

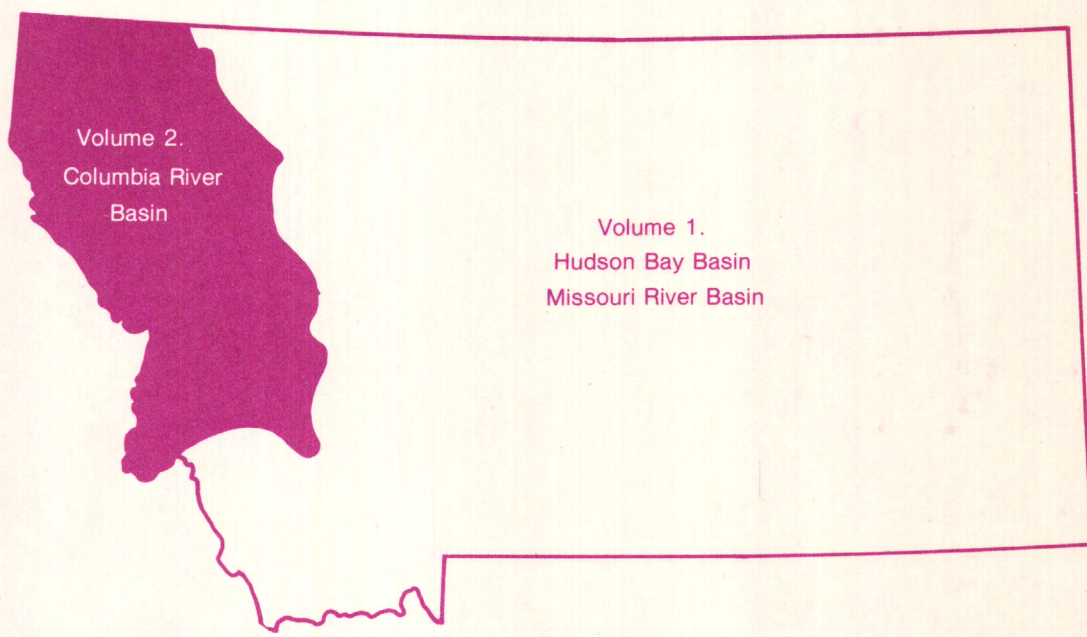
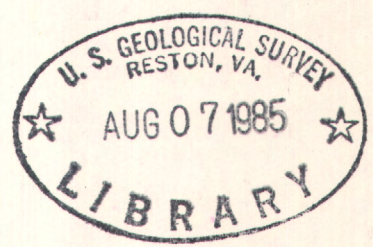
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# Water Resources Data Montana

## Water Year 1984

Volume 2. Columbia River Basin



U.S. GEOLOGICAL SURVEY WATER DATA REPORT MT-84-2  
Prepared in cooperation with the State of Montana  
and with other agencies



# CALENDAR FOR WATER YEAR 1984

1983

## OCTOBER

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1984

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## SEPTEMBER

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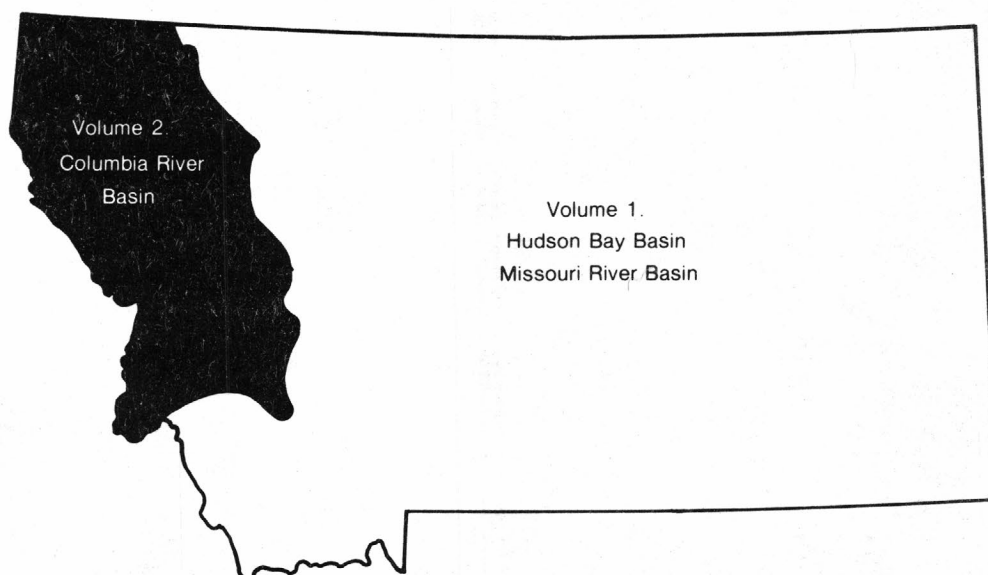




