244	170	330	242	358	1360	501	204	96	69
19	54	116	e210	170	335	240	355	1700	489	194	96	68
20	53	114	e160	169	625	244	368	1560	511	183	94	68
21	55	109	e130	167	848	246	405	1440	541	173	92	66
22	57	117	e110	167	737	244	489	1300	515	166	90	66
23	54	164	e120	167	616	242	609	1200	495	158	89	65
24	53	329	e140	167	521	242	763	1100	495	152	89	65
25	53	1480	e160	167	459	240	783	1070	511	154	88	63
26	54	1340	e160	167	410	239	720	946	508	149	85	62
27	52	793	e170	167	383	233	616	796	492	142	84	60
28	52	569	e140	167	368	229	538	708	471	137	82	60
29	51	468	e120	167	---	222	489	677	471	134	81	60
30	54	439	e100	167	---	217	450	729	555	131	80	59
31	62	---	e120	167	---	213	---	741	---	129	79	---
TOTAL	1692	7722	6392	4551	8953	8977	15260	25441	19307	7836	3142	2088
MEAN	54.6	257	206	147	320	290	509	821	644	253	101	69.6
MAX	62	1480	347	170	848	447	1060	1700	908	508	134	78
MIN	51	53	100	115	151	213	215	381	471	129	79	59
AC-FT	3360	15320	12680	9030	17760	17810	30270	50460	38300	15540	6230	4140
CFSM	.30	1.41	1.13	.81	1.76	1.59	2.79	4.51	3.54	1.39	.56	.38
IN.	.35	1.58	1.31	.93	1.83	1.83	3.12	5.20	3.95	1.60	.64	.43

CAL YR 1990 TOTAL 102136 MEAN 280 MAX 1480 MIN 51 AC-FT 202600 CFSM 1.54 IN. 20.88
WTR YR 1991 TOTAL 111361 MEAN 305 MAX 1700 MIN 51 AC-FT 220900 CFSM 1.68 IN. 22.76

e Estimated

PEND OREILLE RIVER BASIN

12391400 CLARK FORK BELOW NOXON RAPIDS DAM, NEAR NOXON, MT

LOCATION.--Lat 47°57'40", long 115°43'58", in SW1/4 sec.33, T.26 N., R.32 W., Sanders County, Hydrologic Unit 17010213, at Noxon Rapids Dam 1 mi upstream from Rock Creek, 3 mi southeast of Noxon, and at river mile 169.7.

DRAINAGE AREA.--21,833 mi^2.

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

GAGE.--Plant generator rating for discharge through powerplant. Water-stage recorder on reservoir determines head on taintor gates. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by The Washington Water Power Co.).

REMARKS.--Records good. Flow regulated by Hungry Horse Reservoir (station 12362000) and Flathead Lake (station 12371500). Diversions for irrigation of about 350,000 acres upstream from station. Some sub-surface flow indicated by comparison with records for adjacent gaging stations. Figures of discharge given herein are combined flows through turbines and spillway.

COOPERATION.--Records collected by the Washington Water Power Co., under general supervison of the Geological Survey, in connection with a Federal Power Commission project.

AVERAGE DISCHARGE.--31 years, 20,590 ft^3/s, 14,920,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 124,900 ft^3/s, June 12, 1964; minimum daily, 60 ft^3/s, Jan. 29, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 77,400 ft^3/s, June 8; minimum daily, 1,970 ft^3/s, Aug. 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14000	16500	21300	16300	20300	23000	25100	29700	64200	50800	19600	8320
2	13800	17300	16000	18000	14700	11400	26300	32800	62800	58400	18700	7280
3	13700	17100	18400	20100	14000	16400	22700	30800	64600	62300	13600	11100
4	13500	11500	16600	17700	19800	21700	16200	30200	66100	53400	3000	10400
5	15300	17300	17000	11700	17200	22600	13700	29800	67700	50300	15800	9240
6	13000	17900	16600	16400	20000	24200	22000	27800	70200	55900	12000	13400
7	9030	15300	16400	16900	23600	24700	30100	30300	75000	55800	10800	12700
8	14300	14600	15800	18700	20400	24300	27000	29700	77400	53500	17300	5780
9	15900	16600	16600	19200	19500	19200	23300	29800	77300	46300	14400	13400
10	16700	15100	18400	20800	17900	7220	25100	30900	74700	33200	9130	13500
11	17300	17800	18000	17800	20300	23600	20900	28300	72800	33300	10100	9370
12	14900	17600	16800	17200	19500	22500	23600	25900	74300	36300	13900	12400
13	15000	18100	17100	9250	19200	22600	24100	30200	75400	34100	11600	14100
14	12700	16700	18700	16900	21000	20700	22600	38500	69500	33100	12000	9320
15	16300	16400	17600	16000	23400	22500	26000	39200	61700	26400	12300	7620
16	16800	17700	15400	20700	20100	10300	22500	35000	53400	24100	11600	11400
17	17300	15900	17400	20900	21200	8400	28200	37500	50000	25400	10100	14100
18	17300	15000	17600	24100	22000	19400	25300	46800	50000	28000	10300	11300
19	15500	19500	19800	18900	21400	18700	22700	65900	46100	24100	15000	16800
20	13300	17700	20100	19500	23400	21300	17000	74200	35700	23700	11600	14400
21	13600	18500	16000	22200	25900	23800	21400	72400	35800	27900	11500	17000
22	15100	13500	13100	20400	27200	24700	22500	71600	44200	20400	14600	12600
23	15000	15600	5780	17600	25500	14600	30000	74200	49800	21500	7070	12900
24	16300	10300	8000	18700	22000	10100	29000	74900	44000	18700	4170	17600
25	16400	22700	6050	21600	25600	18400	31100	76200	46700	22500	1970	14200
26	16900	27100	11000	18600	27100	19700	30700	77200	55200	21700	8670	17300
27	15900	26100	16900	5330	17900	15100	32300	74600	55400	24700	8440	16800
28	13600	21200	15800	20400	23400	17300	30700	71400	50300	15100	9390	19000
29	16300	19600	15800	18200	---	14300	30800	69700	49500	19400	9130	11700
30	16000	17700	12500	17600	---	7900	29100	67500	49000	16100	12000	15800
31	13700	---	14900	16600	---	10700	---	64300	---	17900	8720	---
TOTAL	464430	523900	487430	554280	593500	561320	752000	1517300	1768800	1034300	348490	380830
MEAN	14980	17460	15720	17880	21200	18110	25070	48950	58960	33360	11240	12690
MAX	17300	27100	21300	24100	27200	24700	32300	77200	77400	62300	19600	19000
MIN	9030	10300	5780	5330	14000	7220	13700	25900	35700	15100	1970	5780
AC-FT	921200	1039000	966800	1099000	1177000	1113000	1492000	3010000	3508000	2052000	691200	755400

CAL YR 1990 TOTAL 8297130 MEAN 22730 MAX 69600 MIN 840 AC-FT 16460000
WTR YR 1991 TOTAL 8986580 MEAN 24620 MAX 77400 MIN 1970 AC-FT 17820000

PEND OREILLE RIVER BASIN

12392000 CLARK FORK AT WHITEHORSE RAPIDS, NEAR CABINET, ID

LOCATION.--Lat 48°05'18", long 116°04'16", in SW1/4NW1/4 sec. 27, T. 55 N., R. 3 E., Bonner County, Hydrologic Unit 17010213, on right bank 0.8 mi downstream from Cabinet Gorge Dam at cableway, 2.1 mi downstream from Blue Creek, 6.1 mi southeast of Clark Fork, and at mile 149.1. Discharge computed at Whitehorse Rapids, 2.3 mi downstream.

DRAINAGE AREA.--22,073 mi^2, revised. (Based on area of 22,067 mi2 for site 0.4 mi upstream prior to Oct. 1, 1964.)

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1928 to current year. Prior to October 1952, published as "near Heron, Mont."

REVISED RECORDS.--WSP 1182: 1936. WSP 1736: 1931, 1936(m), 1937.

GAGE.--Water-stage recorder. Datum of gage is 2,060.00 ft above National Geodetic Vertical Datum of 1929 (levels by Washington Water Power Co). See WSP 1933 for history of changes made prior to Sept. 30, 1952. Water-stage recorder at site 0.4 mi upstream at datum 60.00 ft lower Oct. 1, 1952, to Sept. 30, 1964, and at present datum Oct. 1, 1964, to May 21, 1973.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by Hungry Horse Reservoir, Flathead Lake, and Noxon Rapids Reservoir. Extreme diurnal fluctuation caused by powerplant at Cabinet Gorge Dam. Diversions above station for irrigation of about 354,000 acres. Discharge measurements indicate about 800 ft^3/s ground-water inflow between Cabinet Gorge Dam and Whitehorse Rapids. Records given herein represent flow at Whitehorse Rapids, computed by adding 600 ft^3/s to observed flows at the measuring cableway, and are considered comparable to records at former site near Heron, except for minor surface inflow from additional drainage area. To determine flow at Cabinet Gorge Dam, 800 ft^3/s should be deducted from discharges published herein.