# Water Resources Data Montana Water Year 1984

## Volume 2. Columbia River Basin

by R.R. Shields, J.R. Knapton, M.K. White, M.A. Jacobson, and M.L. Kasman



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT MT-84-2  
Prepared in cooperation with the State of Montana  
and with other agencies



UNITED STATES DEPARTMENT OF THE INTERIOR

DONALD PAUL HODEL, Secretary

GEOLOGICAL SURVEY

Dallas L. Peck, Director

For information on the water program in Montana write to  
District Chief, Water Resources Division  
U.S. Geological Survey  
301 South Park Avenue  
Federal Office Building, Room 428  
Drawer 10076  
Helena, Montana 59626



## 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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Donna K. Vincent typed the text of the report.

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 G. M. Pike, District Chief, and A. Clebsch, Jr., Regional Hydrologist, Central Region.

Data for Montana are in two volumes as follows:

- Volume 1. Hudson Bay and Missouri River Basins
- Volume 2. Columbia River Basin



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## GAGING STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED

(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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## WATER RESOURCES DATA FOR MONTANA, 1984

Volume 1: Hudson Bay and Missouri River Basins  
Volume 2: Columbia River Basin

### INTRODUCTION

The Water Resources Division of the U.S. Geological Survey, in cooperation with State and other federal agencies, obtain 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 the 1984 water year 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 of ground-water wells. This volume contains records for water discharge at 56 gaging stations; stage and contents at 3 lakes and reservoirs; water quality at 20 gaging stations, 3 water-quality stations; and 3 lake stations; and water levels at 10 observation wells. Also included are data for 31 crest-stage partial-record stations and 20 smaller reservoirs. Additional water data were collected at various sites, not involved in the systematic data collection program, and are published as miscellaneous measurements. A few pertinent stations in bordering States are also included in this report. In volumes 1 and 2, the locations of gaging stations are shown on figure 3, water-quality stations are shown on figure 4, and ground-water observation wells are shown on figure 4. 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 Branch of Distribution, U.S. Geological Survey, 604 South Pickett Street, Alexandria, Virginia, 22304-4658.

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 84-2." These water-data reports are for sale, in paper copy or in 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  
L. Berry, director

Montana State Highway Commission  
G. Wicks, director of highways

Montana Department of Fish, Wildlife, and Parks  
J. W. Flynn, director

Montana Department of Health and Environmental Sciences  
Dr. J. J. Drynan, director

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

Montana Bureau of Mines and Geology  
Dr. E. C. Bingler, director

The following organizations aided in collecting records:

The Montana Power Company, The Washington Power Company, and Pacific Power and Light Company.

Organizations that supplied data are acknowledged in station descriptions.

## GENERAL HYDROLOGIC SETTING

The upper Columbia River basin in western Montana is comprised of three major river systems: the Kootenai River, which originates in British Columbia, Canada; 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, Mont. The upper Columbia River basin is in the Northern Rocky Mountain physiographic province, which is characterized by densely forested mountains and intermontane valleys where most of the area's population has settled. The range in elevation of the basin is dramatic. The elevation is about 1,800 feet above sea level where the Kootenai River flows from the State and is about 10,000 feet at the Continental Divide in Glacier National Park. The upper Columbia River basin occupies about 17 percent of the State; however, runoff from the basin is greater than 50 percent of the State's total streamflow.

Annual precipitation varies considerably throughout the basin, from about 15 inches in the lower valleys to about 120 inches along the Continental Divide in Glacier National Park. Much of this precipitation occurs as snow during the winter. Peak runoff from the basin can result from either spring snowmelt or spring snowmelt mixed with rain during May and June. The June 1964 flood is an example of mixed snowmelt-rainfall runoff. The northwestern part of the basin is sometimes affected by warm, wet Pacific storm fronts during the winter that can bring intense rains and thawing conditions that can cause major flooding. The January 1974 flood is an example of this type of runoff.

Water generally is suitable for all uses throughout the basin, being a calcium bicarbonate type with relatively small concentrations of dissolved solids. Water from alluvial, glacial-deposit, and bedrock aquifers supply most domestic and livestock needs. The largest supplies of ground water generally occur in the alluvium of the intermontane valleys.

## WATER ISSUES--1984 WATER YEAR

A streamflow and water-quality station was installed on the Flathead River at Perma, Mont., during the 1984 water year to aid in the assessment of water resources on the Confederated Salish and Kootenai Tribes of the Flathead Reservation. Three streamflow stations were installed on Silver Bow Creek near Butte, Mont., to provide hydrologic information for a study of the water resources of the Butte area being conducted by the Montana Bureau of Mines and Geology. A streamflow station was installed on Warm Springs Creek near Warm Springs, Mont., to aid in a study being conducted by Montana Department of Fish, Wildlife and Parks. No streamflow stations were discontinued in the upper Columbia River basin during this water year.

Of continued concern to water managers in the basin are: potential hydrologic effects of large surface coal mines being developed or planned in Canadian watersheds of the Flathead River; a copper-silver mine with a 7-mile slurry pipeline extending to a tailing impoundment in the Lake Creek basin south of Troy, Mont.; a U.S. Environmental Protection Agency designated National Priorities List (NPL) site near Libby, Mont., where wood preservatives have been detected in the ground water; an NPL site at Milltown, Mont., where large concentrations of arsenic were detected in water from four domestic wells; and an NPL site in the Butte-Anaconda, Mont. area, where mine and processing wastes threaten surface- and ground-water quality. Other major concerns are: the effects on water quality of numerous other abandoned mines and processing sites in the upper Clark Fork drainage; nutrient loading of the Clark Fork near Missoula, Mont.; water-temperature and water-level fluctuations downstream from Hungry Horse Dam and their effect on fisheries in the Flathead River; eutrophication of Flathead Lake; nutrient loading of Lake Koocanusa; dewatering of the Bitterroot River near Hamilton, Mont.; and the development or potential development of small-scale diversion projects for hydroelectric power.

To aid water resources planners of the Confederated Salish and Kootenai Tribes of the Flathead Reservation, the U.S. Geological Survey has entered into a cooperative agreement for a 3-year study of the ground-water resources on the reservation. Also, during the 1984 water year the Geological Survey completed an investigation to develop a method for estimating streamflow characteristics in cooperation with the U.S. Forest Service. The resultant report, entitled "A method for estimating mean and low flows of streams in national forests of Montana," has been released as Water-Resources Investigations Report 85-4071 of the U.S. Geological Survey.

## SUMMARY OF HYDROLOGIC CONDITIONS -- 1984 WATER YEAR

Precipitation and temperature

The 1984 water year in the upper Columbia River basin was characterized by minor variations in hydrologic conditions. Precipitation data are published by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service for 41 stations in western Montana, generally in valley locations, and data for mountain precipitation occurring as snow during the winter are published by the U.S. Department of Agriculture, Soil Conservation Service, in the report "Water Supply Outlook for Montana." Precipitation data reported by the National Weather Service for the 1984 water year was 18.86 inches, 1.16 inches (6 percent) less than normal. The precipitation for the winter as indicated by the National Weather Service reporting stations from October 1983 to March 1984 averaged 8.68 inches, 2.05 inches less than normal. According to the April 1 and May 1, 1984 Soil Conservation Service reports, snowpack generally was 70 to 90 percent of normal for most of the basin, with the Yaak River drainage in the northwestern part of the basin receiving less than 70 percent of normal. From April 1984 through September 1984 precipitation as reported by the National Weather Service, averaged 10.18 inches, 0.89 inch greater than normal, with most of the increase occurring during May.