AVERAGE DISCHARGE.--63 years, 22,240 ft^3/s, 16,110,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 153,000 ft^3/s May 29 to June 1, 1948; maximum gage height, 50.97 ft, May 31, 1948, site and datum then in use; minimum observed, 270 ft^3/s Aug. 12, 1952 (discharge measurement), at sites in use since October 1952, during filling of Cabinet Gorge Reservoir; minimum daily since reservoir filled, 762 ft^3/s Sept. 2, 1962.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1894 reached a discharge of 195,000 ft^3/s from floodmark, elevation of 2,137.1 ft, at site about 4 mi upstream and 0.1 mi below "near Heron" site.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 80,300 ft^3/s June 8; minimum daily, 4,260 ft^3/s Aug. 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14700	18300	23600	16400	21200	27300	26400	33800	67200	e54500	22100	9780
2	15700	18800	19000	19400	16200	14400	30100	34700	66300	e60900	19800	9410
3	16100	19100	19900	21400	16400	20000	26900	34500	67600	e65200	15100	13100
4	14600	13900	19700	18900	22600	23800	17800	33700	e69000	e57600	7160	11900
5	15100	18200	19500	13400	18600	25400	18700	32500	e70800	e52400	17000	9940
6	15000	19900	19000	18600	21900	27500	24800	32200	e71500	e58100	12600	14300
7	10100	18000	18900	18600	26500	28300	35000	33900	e77500	e57400	12600	15200
8	15400	15700	17500	20800	23700	26500	32500	34700	e80300	e55400	18900	5990
9	17300	18200	18500	21600	21800	21900	27800	34600	e80200	50400	16600	15500
10	18200	17700	20400	23000	20700	10200	28600	35200	e78100	37800	10600	15500
11	19200	20100	20200	19400	22500	27600	25300	33300	76300	36100	12000	10600
12	16000	19700	20000	19500	21100	24800	26400	30100	77400	39600	15000	14700
13	15600	20700	20600	10500	22400	25100	27700	34500	78300	38000	14700	15600
14	16000	19100	19200	18200	24400	23100	25200	42500	72600	37400	13900	9890
15	16500	21100	20200	17800	25500	25700	28200	44400	64900	30600	13800	9540
16	18100	19300	19300	24000	24000	12100	25500	38300	57200	29000	14200	12900
17	19800	17500	20000	24000	25000	13500	30800	42000	e55900	27000	12400	15200
18	18400	16700	20400	25900	22800	22000	31100	52400	e53700	29900	13900	13400
19	16500	21200	20900	21900	23200	19100	25700	70400	50300	27500	15100	17500
20	14900	19300	21600	22500	26100	24900	18300	78900	40100	25800	12400	16200
21	15900	20700	18900	23900	31200	26300	26000	76000	39400	32600	13700	18700
22	16800	15300	16800	23000	30500	27300	29200	75100	47800	22600	17400	14000
23	16900	18000	8750	21000	29900	17900	29700	77600	53500	25100	8040	15300
24	18100	11800	8490	20400	26800	12900	33800	77800	48700	20100	4280	18000
25	17200	27100	7670	23800	27600	19500	35100	79400	49500	24300	4260	17500
26	18500	33800	11100	21400	31100	22400	35100	80200	57500	24800	8600	17700
27	16900	31900	19900	7080	23800	18100	35800	77100	58600	26400	11700	17700
28	16500	26200	17600	22600	23500	19200	35100	73500	54900	20600	8860	22500
29	17500	22400	16500	20400	---	16700	35100	72200	51500	20400	10700	13400
30	17600	20200	15600	19400	---	7870	33100	70200	52900	18400	12800	16500
31	15800	---	16200	19400	---	12500	---	67000	---	19900	9900	---
TOTAL	510900	599900	555910	618180	671000	643870	860800	1632700	1869500	1125800	400100	427450
MEAN	16480	20000	17930	19940	23960	20770	28690	52670	62320	36320	12910	14250
MAX	19800	33800	23600	25900	31200	28300	35800	80200	80300	65200	22100	22500
MIN	10100	11800	7670	7080	16200	7870	17800	30100	39400	18400	4260	5990
AC-FT	1013000	1190000	1103000	1226000	1331000	1277000	1707000	3238000	3708000	2233000	793600	847800

CAL YR 1990 TOTAL 9259300 MEAN 25370 MAX 72200 MIN 3980 AC-FT 18370000
WTR YR 1991 TOTAL 9916110 MEAN 27170 MAX 80300 MIN 4260 AC-FT 19670000

e Estimated

PEND OREILLE RIVER BASIN

12392000 CLARK FORK AT WHITEHORSE RAPIDS, NEAR CABINET, ID--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.-May 1984 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
OCT									
15...	1030	23400	179	--	7.0	7.5	--	--	--
29...	1215	22400	108	--	17.0	10.0	--	--	--
NOV									
14...	0900	19100	179	--	8.0	7.5	--	--	--
25...	1330	27100	160	8.1	2.0	5.5	11.3	98	K2
DEC									
10...	1330	23400	166	--	5.0	6.0	--	--	--
26...	0930	7000	166	--	0.0	10.0	--	--	--
JAN									
08...	1330	22300	180	8.0	-8.0	3.5	12.8	104	K1
22...	1100	29600	185	--	-3.0	2.0	--	--	--
FEB									
04...	1600	30000	177	--	2.0	3.0	--	--	--
19...	1320	23200	176	--	11.0	3.0	--	--	--
MAR									
18...	1130	28200	163	8.2	14.0	3.5	11.9	97	K1
APR									
01...	1130	29600	166	--	--	--	--	--	--
08...	0847	35000	171	--	7.0	5.0	--	--	--
15...	0910	32200	157	--	8.0	7.0	--	--	--
22...	1225	29200	155	--	--	--	--	--	--
MAY									
01...	1045	34300	175	--	11.0	9.0	--	--	--
06...	1015	34400	143	--	12.0	8.5	--	--	--
13...	1030	34200	148	8.2	17.0	9.0	10.6	100	K1
21...	1430	74100	131	--	--	--	--	--	--
28...	1415	75200	135	--	16.5	12.5	--	--	--
JUN									
03...	0920	65600	145	--	--	--	--	--	--
11...	1000	74100	133	--	15.0	--	--	--	--
17...	0930	54200	136	--	11.0	12.0	--	--	--
24...	0930	53200	138	--	13.0	13.5	--	--	--
JUL									
08...	1445	57800	149	--	22.0	17.0	--	--	--
23...	0930	29600	159	8.2	26.0	20.0	9.0	106	K2
AUG									
08...	1330	24200	161	--	24.0	20.5	--	--	--
19...	1445	21900	164	--	26.0	19.0	--	--	--
SEP									
03...	1300	21500	173	--	25.0	21.0	--	--	--
18...	0915	1780	175	8.2	21.0	18.5	9.2	106	K1
30...	0930	26700	172	--	23.0	19.0	--	--	--

12392000 CLARK FORK AT WHITEHORSE RAPIDS, NEAR CABINET, ID--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS TOTAL (MG/L AS CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM PERCENT	POTASSIUM, DISSOLVED (MG/L AS K)	BICARBONATE WATER WH FET FIELD MG/L AS HCO3	CARBONATE WATER WH FET FIELD MG/L AS CO3
NOV 25...	K3	89	25	6.5	3.0	7	0.7	110	0
JAN 08...	K3	--	--	--	--	--	--	120	0
MAR 18...	K4	88	25	6.3	2.7	6	0.8	97	0
MAY 13...	<1	78	22	5.7	2.5	6	0.6	84	0
JUL 23...	K4	--	--	--	--	--	--	96	0
SEP 18...	K2	90	25	6.6	2.9	7	0.9	110	0

DATE	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER AC-FT)	SOLIDS, DISSOLVED (TONS PER DAY)
NOV 25...	90	7.2	2.2	<0.1	6.0	104	105	0.14	7610
JAN 08...	94	--	--	--	--	--	--	--	--
MAR 18...	79	5.5	1.6	<0.1	6.0	118	96	0.16	8980
MAY 13...	69	5.4	1.6	<0.1	6.2	90	86	0.12	8310
JUL 23...	79	--	--	--	--	--	--	--	--
SEP 18...	87	5.2	0.50	0.1	7.4	103	101	0.14	496

K Results based on counts outside ideal colony range.

PEND OREILLE RIVER BASIN

12392000 CLARK FORK AT WHITEHORSE RAPIDS, NEAR CABINET, ID--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITRO-GEN, NITRATE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P)
OCT												
15...	0.024	0.007	--	0.031	--	0.015	--	0.29	0.3	0.008	0.002	--
29...	0.013	0.007	--	0.020	--	0.014	--	0.19	0.2	0.003	0.001	--
NOV												
14...	0.022	0.005	--	0.027	--	0.009	--	--	<0.2	<0.001	0.004	--
25...	--	<0.010	0.03	<0.100	<0.10	0.040	0.03	--	<0.2	0.040	<0.010	<0.01
25...	0.024	0.005	--	0.029	--	0.006	--	--	--	0.002	<0.001	--
DEC												
10...	0.047	0.001	--	0.048	--	0.028	--	--	<0.2	0.007	0.004	--
26...	0.051	0.004	--	0.055	--	0.025	--	--	<0.2	0.012	0.001	--
JAN												
08...	--	<0.010	<0.01	<0.100	0.20	<0.010	0.06	--	<0.2	0.020	0.020	0.03
08...	0.063	0.003	--	0.066	--	0.007	--	--	--	0.039	0.033	--
22...	0.081	0.005	--	0.086	--	0.058	--	0.14	0.2	0.013	0.004	--
FEB												
04...	0.071	0.008	--	0.079	--	0.007	--	0.39	0.4	<0.001	<0.001	--
19...	0.060	0.009	--	0.069	--	0.024	--	0.48	0.5	0.020	<0.001	--
MAR												
18...	--	<0.010	<0.01	0.060	<0.05	0.010	<0.01	--	<0.2	0.020	<0.010	<0.01
18...	0.030	0.002	--	0.032	--	0.009	--	0.19	0.2	0.041	0.002	--
APR												
01...	0.018	0.012	--	0.030	--	0.034	--	--	<0.2	0.001	0.006	--
08...	0.032	0.008	--	0.040	--	0.039	--	--	<0.2	0.003	<0.001	--
15...	0.017	0.006	--	0.023	--	0.029	--	--	<0.2	0.005	0.002	--
22...	0.019	0.015	--	0.034	--	0.016	--	--	<0.2	0.002	0.006	--
MAY												
01...	--	--	--	--	--	--	--	--	<0.2	0.004	--	--
06...	0.013	0.005	--	0.018	--	0.015	--	0.19	0.2	0.012	<0.001	--
13...	--	<0.010	<0.01	0.052	<0.05	0.010	0.02	--	<0.2	0.020	<0.010	<0.01
13...	0.030	0.006	--	0.036	--	0.020	--	--	<0.2	0.008	0.014	--
21...	0.051	0.002	--	0.053	--	0.024	--	0.68	0.7	0.020	0.002	--
28...	0.037	0.003	--	0.040	--	0.030	--	--	<0.2	0.015	0.008	--
JUN												
03...	0.045	0.011	--	0.056	--	0.048	--	--	<0.2	0.019	0.004	--
11...	--	0.004	--	<0.005	--	0.017	--	--	<0.2	0.015	0.008	--
17...	--	0.005	--	<0.005	--	0.028	--	--	<0.2	0.064	0.005	--
24...	0.032	0.003	--	0.035	--	0.009	--	0.29	0.3	0.017	<0.001	--
JUL												
08...	0.012	0.003	--	0.015	--	0.007	--	--	<0.2	0.015	<0.001	--
23...	--	<0.010	<0.01	<0.050	<0.05	0.021	<0.01	--	<0.2	<0.010	<0.010	<0.01
23...	0.002	0.003	--	0.005	--	<0.002	--	--	<0.2	0.004	<0.001	--
AUG												
08...	0.003	0.004	--	0.007	--	0.014	--	--	<0.2	0.006	0.002	--
19...	0.003	0.003	--	0.006	--	0.014	--	0.29	0.3	0.015	0.001	--
SEP												
03...	0.029	0.003	--	0.032	--	0.016	--	0.28	0.3	0.013	0.006	--
18...	0.043	0.010	<0.01	0.053	0.064	0.010	0.02	0.29	0.3	0.020	0.010	0.02
18...	0.036	0.007	--	0.043	--	0.027	--	0.27	0.3	0.017	0.009	--