Temperatures for the year generally were normal. However, December temperatures were 13° Fahrenheit less than normal, whereas January to March temperatures averaged 4 to 5° Fahrenheit greater than normal.

Streamflow

Streamflow data for the 1984 water year are compared to data for the 1961-80 water years at three long-term streamflow stations (fig. 1). The effects of less than normal snowpack and greater than normal winter temperatures are apparent from the graph of the Middle Fork Flathead River near West Glacier (station 12358500). At that site, greater than normal streamflow occurred in January and less than normal streamflow occurred in



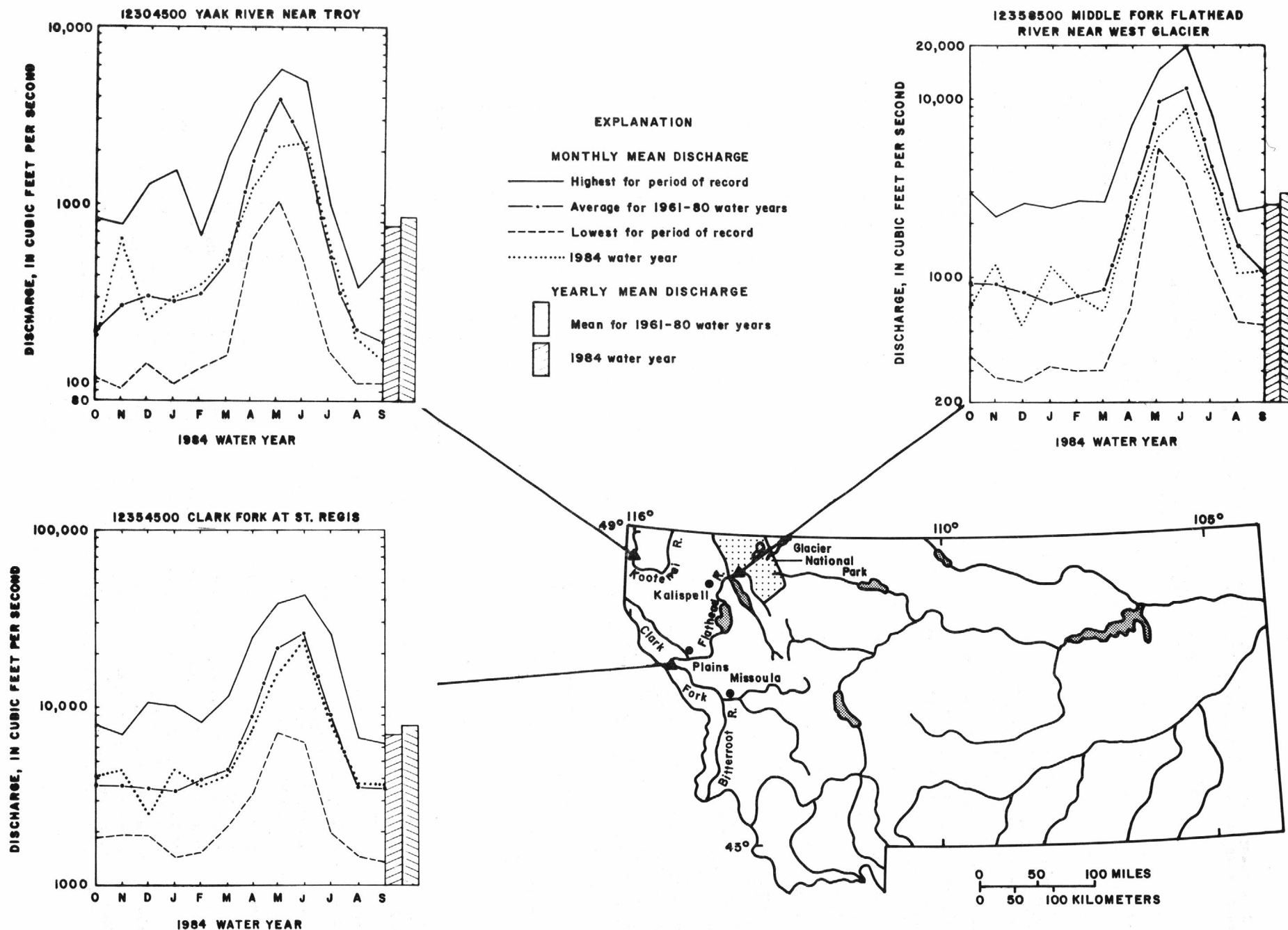


Figure 1.--Streamflow data for the 1984 water year compared to data for the 1961-80 water years at long-term stations.

## WATER RESOURCES DATA FOR MONTANA, 1984

No extraordinary flood flows were recorded during the 1984 water year. Peak discharges for several representative streamflow-gaging stations in the basin are listed in table 1.

Table 1.--Comparison of peak discharge for the 1984 water year with peak discharge for the period of record at long-term station <sup>1</sup>  
[<, less than]

Station number	Station name	Drainage area (square miles)	Peak discharge, 1984 water year			Peak discharge, period of record	
			Date	Cubic feet per second	Recurrence interval (years)	Date	Cubic feet per second
12301300	Tobacco River near Eureka	440	05-31	902	<2	06-18-74	2,470
12304500	Yaak River near Troy	766	05-30	4,260	<2	05-21-56	12,100
12332000	Middle Fork Rock Creek near Philipsburg	123	06-21	1,110	4	06-16-74	1,680
12340000	Blackfoot River near Bonner	2,290	05-31	6,610	<2	06-10-64	19,200
12340500	Clark Fork above Missoula	5,999	06-22	13,800	<2	06-21-75	32,300
12354500	Clark Fork at St. Regis	10,709	06-01	34,900	<2	05-24-48	68,900
12355500	North Fork Flathead River near Columbia Falls	1,548	05-31	15,400	<2	06-09-64	69,100