12392000 CLARK FORK AT WHITEHORSE RAPIDS, NEAR CABINET, ID--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)
NOV							
25...	<1	82	1	2	9	7	1
MAR							
18...	<1	80	<1	<1	3	60	<1
MAY							
13...	<1	73	2	4	3	67	1
SEP							
18...	1	77	<1	<1	3	11	<1

DATE	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)	SEDI-MENT, SUS-PENDED (MG/L)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY)
NOV							
25...	1	<0.1	<1	<1	19	18	1320
MAR							
18...	12	<0.1	<1	<1	7	3	228
MAY							
13...	12	<0.1	<1	<1	5	6	554
SEP							
18...	1	<0.1	<1	<1	13	--	--

COLUMBIA RIVER BASIN

PEND OREILLE RIVER BASIN

Smaller reservoirs in Pend Oreille River basin in Montana

12325000 GEORGETOWN LAKE.--Lat 46°12'55", long 113°16'40", in SW1/4 sec.6, T.5 N., R.13 W., Granite County, Hydrologic Unit 17010202, at dam on Flint Creek, 2 mi west of Southern Cross, 8 mi south of Philipsburg, and at river mile 38.8. DRAINAGE AREA, 50.1 mi^2. PERIOD OF RECORD, October 1939 to current year. May to July 1948 daily elevations and contents, published in WSP 1080. Records of daily elevations since October 1940 are in files of Helena district office. Nonrecording gage read daily. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by The Montana Power Co.).

Reservoir is formed by masonry and concrete dam. Storage began about 1905 to store water for pumpage into Warm Springs Creek for use of reduction works of Anaconda Copper Mining Co. at Anaconda, or for release through Flint Creek for irrigation, power development, and recreation. Usable capacity, 31,040 acre-ft between elevation 6,398.00 ft, bottom of outlet pipes, and 6,429.50 ft, maximum design level. Figures given herein represent usable contents. Records furnished by The Montana Power Co. REVISED RECORDS, WSP 1316: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 31,700 acre-ft, July 8,9, 1980, elevation, 6,429.72 ft; minimum observed, 15,990 acre-ft, Apr. 28,29, 1957, elevation, 6,424.15 ft.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 31,040 acre-ft, June 25,30, elevation, 6,429.50 ft; minimum observed, 25,800 acre-ft, Nov. 2, elevation, 6,428.35 ft.

12332500 EAST FORK ROCK CREEK RESERVOIR.--Lat 46°07'54", long 113°22'48", in NE1/4 sec.6, T.4 N., R.14 W., Granite County, Hydrologic Unit 17010202, at dam on East Fork Rock Creek, 14 mi southwest of Philipsburg, and at river mile 9.7. DRAINAGE AREA, 30.3 mi^2. PERIOD OF RECORD, October 1939 to current year (seasonal records only for most years 1946-60, 1964, 1968). Records for October 1955 to April 1956, published in WSP 1446, have been found to be in error and should not be used. May to August 1948 scattered daily contents, published in WSP 1080. Elevations determined by hand levels from reference points at indefinite intervals. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

Reservoir is formed by earthfill dam with concrete spillway completed in 1937; storage began in 1936. Usable capacity, 16,040 acre-ft between elevation 5,990.0 ft, bottom of outlet, and 6,055.5 ft, spillway crest. Dead storage unknown. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Department of Natural Resources and Conservation. REVISED RECORDS, WSP 1316: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, in excess of 16,000 acre-ft, when reservoir was full and spilling at times in several years; no storage at times in 1955, 1961, 1966, 1973, 1977, and 1978.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 9,520 acre-ft, July 2, elevation, 6,037.0 ft; minimum observed, 1,240 acre-feet, Sept. 3, elevation, 6,001.8 ft.

12336500 NEVADA LAKE.--Lat 46°48'06", long 112°48'42", in NE1/4 sec.14, T.12 N., R.10 W., Powell County, Hydrologic Unit 17010203, at dam on Nevada Creek, 7 mi west of Finn. DRAINAGE AREA, 145 mi^2. PERIOD OF RECORD, October 1939 to current year (incomplete 1948, 1950-58, 1961-62, 1965-66, 1969-70). Nonrecording gage usually read at or near end of month. Prior to October 1976, published as Nevada Creek Reservoir near Finn. Prior to 1961, elevations determined by hand level from spillway. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

Reservoir is formed by earthfill dam with concrete spillway completed in 1938. Usable capacity, 12,640 acre-ft between elevation, 4,551.5 ft, bottom of outlet, and 4,616.0 ft, spillway crest. Dead storage, 12 acre-ft below elevation, 4,551.5 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Department of Natural Resources and Conservation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 13,520 acre-ft, June 3, 1953, elevation, 4,618.3 ft; no storage Aug. 14 to Oct. 31, 1973, Sept. 18, 1977, Sept. 15, 1988.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 12,370 acre-ft, June 3, elevation, 4,615.93 ft; minimum observed, 2,980 acre-ft, Sept. 30, interpolated.

12342000 PAINTED ROCKS LAKE.--Lat 45°43'06", long 114°16'45", in NE1/4SE1/4 sec.26, T.1 S., R.22 W., Ravalli County Hydrologic Unit 17010205, at dam on West Fork Bitterroot River, 7 mi upstream from Nez Perce Creek, 16.5 mi southwest of Conner, 23 mi south of Darby, and at river mile 19.8. DRAINAGE AREA, 317 mi^2. PERIOD OF RECORD, June 1940 to current year (incomplete 1956-58, 1960-61). Prior to December 1958, figures of contents may be total or usable. Records for August 1954, published only in WSP 1736. May to September 1948 scattered daily contents published in WSP 1080. Prior to October 1959, published as West Fork Bitterroot River Reservoir near Conner. Elevations determined at or near end of month by hand levels from spillway or from staff gage on right wingwall above spillway. Prior to 1959, elevations determined by measuring from floor of control tower. Datum of gage is at National Geodetic Vertical Datum of 1929.

Reservoir is formed by earthfill dam with concrete spillway completed in 1940. Usable capacity, 31,700 acre-ft between elevation 4,625.5 ft, bottom of outlet, and 4,725.5 ft, spillway crest. Dead storage, 656 acre-ft below elevation 4,625.5 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Department of Natural Resources and Conservation. REVISED RECORDS, WSP 1316: Drainage area.

EXTREMES OF PERIOD OF RECORD: Maximum contents observed, 33,930 acre-ft, June 18, 1974, May 30, 1991, elevation, 4,728.7 ft; no storage October 1940 to January 1941, March 1942, March, April 1954, Apr. 25, 1973, winter of 1973-74, 1974-75, November, December 1976, January through March 1982, November 1985 through February 1986, October 1987 to March 1988.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 33,930 acre-ft, May 30, elevation, 4,728.7 ft; minimum observed, 1,130 acre-ft, Feb. 5, elevation, 4,637.5 ft.

Smaller reservoirs in Pend Oreille River basin in Montana--Continued

12344500 LAKE COMO.--Lat 46°03'40", long 114°14'00", in NE1/4NW1/4 sec.32, T.4 N., R.21 W., Ravalli County, Hydrologic Unit 17010205, at dam on Rock Creek, 4 mi northwest of Darby, and at river mile 3.6. DRAINAGE AREA, 54.6 mi^2. PERIOD OF RECORD: October 1939 to current year. April to August 1948 scattered daily gage height and content published in WSP 1080. Prior to October 1967, published as Como Lake. Nonrecording gage read at or near end of month in winter and more often during irrigation season but only monthend figures supplied. Datum of gage is at National Geodetic Vertical Datum of 1929.

Reservoir is formed by earthfill dam with concrete spillway completed in 1909. Usable capacity, 34,920 acre- ft between elevation 4,188.0 ft, bottom of outlet, and 4,242.5 ft, spillway crest. Dead storage unknown below elevation, 4,188.0 ft, elevation of natural lake outlet. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Bitterroot Irrigation District. REVISED RECORDS, WSP 1316: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 36,920 acre-ft, June 30, 1957, June 30, 1960, July 1, 1963, June 1, 1964, elevation, 4,244 ft; no storage at times in several years.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 33,050 acre-ft, June 30, elevation, 4,240.5 ft; minimum observed, 1,900 acre-ft, Sept. 30, elevation 4,196.6 ft.

CAMAS RESERVOIRS.--A group of four reservoirs in the Little Bitterroot River basin operated for irrigation and recreation. Nonrecording gages are set to approximate National Geodetic Vertical Datum of 1929 and are read on the last day of the month. Figures given herein represent usable contents. Records furnished by Bureau of Indian Affairs. May to July 1948 scattered daily contents for individual reservoirs, published in WSP 1080.

12372500 LITTLE BITTERROOT LAKE.--Lat 48°05'34", long 114°14'51", in SE1/4SE1/4SW1/4 sec.16, T.27 N., R.24 W., Flathead County, Hydrologic Unit 17010212, at dam on Little Bitterroot River, 2 mi southwest of Marion and at river mile 70.3. DRAINAGE AREA, 31.8 mi^2. PERIOD OF RECORD, December 1939, April 1940, September 1940 to current year.