12358500	Middle Fork Flathead River near West Glacier	1,128	05-31	18,200	<2	06-09-64	140,000
12370000	Swan River near Bigfork	671	06-22	4,820	<2	06-20-74	8,890

<sup>1</sup> Peak discharge not determined for station 12335500, Nevada Creek above reservoir, near Finn, because of ice conditions.

No periods of extended low flows were recorded this year. Minimum daily discharge for the same streamflow-gaging stations used in the peak-flow comparison, plus the Nevada Creek station, are listed in table 2. Two stations recorded minimum daily flows at the 5-year recurrence interval for the 1-day minimum daily flows--one at the 10-year recurrence interval and one at the 40-year recurrence interval. Most, however, were less than or at the 2-year recurrence interval for the minimum daily flows.

Table 2.--Comparison of minimum daily discharge for the 1984 water year with minimum discharge for the period of record at long-term stations.  
[>, greater than; <, less than]

Station number	Station name	Drainage area (square miles)	Minimum daily discharge, 1984 water year			Minimum discharge, period of record	
			Date	Cubic feet per second	Recurrence interval (years)	Date	Cubic feet per second
12301300	Tobacco River near Eureka	440	12-24	50	2	01-11-63	20
12304500	Yaak River near Troy	766	09-20	117	>2	12-09-72	50
12332000	Middle Fork Rock Creek near Philipsburg	123	12-24	20	>2	02-09-53	5.3
12335500	Nevada Creek above reservoir, near Finn	116	12-24	6.0	>2	At times 1944, 1957 1972, 1973	<2.0
12340000	Blackfoot River near Bonner	2,290	12-23	200	40	01-4, 5-50	200
12340500	Clark Fork above Missoula	5,999	12-24	600	2	09-27-37	340
12354500	Clark Fork at St. Regis	10,709	12-23	1,200	10	01-10-80	870
12355500	North Fork Flathead River near Columbia Falls	1,548	12-24	300	5	01-08-53	198
12358500	Middle Fork Flathead River near West Glacier	1,128	12-24	280	5	11-27-52	<173
12370000	Swan River near Bigfork	671	12-25	354	>2	01-26-29-30	193