Reservoir is formed by earthfill dam; storage began in 1918. Usable capacity, 26,400 acre-ft between elevation 3,897.98 ft and 3,906.48 ft. No dead storage. Prior to 1960, usable capacity, 24,000 acre-ft.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 26,800 acre-ft, May 31, 1959, elevation, 3.906.60 ft; no storage at times in 1939-46.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 23,700 acre-ft, May 31, June 30, elevation, 3,905.78 ft; minimum observed, 15,300 acre-ft, Oct. 31, Nov. 30, Dec. 31, Jan. 31, elevation, 3,903.48 ft.

12373500 HUBBART RESERVOIR.--Lat 47°55'43", long 114°43'53", in SE1/4NE1/4 sec.18, T.25 N., R.24 W., Flathead County, Hydrologic Unit 17010212, at dam on Little Bitterroot River, 9 mi northwest of Niarada and at river mile 55.8. DRAINAGE AREA: 114 mi^2. PERIOD OF RECORD, December 1939, April 1940, September 1940 to current year.

Reservoir is formed by concrete variable-radium dam; storage began in 1924. Usable capacity, 12,120 acre-ft between elevation 3,140.0 ft and 3,210.0 ft. No dead storage.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 13,050 acre-ft, May 31, 1959, elevation, 3,220.92 ft; no storage September to December 1959, Sept. 30, Oct. 1, 1973, October through November 1987.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 12,120 acre-ft, Apr. 30, May 31, June 30, elevation, 3,219.0 ft; minimum observed, 5,840 acre-ft, Sept. 30, elevation, 3,202.4 ft.

12375000 UPPER DRY FORK RESERVOIR.--Lat 47°44'55", long 114°40'53", in SE1/4SE1/4SW1/4 sec. 16, T.23 N., R.24 W., Sanders County, Hydrologic Unit 17010212, at dam on Dry Fork Creek, 4 mi northwest of Lonepine. DRAINAGE AREA, 8.53 mi^2. PERIOD OF RECORD. April 1940, September 1940 to current year.

Reservoir is formed by earthfill dam; storage began in 1940. Usable capacity, 2,810 acre-ft between elevation 2,900.0 ft and 2,928.5 ft. No dead storage. Prior to 1960, usable capacity, 2,700 acre-ft. Natural flow of Alder Creek in Thompson River basin is diverted in SW1/4 sec 16, T.23 N., R.25 W., and carried by inter-basin canal to upper Dry Fork Creek for storage in this reservoir.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 3,140 acre-ft, May 31, 1980, elevation, 2,929.5 ft; no storage at times in 1940, 1942, 1943.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 2,840 acre-ft, May 31, elevation, 2,928.6 ft; minimum observed, 1,350 acre-ft, Sept. 30, elevation, 2,922.5 ft.

12375500 DRY FORK RESERVOIR.--Lat 47°42'00", long 114°40'02", in SW1/4NW1/4NW1/4 sec.3, T.22 N., R.24 W., Sanders County, Hydrologic Unit 17010212, at dam on Dry Fork Creek, 1 mi west of Lonepine. DRAINAGE AREA, 17.8 mi^2. PERIOD OF RECORD, December 1939, April 1940, September 1940 to current year. Records published in WSP 1316 were listed in error and should not be used.

Reservoir is formed by earthfill dam; storage began in 1921. Usable capacity, 3,860 acre-ft between elevation is 2,830.5 ft and 2,856.3 ft. No dead storage. Prior to 1960, usable capacity, 4,000 acre-ft.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 4,270 acre-ft, May 31, 1980, elevation, 2,857.4 ft; no storage Aug. 31, 1944, Aug. 31, Sept. 30, 1946, Oct. 31, 1951.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 3,860 acre-ft, June 30, elevation, 2,856.3 ft; minimum observed, 880 acre-ft, Oct. 31, elevation, 2,844.0 ft.

COLUMBIA RIVER BASIN

PEND OREILLE RIVER BASIN

Smaller reservoirs in Pend Oreille River basin in Montana--Continued

MISSION VALLEY RESERVOIRS.--A group of eight reservoirs, in an area east of and tributary to Flathead River and between Flathead Lake and Jocko River, Lake County, Hydrologic Unit 17010212, is operated for irrigation.

PERIOD OF RECORD, December 1939, September 1940 to current year. Nonrecording gages are set to approximate National Geodetic Vertical Datum of 1929, and are read on the last day of the month. Figures given herein represent usable contents. Records furnished by Bureau of Indian Affairs. April to July 1948 monthend contents and daily maximum for individual reservoirs, published in WSP 1080.

12371000 TURTLE LAKE.--Lat 47°40'19", long 114°04'32", in SW1/4NW1/4NE1/4 sec.18, T.22 N., R.19 W., at outlet works 4 mi southeast of Polson, fed entirely by various canals; storage began in 1932. Prior to October 1968, published as "Twin Reservoir." Usable capacity, 899 acre-ft between elevation 3,061.0 ft and 3,090.5 ft. No dead storage.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 899 acre-ft, June 30, 1956, June 30, 1964, elevation, 3,090.5 ft; no storage at times in July 1941, August, September 1944, October 1957, July, August, September 1977.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 744 acre-ft, June 30, elevation, 3,088.0 ft; minimum observed, 175 acre-ft, Aug. 31, elevation, 3,072.2 ft.

12376700 LOWER CROW RESERVOIR.--Lat 47°30'09", long 114°13'35", in SW1/4SE1/4SE1/4 sec.11, T.20 N., R.21 W., at outlet works on Crow Creek, 5.2 mi northwest of Charlo, at at river mile 3.44; storage began in 1933. Usable capacity 10,350 acre-ft between elevation 2,800 ft and 2,877.0 ft. No dead storage.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 10,770 acre-ft, May 21, 22, 1948, elevation, 2,878.2 ft; no storage Sept. 30, 1963, Oct. 31, Nov. 30, 1981.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 9,680 acre-ft, June 30, elevation, 2,875.0 ft; minimum observed, 7,520 acre-ft, Dec. 31, Jan. 31, elevation 2,867.7 ft.

12377200 MISSION RESERVOIR.--Lat 47°18'54", long 114°01'15", in NW1/4SW1/4SE1/4 sec.15, T.18 N., R.19 W., at outlet works on Mission Creek, 4 mi east of St. Ignatius and at river mile 16.7; storage began in 1935. Usable capacity 7,250 acre-ft between elevation 3,340.7 ft and 3,406.0 ft.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 8,370 acre-ft, June 30, 1970, June 30, 1976, elevation, 3,409.8 ft; no storage at times during September 1949, February, March, 1964.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 8,400 acre-ft, June 30, elevation, 3,409.9 ft; minimum observed, 102 acre-ft, Oct. 31, elevation, 3,360.4 ft.

12377300 ST. MARYS LAKE.--Lat 47°15'58", long 113°56'08", in SW1/4NE1/4NE1/4 sec.6, T.17 N., R.18 W., at outlet works on Dry Creek, 8 mi southwest of St. Ignatius, fed by water diverted from Jocko River; storage began in 1919. Prior to October 1968, published as "Tabor Reservoir." Usable capacity, 23,300 acre-ft between elevation 3,911.5 ft and 4,025.0 ft, not including contents of natural lake. No dead storage.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 23,510, acre-ft, June 30, 1976, June 30, 1978, elevation, 4,025.7 ft; no storage Sept. 30, 1969.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 23,170 acre-ft, June 30, elevation, 4,024.5 ft; minimum observed, 457 acre-ft, Dec. 31, Jan. 31, Feb. 28, elevation, 3,914.5 ft.

12377900 PABLO RESERVOIR.--Lat 47°38'25", long 114°08'33", in SW1/4SW1/4NE1/4 sec.27, T.22 N., R.20 W., at outlet works 3 mi south of Polson, 3 mi northwest of Pablo, fed entirely by various canals, some water supplies by Flathead pumping plant; storage began in 1914. Usable capacity, 27,100 acre-ft between elevation 3,179 ft, gate sill, and 3,210.2 ft. No dead storage.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 28,120 acre-ft, June 30, 1968, elevation, 3,210.77 ft; no storage at times in several years.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 26,110 acre-ft, June 30, elevation, 3,209.8 ft; minimum observed, 1,240 acre-ft, Sept. 30, elevation, 3,187.5 ft.

12378200 McDONALD RESERVOIR.--Lat 47°25'31", long 113°59'27", in SE1/4NE1/4NE1/4 sec.10, T.19 N., R.19 W., at outlet works on Post Creek, 9 mi east of Charlo, and at river mile 12.4; storage began in 1919. Usable capacity, 8,220 acre-ft between elevation 3,545.0 ft, and 3,598.0 ft, not including contents of natural lake. No dead storage.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 8,330 acre-ft, June 30, 1983, elevation, 3,598.5 ft; no storage Aug. 31, 1961, Aug. 30, 1966, Oct. 31, 1971, Apr. 30, 1972.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 7,410 acre-ft, June 30, elevation, 3,593.9 ft; minimum observed, 300 acre-ft, Oct. 31, elevation, 3,545.1 ft.

12378300 KICKING HORSE RESERVOIR.--Lat 47°27'25", long 114°04'35", in SE1/4NE1/4NE1/4 sec.36, T.20 N., R.20 W., at outlet works 4 mi northeast of Charlo, fed entirely by various canals; storage began in 1930. Usable capacity 8,350 acre-ft between elevation 3,062.14 ft and 3,061.94 ft. Dead storage, 70 acre-ft below elevation 3,042.0 ft. Formerly published as 12379700 Kicking Horse Reservoir prior to 1988 water year.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 10,320 acre-ft, June 30, 1976, May 31, 1980, elevation, 3,064.4 ft; no storage Aug. 31, 1961.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 9,680 acre-ft, June 30, elevation, 3,063.6 ft; minimum observed, 1,330 acre-ft, Mar. 31, elevation, 3,049.4 ft.

Smaller reservoirs in Pend Oreille River basin in Montana--Continued

12378400 NINEPIPE RESERVOIR.--Lat 47°27'20", long 114°08'08", in NE1/4NW1/4NW1/4 sec.34, T.20 N., R.20 W., at outlet works 2 mi northeast of Charlo, fed entirely by various canals; storage began in 1911. Usable capacity 14,870 acre-ft between elevation 2,895.4 ft and 3,010.0 ft. No dead storage. Formerly published as 12380000 Ninepipe Reservoir prior to 1988 water year.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 16,950 acre-ft, June 30, 1974, elevation, 3,012.3 ft; no storage Aug. 31, 1961.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 15,510 acre-ft, June 30, elevation, 3,010.4 ft; minimum observed, 2,130 acre-ft, Sept. 30, elevation, 2,998.4 ft.