Quality of streamflow

At Kootenai River below Libby Dam, near Libby (station 12301933) the following relationship exists between dissolved solids and specific conductance:

$$\text{Dissolved-solids concentration} = 4.17 + (0.547 \times \text{specific conductance})$$

Specific conductance was measured at the station once a month during the 1984 water year. The mean value for the 12 measurements was 234 microsiemens per centimeter at 25° Celcius, with values ranging from 180 to 265 microsiemens. The mean value of 234 microsiemens for 1984 compares to a mean of 234 microsiemens for 1983 and 257 microsiemens for the period since impoundment of water in the reservoir behind Libby Dam (1972-84). Streamflow for the Kootenai River during 1984 was about the long-term average. Therefore, the smaller value for the mean specific conductance may have resulted more from the physical nature in which water is withdrawn from the reservoir at selected depths than by hydrologic conditions in the basin.

Both total phosphorus and dissolved orthophosphorus remained at relatively small concentrations, less than 0.010 milligram per liter, during the 1984 water year. Nutrient enrichment in the Kootenai River and Lake Koocanusa has been a concern in the past because of the discharge of phosphate-enriched effluent from an upstream fertilizer processing plant. The maximum measured dissolved phosphorus concentrations commonly showing a ten fold or more increase over present concentrations, occurred at stations on the Kootenai River near the end of the 1960's. Pollution-abatement practices then improved and concentrations decreased through the early to mid-1970's. The mean dissolved phosphorus concentrations at the station for 1975-82 was about 0.010 milligram per liter. Although dissolved phosphorus was not measured during the 1983 and 1984 water years, measurements of total phosphorus and dissolved orthophosphorus during 1984 indicate that phosphorus concentrations are normal when compared to those from 1975-82.

In the upper Columbia River basin, water quality is monitored at the following three National Stream Quality Accounting Network (NASQAN) stations:

12353000 Clark Fork below Missoula, Montana;  
12355000 Flathead River at Flathead, British Columbia; and  
12363000 Flathead River at Columbia Falls, Montana.

Minimum and maximum values for selected key water-quality parameters measured in 1984 along with the minimum and maximum values for the period of NASQAN record are listed in table 3 for each site. In addition to these values, the number of samples (N) for each of the groups is given. The minimums and maximums listed in the table for measurements made during the 1984 water year generally were within the ranges for the periods of NASQAN record. Only at Flathead River at Columbia Falls did a turbidity measurement exceed the previous maximum for the period of record. Although four or six measurements per year at a site cannot adequately monitor all hydrologic conditions, monitoring schedules were maintained so that seasonally-affected periods were sampled. No unusual water-quality conditions were detected, and water quality-values for the year conformed to long-term patterns.

Table 3.--Comparison of minimum and maximum values for selected water-quality measurements during the 1984 water year to minimum and maximum for the period of record

Station	1984			Period of record through 1983		
	Number of samples	Minimum	Maximum	Number of samples	Minimum	Maximum
<u>Dissolved solids, in milligrams per liter</u>						
Clark Fork below Missoula	6	83	164	43	59	218
Flathead River at Flathead, B.C.	4	114	148	89	79	176
Flathead River at Columbia Falls	4	75	111	37	72	128
<u>Dissolved phosphorous, in milligrams per liter</u>						
Clark Fork below Missoula	6	<.010	.04	43	.010	.290
Flathead River at Flathead, B.C.	4	<.005	.006	57	<.010	.030
Flathead River at Columbia Falls	4	<.005	<.005	37	<.010	.080
<u>Dissolved oxygen, in percent saturation</u>						
Clark Fork below Missoula	6	86	116	68	82	127
Flathead River at Flathead, B.C.	4	92	102	114	91	110
Flathead River at Columbia Falls	4	94	100	87	92	107
<u>Turbidity, in nephelometric turbidity units</u>						
Clark Fork below Missoula	6	.9	6.2	43	.4	100
Flathead River at Flathead, B.C.	4	.1	50	50	<.05	55
Flathead River at Columbia Falls	4	.4	90	37	.2	80
<u>Dissolved arsenic, in micrograms per liter</u>						
Clark Fork below Missoula	4	2	3	21	1	12
Flathead River at Flathead, B.C.	4	<1	<1	34	<1	2
Flathead River at Columbia Falls	4	<1	<1	19	<1	2
<u>Dissolved iron, in micrograms per liter</u>						
Clark Fork below Missoula	4	<3	15	21	7	820
Flathead River at Flathead, B.C.	4	<3	26	34	3	300
Flathead River at Columbia Falls	4	<3	17	19	3	70
<u>Dissolved copper, in micrograms per liter</u>						
Clark Fork below Missoula	4	2	6	21	1	26
Flathead River at Flathead, B.C.	4	<1	2	34	<1	8
Flathead River at Columbia Falls	4	1	3	19	<1	4

### Ground water

The U.S. Geological Survey measures water levels in a network of observation wells in Montana, which includes several wells in the the intermontane basins west of the Continental Divide (Region 12). Water-level measurements have been collected from numerous other wells for short periods of time as part of hydrologic studies in selected areas. Although these project wells are not part of the statewide observation-well program, data obtained from them are available upon request.

Ground-water levels in most areas were about average throughout the year and the same as or higher than the preceding year. In the Bitterroot Valley, water levels in two wells were slightly higher than the previous year. Water levels in wells in the Mission Valley area were higher than average and slightly higher than last year, whereas those in the Little Bitterroot Valley were lower than average and lower than last year. Water levels near Lake Koocanusa, on the Kootenai River, continued a trend of gradual rise since the reservoir started filling in 1972.

Irrigation pumpage continued to have little or no effect on water levels in the Kalispell area of the Flathead River drainage. Water levels there were about average but lower than last year.

### DEFINITION OF TERMS

Terms related to streamflow, water-quality, and other hydrologic data, as used in this report are defined below. See also the table for converting Inch-Pound units to International System of units (SI) 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 43,500 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Algae are mostly aquatic single-celled, colonial, or multi-celled plants, containing chlorophyll and lacking roots, stems, and leaves.

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, 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 intestines 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 which produce blue colonies within 24 hours when incubated at  $44.5^{\circ}\text{C} \pm 0.2^{\circ}\text{C}$  on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL (milliliters) of sample.

Fecal streptococcal bacteria are bacteria found also in intestines 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  $35^{\circ}\text{C} \pm 1.0^{\circ}\text{C}$  on M-enterococcus 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 unconsolidated material of which streambed, lake, pond, reservoir, or estuary bottom is composed.

Bottom material: See Bed material.

Cells/volume refers to the number of cells of any organism which is counted by using a microscope and grid or counting cell. Many planktonic organisms are multicelled and are counted according to the number of contained cells per sample, usually milliliters (mL) or liters (L).

Cfs-day is the volume of water represented by 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.

Chemical oxygen demand (COD) is a measure of the chemically oxidizable material in the water, and furnishes an approximation of the amount of organic and reducing material present. The determined value may correlate with natural water color or with carbonaceous organic pollution from sewage or industrial wastes.

Chlorophyll refers to the green pigments of plants. Chlorophyll a and b are the two most common pigments in plants and their concentrations provide an indication of plant biomass. Chlorophyll is expressed in units of milligrams per square meter (MG/M<sup>2</sup>).

Color unit is produced by one milligram per liter of platinum in the form of the chloroplatinate ion. Color is expressed in units of 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 (CFSM) is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

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

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 is that material in a representative water sample which passes through a 0.45 µm membrane filter. This is a convenient operational definition used by Federal agencies that collect water data. Determinations of "dissolved" constituents are made on subsamples of the filtrate.

Diversity index is a numerical expression of evenness of distribution of aquatic organisms. The formula for diversity index is:

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

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

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

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 attributable to the presence of alkaline earths (principally calcium and magnesium) and is expressed as equivalent calcium carbonate (CaCO<sub>3</sub>).

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 Map; each hydrologic unit is identified by an 8-digit number.

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 analysis.