12380000 UPPER JOCKO LAKE.--Lat 47°11'34", long 113°42'44, in NE1/4NW1/4 sec. 36, T. 17 N., R. 17 W., Missoula County, Hydrologic Unit 17010212, at dam on Jocko River, 17.3 mi southeast of Arlee, and at river mile 41.8. DRAINAGE AREA, 2.99 mi^2. PERIOD OF RECORD, April 1968 to current year. Nonrecording gage read at end of month. U.S. Geological Survey began publishing data October 1988. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Bureau of Indian Affairs).

Reservoir is formed by earthfill dam; storage began in 1967. Was previously known as "Black Lake" prior to dam construction. Usable capacity, 4,440 acre-ft between elevation 4,390.0 ft, outlet sill, and 4,440.0 ft, spillway elevation. Dead storage, 763 acre-ft. Transmountain diversion takes water from Placid Creek in Clearwater River basin in SW1/4 sec. 29, T. 17 N., R. 16 W., to Upper Jocko Lake, thence to Lower Jocko Lake. Some water may then be diverted to St. Mary's Lake for use in the Mission Valley. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Bureau of Indian Affairs.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 4,290 acre-ft, May 31, 1971, elevation, 4,439.1 ft; no storage at times each year.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 3,300 acre-ft, May 31, elevation, 4,426.1 ft; no storage most of year.

12380500 LOWER JOCKO LAKE.--Lat 47°12'10", long 113°45'35", in NW1/4SW1/4NW1/4 sec.27, T.17 N., R.17 W., Missoula County, Hydrologic Unit 17010212, at dam on Jocko River, 15 mi east of Arlee, and at river mile 39.3. DRAINAGE AREA, 7.39 mi^2. PERIOD OF RECORD, December 1939, April 1940, September, 1940, to current year (no winter records most years since 1947). Records for November 1957, published only in WSP 1736. May to July 1948 scattered daily contents, published in WSP 1080. Nonrecording gage read at end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Bureau of Indian Affairs).

Reservoir is formed by earthfill dam; storage began in 1937. Usable capacity, 5,380 acre-ft between elevation 4,267.0 ft and 4,340.0 ft. Prior to 1960, usable capacity, 7,600 acre-ft at elevation 4,350 ft. Dead storage unknown below elevation 4,267 ft, elevation of natural lake outlet. Transmountain diversion takes water from Placid Creek in Clearwater River basin in SW1/4 sec.29, T.17 N., R.16 W., to Upper Jocko Lake, thence to Lower Jocko Lake. Some water may then be diverted to St. Mary's Lake for use in the Mission Valley. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Bureau of Indian Affairs.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 6,700 acre-ft, June 9, 1948, elevation, 4,342.7 ft; no storage at times.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 4,600 acre-ft, June 30, elevation, 4,323.7 ft; no storage most of year.

12390000 THOMPSON FALLS RESERVOIR.--Lat 47°35'42", long 115°21'36", in NE1/4 sec.7, T.21 N., R.29 W., Sanders County, Hydrologic Unit 17010213, at dam on Clark Fork at Thompson Falls, at river mile 208.0. DRAINAGE AREA, 20,968 mi^2. PERIOD OF RECORD, October 1939 to current year. Nonrecording gage is read several times daily but only monthend figures supplied. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by The Montana Power Company).

Reservoir is formed by two concrete dams, first generator installed July 1915. Usable capacity, 14,970 acre- ft between elevation 2,380.0 ft, spillway crest, and 2,396.0 ft, top of flashboards. Dead storage unknown. Figures given herein represent usable contents. Water is used for power development and recreation. Records furnished by The Montana Power Company.

EXTREMES FOR PERIOD OF RECORD: Maximum monthend contents observed, 16,190 acre-ft, Feb. 28, 1991, elevation, 2,396.8 ft; no storage July 31, 1958.

EXTREMES FOR CURRENT YEAR: Maximum monthend contents observed, 16,190 acre-ft, Feb. 28, elevation, 2,396.8 ft; minimum observed, 14,680 acre-ft, Aug. 31, elevation, 2,395.8 ft.

12391300 NOXON RAPIDS RESERVOIR.--Lat 47°57'38", long 115°44'00", in NE1/4SW1/4SW1/4 sec.33, T.26 N., R.32 W., Sanders County, Hydrologic Unit 17010213, at dam on Clark Fork, 3 mi southeast of Noxon, 7.2 mi upstream from Bull River, and at river mile 169.7. DRAINAGE AREA, 21,833 mi^2. PERIOD OF RECORD, April 1959 to current year. Prior to October 1962, published as "Noxon Reservoir." Record of daily elevation on file in Helena district office. Water-stage recorder, midnight readings. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by the Washington Water Power Company).

Reservoir is formed by concrete and earthfill dam, construction began in 1955, completed in 1959. Storage began Apr. 3, 1959. Usable capacity, 334,600 acre-ft between elevation 2,270.00 ft, minimum operating level, and 2,331.00 ft. Figures given herein represent usable contents. Water is used for power production, flood control, and recreation. Records furnished by The Washington Water Power Company.

EXTREMES FOR PERIOD OF RECORD: Maximum contents, 335,400 acre-ft, Apr. 7, 1960, elevation, 2,331.10 ft; minimum since first filling, 26,380 acre-ft, May 10, 1967, elevation, 2,277.15 ft.

EXTREMES FOR CURRENT YEAR: Maximum contents, 334,500 acre-ft, July 1, elevation, 2,330.99 ft; minimum, 285,900 acre-ft, May 7, elevation, 2,324.60 ft.

COLUMBIA RIVER BASIN

PEND OREILLE RIVER BASIN

Smaller reservoirs in Pend Oreille River basin in Montana--Continued

Monthend contents, in acre-feet, water year October 1990 to September 1991

Date	Georgetown Lake	East Fork Rock Creek Reservoir	Nevada Lake	Painted Rocks Lake	Lake Como	Camas Reservoir	Mission Valley Reservoirs
Sept. 30	28,390	--	b7,400	b6,480	a3,530	25,020	22,140
Oct. 31	a25,800	--	b6,960	a2,890	a5,580	25,200	22,940
Nov. 30	28,280	--	b6,430	a2,360	a8,760	25,910	23,320
Dec. 31	28,690	--	a6,560	a2,420	a10,740	25,940	22,360
Jan. 31	b29,200	--	a6,690	a1,320	a12,110	25,940	22,560
Feb. 28	b29,440	--	a6,810	c1,130	b13,990	31,200	23,370
Mar. 31	b29,550	--	b8,260	a2,070	b16,230	36,630	25,760
Apr. 30	b29,850	a5,350	b9,750	9,700	b18,370	40,970	28,640
May 31	30,860	a6,500	a12,130	a33,890	31,380	42,450	43,830
June 30	31,040	a9,320	a11,510	b32,750	b33,050	42,500	100,700
July 31	29,670	a6,020	10,310	a30,010	c25,900	38,660	75,970
Aug. 31	29,670	a1,670	4,940	a14,900	b5,620	32,180	34,560
Sept. 30	27,770	a2,080	b2,910	b4,010	1,900	28,110	15,820

Date	Upper Jocko Lake	Lower Jocko Lake	Thompson Falls Reservoir	Noxon Rapids Reservoir
Sept. 30	0	0	16,040	325,900
Oct. 31	0	0	15,730	319,800
Nov. 30	0	0	15,580	316,200
Dec. 31	0	0	15,730	328,700
Jan. 31	0	0	16,040	308,800
Feb. 28	0	0	16,190	306,700
Mar. 31	0	0	15,890	331,600
Apr. 30	0	0	15,890	308,900
May 31	3,300	3,660	15,640	331,300
June 30	3,140	4,600	15,780	332,500
July 31	692	3,430	15,790	318,600
Aug. 31	0	361	14,680	322,900
Sept. 30	0	0	16,020	321,900

a Interpolated.
b Figure of contents for first day of following month.
c Estimate.

CHEMICAL QUALITY OF PRECIPITATION

PRICKLY PEAR CREEK BASIN

462905112035401 MC BEATH RESIDENCE NEAR CLANCY, MT (MT07)
(National trends network)

LOCATION.--Lat 46°29'05", long 112°03'54", in NE1/4NW1/4NE1/4 sec.2, T.8 N., R.4 W., Jefferson County, at National Forest boundary fence at private residence on Lump Gulch Road, 5.1 mi west of Clancy and 10 mi south of Helena.

PERIOD OF RECORD.--Water years 1981-1982, 1984 to current year. Prior to Oct. 1984, published as 462905112034001

EQUIPMENT.--The sample collector is an Aerochem Metrics Model 301 precipitation collector. An automatic sensor detects occurrences of precipitation, activating a motor which removes a cover from the wetfall collection vessel. When precipitation ceases the cycle is reversed. The sampling vessel is polyethylene and has a collection diameter of 28.6 cm and a capacity of 13 liters. Precipitation is measured using a Belfort Universal rain gage, series 5-780 with a event recorder.*

REMARKS.--Because laboratory quality assurance may not have been completed, data contained in the tables are considered preliminary and are subject to updating.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.01	.00	.00	---	.00	.08	.00	.00	.00	---	.05	.00
2	.02	.00	.00	---	.00	.01	.07	.08	.08	---	.00	.00
3	.00	.00	.00	.00	.00	.00	.04	.04	.00	.00	.00	.00
4	.00	.11	.03	.00	.00	.12	.00	.03	.29	.00	.00	.00
5	.00	.14	.01	.00	.00	.02	.00	.00	.45	.00	.00	.00
6	.02	.00	.00	.01	.00	.00	.00	.00	.02	.00	.02	.00
7	.00	.00	.00	.00	.00	.00	.00	.02	.23	.00	.00	.00
8	.00	.01	.00	.00	.00	.00	.00	.02	.00	.00	.00	.39
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02	.00	.11
10	.01	.00	.00	.00	.00	.01	.00	.01	.00	.08	.01	.16
11	.00	.00	.02	.00	.00	.00	.92	1.00	.00	.00	.00	.93
12	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.01	.00	.00	.02	.00	.02	.01	.00	.00	.02	.00	.22
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.19
15	.00	.00	.00	.13	.00	.01	.00	.00	.00	.01	.00	.00
16	.10	.00	.00	.00	.01	.37	.05	.00	.00	.02	.00	.00
17	.00	.00	.04	.00	.00	.00	.16	.34	.00	.00	.00	.05
18	.00	.00	.26	.20	.01	.00	.05	.98	.00	.00	.00	.00
19	.00	.00	.00	.54	.00	.00	.00	.00	.26	.00	.00	.00
20	.00	.07	.00	.00	.00	.01	.00	.04	.27	.00	.00	.00
21	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.01
22	.00	.00	.00	.04	.12	.00	.00	.00	.90	.00	.00	.00
23	.00	.00	.00	.00	.06	.04	.00	.00	.00	.00	.04	.00
24	.00	.00	.00	.07	.00	.07	.02	.00	.18	.00	.00	.00
25	.00	.05	---	.00	.00	.32	.10	.05	---	.38	.00	.00
26	.00	.00	---	.00	.00	.00	.00	.00	---	.00	.00	.00
27	.00	.05	.00	.07	.00	.00	.00	.17	---	.00	.37	.00
28	.00	.00	.22	.28	.01	.00	.00	.00	---	.00	.20	.00
29	.00	.00	.04	.00	---	.00	.06	.10	---	.00	.00	.00
30	.00	.07	---	.00	---	.00	.00	.33	---	.00	.00	.00
31	.00	---	---	.00	---	.00	---	.01	---	.00	.00	---
TOTAL	0.19	0.50	0.62	1.36	0.21	1.13	1.48	3.22	2.68	0.58	0.69	2.06

*The use of the brand name in this report is for identificaton purposes only and does not imply endorsement by the U.S. Geological Survey.

CHEMICAL QUALITY OF PRECIPITATION

PRICKLY PEAR CREEK BASIN

462905112035401 MC BEATH RESIDENCE NEAR CLANCY, MT (MT07)--Continued

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TOTAL PRECIP-ITATION FOR DEFINED PERIOD (IN) (00193)	SPEC. CONDUC-TANCE FIELD ATM DEP WET TOT (US/CM) (83154)	SPEC. CONDUC-TANCE LAB ATM DEP WET TOT (US/CM) (83156)	PH FIELD ATM DEP WET T (UNITS) (83106)	PH LAB ATM DEP WET T (UNITS) (83107)	CALCIUM ATM DEP WET DIS (MG/L) (82932)	MAG-NESIUM ATM DEP WET DIS (MG/L) (83002)
SEP 25-OCT 02	0.03	--	7.5	--	6.59	0.180	0.031
OCT 02-09	0.02	--	8.9	--	5.55	0.205	0.104
OCT 09-16	0.14	8.7	3.1	4.92	5.94	0.098	0.015
OCT 16-23	0.0	--	--	--	--	--	--
OCT 23-30	0.0	--	--	--	--	--	--
OCT 30-NOV 06	0.25	6.1	3.1	5.03	5.64	0.029	0.007
NOV 06-13	0.01	--	--	--	--	--	--
NOV 13-20	0.02	--	8.2	--	5.99	0.122	0.014
NOV 20-27	0.10	9.9	3.6	4.80	5.32	0.100	0.011
NOV 27-DEC 04	0.12	5.4	2.7	5.18	5.59	0.094	0.013
DEC 04-11	0.06	10.7	3.6	4.79	5.87	0.118	0.022
DEC 11-18	0.05	--	3.9	--	5.85	0.195	0.022
DEC 18-26	0.25	6.0	4.4	5.15	5.26	0.095	0.013
DEC 26 1990-JAN 02 1991	0.26	4.1	2.0	5.27	5.79	0.038	0.009
JAN 02-08	0.01	--	--	--	--	--	--
JAN 08-15	0.02	--	4.8	--	5.96	0.007	<0.001
JAN 15-22	0.87	4.4	3.5	5.17	5.18	0.024	<0.003
JAN 22-29	0.46	5.9	4.3	4.95	5.19	0.055	0.009
JAN 29-FEB 05	0.0	--	--	--	--	--	--
FEB 05-12	0.0	--	--	--	--	--	--
FEB 12-19	0.02	--	37.0	--	4.14	0.185	0.018
FEB 19-26	0.18	8.5	6.7	4.93	5.16	0.197	0.027
FEB 26-MAR 05	0.24	6.9	2.3	5.05	5.71	0.109	0.013
MAR 05-12	0.01	--	79.9	--	4.69	--	--
MAR 12-19	0.40	8.0	3.9	4.93	5.38	0.048	0.007
MAR 19-26	0.49	8.0	4.9	5.15	5.88	0.312	0.034
MAR 26-APR 02	0.0	--	--	--	--	--	--
APR 02-09	0.11	26.6	--	4.30	--	--	--
APR 09-16	0.93	6.5	2.2	4.98	5.60	0.045	0.007
APR 16-23	0.26	15.3	4.0	4.58	5.65	0.133	0.018
APR 23-30	0.18	17.4	6.0	4.59	5.69	0.282	0.028
APR 30-MAY 07	0.17	16.3	9.7	4.73	6.39	0.479	0.048
MAY 07-14	1.03	6.2	5.8	5.78	5.96	0.410	0.035
MAY 14-21	1.36	6.2	4.5	5.51	5.86	0.301	0.031
MAY 21-28	0.22	16.0	5.1	4.60	5.70	0.123	0.012
MAY 28-JUN 04	0.52	13.8	7.7	4.81	5.47	0.452	0.026
JUN 04-11	0.99	22.4	15.6	4.49	4.73	0.342	0.047

CHEMICAL QUALITY OF PRECIPITATION

PRICKLY PEAR CREEK BASIN

462905112035401 MC BEATH RESIDENCE NEAR CLANCY, MT (MT07)--Continued

CHEMICAL ANALYSES, WATER YEAR SEPTEMBER 1990 TO OCTOBER 1991

DATE	SODIUM ATM DEP WET DIS (MG/L) (83138)	POTASSIUM ATM DEP WET DIS (MG/L) (83120)	SULFATE ATM DEP WET DIS AS SO4 (MG/L) (83160)	CHLORIDE ATM DEP WET DIS (MG/L) (82944)	NITROGEN NITRATE ATM DEP WET DIS AS NO3 (MG/L) (83071)	NITROGEN AMMON. ATM DEP WET DIS AS NH4 (MG/L) (83047)	PHOSPHORUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111)
SEP 25-OCT 02	0.070	0.024	0.45	0.17	0.53	0.030	0.050
OCT 02-09	0.221	0.959	0.89	0.19	<0.03	<0.020	0.020
OCT 09-16	0.022	0.025	0.31	0.06	0.31	0.080	<0.020
OCT 16-23	--	--	--	--	--	--	--
OCT 23-30	--	--	--	--	--	--	--
OCT 30-NOV 06	0.011	0.005	0.26	0.05	0.34	0.050	<0.020
NOV 06-13	--	--	--	--	--	--	--
NOV 13-20	0.528	0.024	0.63	0.15	1.49	0.370	0.050
NOV 20-27	0.103	0.006	0.16	0.06	0.22	<0.020	<0.020
NOV 27-DEC 04	0.051	0.018	0.17	0.06	0.19	<0.020	<0.020
DEC 04-11	0.246	0.026	0.22	0.13	0.25	<0.020	<0.020
DEC 11-18	0.097	0.018	0.33	0.09	0.45	0.120	<0.020
DEC 18-26	0.066	0.023	0.30	0.10	0.60	0.060	<0.020
DEC 26 1990-JAN 02 1991	0.033	0.008	0.15	0.04	0.17	<0.020	<0.020
JAN 02-08	--	--	--	--	--	--	--
JAN 08-15	0.036	0.001	0.02	0.02	0.03	<0.010	<0.006
JAN 15-22	0.022	0.006	0.11	0.03	0.22	<0.020	<0.020
JAN 22-29	0.026	0.011	0.26	0.05	0.44	0.020	<0.020
JAN 29-FEB 05	--	--	--	--	--	--	--
FEB 05-12	--	--	--	--	--	--	--
FEB 12-19	0.188	0.221	0.36	0.14	0.82	0.120	<0.020
FEB 19-26	0.066	0.016	0.42	0.07	0.42	0.140	<0.020
FEB 26-MAR 05	0.075	0.008	0.11	0.08	0.27	<0.020	<0.020
MAR 05-12	--	--	--	--	--	--	--
MAR 12-19	0.038	0.003	0.29	<0.03	0.39	0.070	<0.020
MAR 19-26	0.106	0.010	0.48	0.14	0.82	0.110	<0.020
MAR 26-APR 02	--	--	--	--	--	--	--
APR 02-09	--	--	--	--	--	--	--
APR 09-16	0.018	0.008	0.17	<0.03	0.21	<0.020	<0.020
APR 16-23	0.093	<0.003	0.43	0.12	0.55	0.070	<0.020
APR 23-30	0.059	0.020	0.87	0.06	0.65	0.150	0.040
APR 30-MAY 07	0.128	0.031	1.11	0.13	0.97	0.280	0.040
MAY 07-14	0.036	0.015	0.73	0.05	0.26	0.020	<0.020
MAY 14-21	0.058	0.012	0.68	0.05	0.50	0.140	<0.020
MAY 21-28	0.083	0.003	0.66	0.07	0.66	0.220	<0.020
MAY 28-JUN 04	0.030	0.029	1.33	0.06	0.67	0.170	0.030
JUN 04-11	0.940	0.080	2.06	0.16	1.32	0.310	<0.020

CHEMICAL QUALITY OF PRECIPITATION

PRICKLY PEAR CREEK BASIN

462905112035401 MC BEATH RESIDENCE NEAR CLANCY, MT (MT07)--Continued

CHEMICAL ANALYSES, WATER YEAR SEPTEMBER 1990 TO OCTOBER 1991

DATE	TOTAL PRECIP-ITATION FOR DEFINED PERIOD (IN) (00193)	SPEC. CONDUC-TANCE FIELD ATM DEP WET TOT (US/CM) (83154)	SPEC. CONDUC-TANCE LAB ATM DEP WET TOT (US/CM) (83156)	PH FIELD ATM DEP WET T (UNITS) (83106)	PH LAB ATM DEP WET T (UNITS) (83107)	CALCIUM ATM DEP WET DIS (MG/L) (82932)	MAG-NESIUM ATM DEP WET DIS (MG/L) (83002)
JUN 1991 11-18	0.0	--	--	--	--	--	--
JUN 18-25	1.61	9.2	7.9	5.32	5.29	0.318	0.039
JUN 25-JUL 02	0.38	7.8	6.4	4.98	5.07	0.135	0.021
JUL 02-09	0.0	--	--	--	--	--	--
JUL 09-16	0.18	19.2	14.5	4.66	5.51	0.528	0.091
JUL 16-23	0.02	--	60.8	--	4.24	2.40	0.309
JUL 23-30	0.38	6.6	5.5	5.01	5.09	0.069	0.009
JUL 30-AUG 06	0.05	12.8	11.5	5.43	6.00	0.583	0.077
AUG 06-13	0.03	--	43.5	--	6.73	1.73	0.171
AUG 13-20	0.0	--	--	--	--	--	--
AUG 20-27	0.04	--	16.6	--	5.56	0.589	0.071
AUG 27-SEP 03	0.57	8.4	7.0	5.23	5.20	0.138	0.014
SEP 03-10	0.50	15.0	7.3	4.66	5.01	0.086	0.005
SEP 10-17	1.54	5.4	4.2	5.72	5.10	0.035	0.003
SEP 17-24	0.02	--	11.0	--	6.33	0.335	0.057
SEP 24-OCT 01	0.0	--	--	--	--	--	--

DATE	SODIUM ATM DEP WET DIS (MG/L) (83138)	POTAS-SIUM ATM DEP WET DIS (MG/L) (83120)	SULFATE ATM DEP WET DIS AS SO4 (MG/L) (83160)	CHLO-RIDE ATM DEP WET DIS (MG/L) (82944)	NI-TROGEN NITRATE ATM DEP WET DIS AS NO3 (MG/L) (83071)	NI-TROGEN AMMON. ATM DEP WET DIS AS NH4 (MG/L) (83047)	PHOS-PHORUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111)
JUN 1991 11-18	--	--	--	--	--	--	--
JUN 18-25	0.097	0.039	0.79	0.18	1.08	0.120	<0.020
JUN 25-JUL 02	0.077	0.069	0.43	0.09	0.61	<0.020	<0.020
JUL 02-09	--	--	--	--	--	--	--
JUL 09-16	0.105	0.331	2.22	0.28	1.64	0.520	<0.020
JUL 16-23	0.525	0.710	10.4	0.59	4.38	0.890	0.050
JUL 23-30	0.037	0.015	0.28	0.05	0.55	<0.020	<0.020
JUL 30-AUG 06	0.177	0.127	1.17	0.23	2.04	0.440	<0.020
AUG 06-13	0.360	0.165	4.15	0.61	3.66	0.240	<0.122
AUG 13-20	--	--	--	--	--	--	--
AUG 20-27	0.147	0.110	1.68	0.27	3.04	0.700	0.230
AUG 27-SEP 03	0.034	0.021	0.59	0.12	1.01	0.260	<0.020
SEP 03-10	0.028	0.032	0.53	0.07	0.78	0.160	<0.020
SEP 10-17	0.032	0.003	0.31	0.05	0.33	0.050	<0.020
SEP 17-24	0.199	0.134	1.27	0.29	1.24	0.160	0.040
SEP 24-OCT 01	--	--	--	--	--	--	--

CHEMICAL QUALITY OF PRECIPITATION

MILK RIVER BASIN

482958109475101 NORTHERN MONTANA AGRICULTURAL RESEARCH CENTER NEAR HAVRE, MT (MT98)
(National trends network)

LOCATION.--Lat 48°29'58", long 109°47'51", in NE1/4SW1/4SW1/4 sec.28, T.32 N., R.15 E., Hill County, at Northern Montana Agricultural Research Center Experiment Station, 3/4 mile south of U.S. Highway 87, 5.7 miles southwest of Havre.

PERIOD OF RECORD.--October 1985 to September 1986.

EQUIPMENT.--The sample collector is an Aerochem Metrics Model 301 precipitation collector. An automatic sensor detects occurrences of precipitation, activating a motor which removes a cover from the wetfall collection vessel. When precipitation ceases the cycle is reversed. The sampling vessel is polyethylene and has a collection diameter of 28.6 cm and a capacity of 13 liters. Precipitation is measured using a Belfort Universal rain gage, series 5-780 with a event recorder.*

REMARKS.--Because laboratory quality assurance may not have been completed, data contained in the tables are considered preliminary and are subject to updating.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.05	.00	---	.00	.09	.00	.00	.00	.00	.07	.00
2	.16	.00	.03	---	.00	.00	.00	.00	.01	.00	.00	.00
3	.00	.00	.00	---	.00	.00	.00	.11	.14	.00	.00	.00
4	.03	.00	.00	---	.00	.02	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	---	.00	.01	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	---	.00	.00	.00	.00	.70	.00	.00	.00
7	.00	.00	.00	---	.00	.01	.00	.00	.10	.00	.00	.00
8	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.02	.00	.01	.00	.00	.01	.08	.00	.00	.24	.00	.00
11	.00	.00	.06	.00	.00	.00	.98	.05	.04	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.77	.00	.00	.63	.00
13	.00	.00	.00	.00	.00	.00	.00	.16	.00	.20	.00	.05
14	.00	.00	.00	.00	.00	.00	.00	.00	.02	.00	.45	.19
15	.05	.00	.00	.00	.00	.00	.00	.39	.00	.00	.02	.00
16	.02	.00	.03	.00	.00	.00	.02	.00	.00	.01	.00	.00
17	.01	.00	.05	.00	.14	.00	.02	.00	.00	.00	.00	.00
18	.00	.00	.13	.04	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.22	.00	.02	.00
20	.00	.04	.00	.00	.00	.00	.00	1.74	.77	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.30	.00	.00	.10
22	.00	.00	.00	.00	.00	.10	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.07	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.09	.00	.02	.03	.00	.00	.00
25	.00	.00	---	.00	.00	.15	.03	.00	.47	.00	.00	.00
26	.00	.00	---	.00	.00	.20	.00	.00	.05	.16	.00	.00
27	.00	.00	.07	.02	.09	.00	.48	.00	.00	.00	.04	.00
28	.00	.00	.25	.00	.25	.00	.24	.88	.36	.00	.00	.00
29	.00	.00	---	.00	---	.00	.04	.00	.04	.00	.00	.00
30	.00	.03	---	.00	---	.00	.00	.06	.04	.00	.00	.00
31	.05	---	---	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	0.34	0.12	0.63	0.06	0.48	0.68	1.89	4.25	3.29	0.61	1.23	0.34

*The use of the brand name in this report is for identification purposes only and does not imply endorsement by the U.S. Geological Survey.

CHEMICAL QUALITY OF PRECIPITATION

MILK RIVER BASIN

482958109475101 NORTHERN MONTANA AGRICULTURAL RESEARCH CENTER NEAR HAVRE, MT (MT98)--Continued

CHEMICAL ANALYSES, WATER YEAR SEPTEMBER 1990 TO OCTOBER 1991

DATE	TOTAL PRECIP-ITATION FOR DEFINED PERIOD (IN) (00193)	SPEC. CONDUC-TANCE FIELD ATM DEP WET TOT (US/CM) (83154)	SPEC. CONDUC-TANCE LAB ATM DEP WET TOT (US/CM) (83156)	PH FIELD ATM DEP WET T (UNITS) (83106)	PH LAB ATM DEP WET T (UNITS) (83107)	CALCIUM ATM DEP WET DIS (MG/L) (82932)	MAG-NESIUM ATM DEP WET DIS (MG/L) (83002)
SEP 25-OCT 02	0.03	--	--	--	--	--	--
OCT 02-09	0.16	4.5	3.2	5.18	5.64	0.083	0.017
OCT 09-16	0.07	9.0	6.2	4.88	5.95	0.236	0.042
OCT 16-23	0.03	--	10.6	--	6.38	0.174	0.043
OCT 23-30	0.0	--	--	--	--	--	--
OCT 30-NOV 06	0.10	11.4	6.4	4.78	5.78	0.204	0.035
NOV 06-13	0.0	--	--	--	--	--	--
NOV 13-20	0.0	--	--	--	--	--	--
NOV 20-27	0.13	5.8	5.0	4.91	5.52	0.121	0.027
NOV 27-DEC 04	0.06	--	4.6	--	5.68	0.128	0.025
DEC 04-11	0.05	9.1	7.6	4.94	6.02	0.340	0.121
DEC 11-18	0.23	7.9	5.1	5.07	5.91	0.263	0.073
DEC 18-26	0.0	--	--	--	--	--	--
DEC 26 1990-JAN 02 1991	0.32	10.5	4.6	4.77	5.31	0.065	0.014
JAN 02-08	0.33	8.5	7.2	4.71	4.95	0.039	0.016
JAN 08-15	0.0	--	--	--	--	--	--
JAN 15-22	0.04	--	6.2	--	6.00	0.076	0.021
JAN 22-29	0.02	--	--	--	--	--	--
JAN 29-FEB 05	0.0	--	--	--	--	--	--
FEB 05-12	0.0	--	--	--	--	--	--
FEB 12-19	0.14	8.1	4.3	4.79	5.34	0.066	0.016
FEB 19-26	0.0	--	--	--	--	--	--
FEB 26-MAR 05	0.46	8.7	6.2	4.94	5.31	0.105	0.017
MAR 05-12	0.02	--	--	--	6.14	--	--
MAR 12-19	0.0	--	--	--	--	--	--
MAR 19-26	0.54	9.5	6.9	4.94	5.51	0.073	0.011
MAR 26-APR 02	0.0	--	--	--	--	--	--
APR 02-09	0.0	--	--	--	--	--	--
APR 09-16	1.06	3.5	7.6	5.40	6.36	0.261	0.045
APR 16-23	0.04	--	17.3	--	6.20	--	--
APR 23-30	0.79	6.9	6.1	4.90	5.24	0.058	0.012
APR 30-MAY 07	0.11	16.4	7.0	4.60	5.66	0.196	0.022
MAY 07-14	0.98	7.6	5.4	5.13	5.82	--	--
MAY 14-21	2.13	6.2	5.8	5.45	6.16	0.480	0.049
MAY 21-28	0.94	3.3	2.7	5.32	5.58	0.067	0.007
MAY 28-JUN 04	0.24	9.4	12.6	5.22	5.64	0.487	0.076
JUN 04-11	0.80	3.8	3.9	5.08	5.33	0.026	<0.003

CHEMICAL QUALITY OF PRECIPITATION

MILK RIVER BASIN

482958109475101 NORTHERN MONTANA AGRICULTURAL RESEARCH CENTER NEAR HAVRE, MT (MT98)--Continued

CHEMICAL ANALYSES, WATER YEAR SEPTEMBER 1990 TO OCTOBER 1991

DATE	SODIUM ATM DEP WET DIS (MG/L) (83138)	POTASSIUM ATM DEP WET DIS (MG/L) (83120)	SULFATE ATM DEP WET DIS AS SO4 (MG/L) (83160)	CHLORIDE ATM DEP WET DIS (MG/L) (82944)	NITROGEN NITRATE ATM DEP WET DIS AS NO3 (MG/L) (83071)	NITROGEN AMMON. ATM DEP WET DIS AS NH4 (MG/L) (83047)	PHOSPHORUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111)
SEP 25-OCT 02	--	--	--	--	--	--	--
OCT 02-09	0.081	0.017	0.23	0.10	0.33	<0.020	<0.020
OCT 09-16	0.185	0.052	0.61	0.13	0.54	0.120	<0.020
OCT 16-23	0.883	0.043	1.12	0.23	1.05	0.280	<0.020
OCT 23-30	--	--	--	--	--	--	--
OCT 30-NOV 06	0.149	0.019	0.81	0.07	0.89	0.280	<0.020
NOV 06-13	--	--	--	--	--	--	--
NOV 13-20	--	--	--	--	--	--	--
NOV 20-27	0.070	0.020	0.48	0.11	0.58	0.130	<0.020
NOV 27-DEC 04	0.134	0.010	0.28	0.13	0.91	0.080	<0.020
DEC 04-11	0.241	0.080	0.61	0.26	0.90	0.120	0.050
DEC 11-18	0.064	0.009	0.31	0.07	1.26	0.220	<0.020
DEC 18-26	--	--	--	--	--	--	--
DEC 26 1990-JAN 02 1991	0.094	0.006	0.20	0.06	1.02	0.050	<0.020
JAN 02-08	0.054	0.006	0.23	0.07	1.20	0.060	<0.020
JAN 08-15	--	--	--	--	--	--	--
JAN 15-22	0.078	0.017	0.69	0.08	0.77	0.430	<0.020
JAN 22-29	--	--	--	--	--	--	--
JAN 29-FEB 05	--	--	--	--	--	--	--
FEB 05-12	--	--	--	--	--	--	--
FEB 12-19	0.033	0.004	0.34	0.06	0.55	0.100	<0.020
FEB 19-26	--	--	--	--	--	--	--
FEB 26-MAR 05	0.039	0.008	0.71	0.04	0.90	0.270	<0.020
MAR 05-12	--	--	--	--	--	--	--
MAR 12-19	--	--	--	--	--	--	--
MAR 19-26	0.057	0.014	0.82	0.06	0.53	0.310	<0.020
MAR 26-APR 02	--	--	--	--	--	--	--
APR 02-09	--	--	--	--	--	--	--
APR 09-16	0.133	0.037	1.08	0.05	0.79	0.550	<0.020
APR 16-23	--	--	--	--	--	--	--
APR 23-30	0.046	0.013	0.60	0.04	0.38	0.120	<0.020
APR 30-MAY 07	0.058	<0.003	1.01	0.10	0.82	0.270	<0.020
MAY 07-14	--	--	--	--	--	--	--
MAY 14-21	0.057	0.023	0.66	0.08	0.75	0.190	<0.020
MAY 21-28	0.016	0.006	0.23	<0.03	0.28	0.090	<0.020
MAY 28-JUN 04	0.072	0.070	1.17	0.13	1.57	0.310	<0.020
JUN 04-11	0.033	0.007	0.17	0.04	0.37	<0.020	<0.020

CHEMICAL QUALITY OF PRECIPITATION

MILK RIVER BASIN

482958109475101 NORTHERN MONTANA AGRICULTURAL RESEARCH CENTER NEAR HAVRE, MT (MT98)--Continued

CHEMICAL ANALYSES, WATER YEAR SEPTEMBER 1990 TO OCTOBER 1991

DATE	TOTAL PRECIP-ITATION FOR DEFINED PERIOD (IN) (00193)	SPEC. CONDUC-TANCE FIELD ATM DEP WET TOT (US/CM) (83154)	SPEC. CONDUC-TANCE LAB ATM DEP WET TOT (US/CM) (83156)	PH FIELD ATM DEP WET T (UNITS) (83106)	PH LAB ATM DEP WET T (UNITS) (83107)	CALCIUM ATM DEP WET DIS (MG/L) (82932)	MAG-NESIUM ATM DEP WET DIS (MG/L) (83002)
JUN 1991 11-18	0.06	9.3	8.2	4.94	5.78	0.468	0.082
JUN 18-25	1.62	6.1	7.2	5.55	5.82	0.225	0.032
JUN 25-JUL 02	0.66	7.2	6.1	5.02	5.16	0.129	0.019
JUL 02-09	0.0	--	--	--	--	--	--
JUL 09-16	0.44	5.4	5.6	5.30	5.78	0.316	0.051
JUL 16-23	0.01	--	--	--	--	--	--
JUL 23-30	0.16	11.1	11.4	5.53	5.97	0.467	0.069
JUL 30-AUG 06	0.07	14.4	12.7	4.86	5.57	0.597	0.098
AUG 06-13	0.63	17.1	10.2	4.75	5.95	0.363	0.054
AUG 13-20	0.49	8.4	7.3	5.38	5.33	0.221	0.028
AUG 20-27	0.0	--	--	--	--	--	--
AUG 27-SEP 03	0.04	22.6	22.6	4.85	5.29	0.765	0.126
SEP 03-10	0.0	--	--	--	--	--	--
SEP 10-17	0.24	8.0	5.3	5.16	5.47	0.147	0.030
SEP 17-24	0.10	12.1	8.4	4.92	5.82	0.206	0.041
SEP 24-OCT 01	0.0	--	--	--	--	--	--

DATE	SODIUM ATM DEP WET DIS (MG/L) (83138)	POTAS-SIUM ATM DEP WET DIS (MG/L) (83120)	SULFATE ATM DEP WET DIS AS SO4 (MG/L) (83160)	CHLO-RIDE ATM DEP WET DIS (MG/L) (82944)	NI-TROGEN NITRATE ATM DEP WET DIS AS NO3 (MG/L) (83071)	NI-TROGEN AMMON. ATM DEP WET DIS AS NH4 (MG/L) (83047)	PHOS-PHORUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111)
JUN 1991 11-18	0.102	0.062	0.97	0.14	1.21	0.070	0.030
JUN 18-25	0.053	0.050	0.57	0.14	0.87	0.250	<0.020
JUN 25-JUL 02	0.033	0.024	0.48	0.08	0.71	0.200	<0.020
JUL 02-09	--	--	--	--	--	--	--
JUL 09-16	0.068	0.057	0.50	0.09	0.79	0.130	<0.020
JUL 16-23	--	--	--	--	--	--	--
JUL 23-30	0.042	0.093	1.36	0.12	1.68	0.620	<0.020
JUL 30-AUG 06	0.063	0.100	1.51	0.16	2.13	0.480	0.240
AUG 06-13	0.040	0.086	1.27	0.11	0.26	0.210	<0.020
AUG 13-20	0.047	0.048	0.76	0.06	1.15	0.300	<0.020
AUG 20-27	--	--	--	--	--	--	--
AUG 27-SEP 03	0.152	0.189	2.13	0.31	4.11	1.06	<0.020
SEP 03-10	--	--	--	--	--	--	--
SEP 10-17	0.067	0.071	0.77	0.10	0.54	0.180	<0.020
SEP 17-24	0.108	0.049	1.21	0.09	1.09	0.410	<0.020
SEP 24-OCT 01	--	--	--	--	--	--	--

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October 1, 1978

FACTORS FOR CONVERTING INCH-POUND UNITS TO INTERNATIONAL SYSTEM UNITS (SI)

The following factors may be used to convert the inch-pound units published herein to the International System of Units (SI).

Multiply inch-pound units	By	To obtain SI units
	Length	
inches (in)	2.54×10^{1}	millimeters (mm)
	2.54×10^{-2}	meters (m)
feet (ft)	3.048×10^{-1}	meters (m)
miles (mi)	1.609×10^{0}	kilometers (km)
	Area	
acres	4.047×10^{3}	square meters (m^2)
	4.047×10^{-1}	square hectometers (hm^2)
	4.047×10^{-3}	square kilometers (km^2)
square miles (mi^2)	2.590×10^{0}	square kilometers (km^2)
	Volume	
gallons (gal)	3.785×10^{0}	liters (L)
	3.785×10^{0}	cubic decimeters (dm^3)
	3.785×10^{-3}	cubic meters (m^3)
million gallons	3.785×10^{3}	cubic meters (m^3)
	3.785×10^{-3}	cubic hectometers (hm^3)
cubic feet (ft^3)	2.832×10^{1}	cubic decimeters (dm^3)
	2.832×10^{-2}	cubic meters (m^3)
cfs-days	2.447×10^{3}	cubic meters (m^3)
	2.447×10^{-3}	cubic hectometers (hm^3)
acre-feet (acre-ft)	1.233×10^{3}	cubic meters (m^3)
	1.233×10^{-3}	cubic hectometers (hm^3)
	1.233×10^{-6}	cubic kilometers (km^3)
	Flow	
cubic feet per second (ft^3/s)	2.832×10^{1}	liters per second (L/s)
	2.832×10^{1}	cubic decimeters per second (dm^3/s)
	2.832×10^{-2}	cubic meters per second (m^3/s)
gallons per minute (gal/min)	6.309×10^{-2}	liters per second (L/s)
	6.309×10^{-2}	cubic decimeters per second (dm^3/s)
	6.309×10^{-5}	cubic meters per second (m^3/s)
million gallons per day	4.381×10^{1}	cubic decimeters per second (dm^3/s)
	4.381×10^{-2}	cubic meters per second (m^3/s)
	Mass	
tons (short)	9.072×10^{-1}	megagrams (Mg) or metric tons

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