Micrograms per gram (µg/g) is a unit expressing the concentration of a chemical element as the mass (micrograms) of the element sorbed per unit mass (gram) of sediment.

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°C (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 represent the mass (milligrams) of solute per unit volume (liter) of water. Concentration of suspended sediment also is expressed in milligrams per liter, and is based on the mass of sediment per liter of water-sediment mixture.

National Geodetic Vertical Datum of 1929 (NGVD) 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.

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, mm), of suspended sediment or bed material 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 recommendations 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 material 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 plants and animals. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides. Insecticides and herbicides, which control insects and plants respectively, are the two categories reported.

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.

Plankton is the community of suspended, floating or weakly swimming organisms that live in the open water of lakes and rivers.

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

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

Milligrams of carbon per area per unit time (mg C/m<sup>2</sup>.time) for phytoplankton are units for expressing primary productivity. They define the amount of carbon dioxide consumed as measured by radioactive carbon (carbon 14). The carbon 14 method is of greater sensitivity than the oxygen light and dark bottle method, and is preferred for use in unenriched waters. Unit time may be either the hour or day, depending on the incubation period.

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 only 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.

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.

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

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).

Suspended-sediment discharge (T/DAY, tons/day) is the rate at which dry weight of sediment passes a section of a stream or is the quantity of suspended sediment, as measured by dry weight or volume, that passes a section in a given time. It is computed by multiplying discharge (ft<sup>3</sup>/s), times suspended-sediment concentration (mg/L), times 0.0027.

Suspended-sediment load is quantity of suspended sediment passing a section in a specified period.

Sodium-absorption-ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions with 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 derived from the atmosphere, vegetables, soil, or rocks that is dissolved in water.

Specific conductance is a measure of the ability of water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25°C. 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, 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  $\mu$ m 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 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 would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Determination 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 sample that is retained on a 0.45  $\mu$ m 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."

Determination of "suspended, total" constituents are made either by analyzing portions of material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total concentrations of the constituent.

Temperature recorder is a thermometer that continuously and automatically records, on a chart, the water temperature of a stream. "Temperature recorder" is the term used to indicate the presence of a thermograph or a digital mechanism that records water temperature in a digital format on punched paper.

Time-weighted average is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water 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 in milligrams per liter by 0.00136.

Tons per day is the quantity of substance in solution or suspension that passes a stream section during a 24-hour day.

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" has double meaning here, indicating both that the sample consists of a water-suspended-sediment mixture and that the analytical method determines all of the constituent in the sample).

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 methodology 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 would be 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, 1984, is called the "1984 water year."

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.

WRD is used as an abbreviation for "Water-Resources Data" in the REVISED RECORDS paragraph to refer to State annual basic-data reports published before 1975.

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

#### DOWNSTREAM ORDER AND STATION NUMBER

All data stations, whether streamsite or well, in this report are assigned an identification number. This number is unique in that it 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. The "downstream order" system is used for regular surface-water stations and the "latitude-longitude" system is used for wells and for surface-water stations where only miscellaneous measurements are made.

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 main-stream station are listed before that station. A station on a tributary that enters between two main-stream stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary on which a station is situated, with respect to the stream to which it is immediately tributary, is indicated by an indentation in a list of stations in the front of the report. Each indentation represents one rank. This downstream order and system of indentation show 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 a partial-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 8-digit number for each station, such as 06090500, which appears just to the left of the station name includes the 2-digit part number "06" plus the 6-digit, downstream order number "090500". Records in this volume are in Part 12 (Columbia 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.

#### NUMBERING SYSTEM FOR WELLS AND MISCELLANEOUS SITES

The 8-digit downstream order station numbers are not assigned to wells and miscellaneous sites where only random water-quality samples or discharge measurements are taken.

The well and miscellaneous site numbering system of the U.S. Geological Survey is based on the grid system of latitude and longitude. The system provides the geographic location of the well or miscellaneous site and a unique number for each site. The number consists of 15 digits. The first 6 digits denote the degrees, minutes, and seconds of latitude, the next 7 digits denote degrees, minutes, and seconds of longitude, and the last 2 digits (assigned sequentially) identify the wells or other sites within a 1-second grid. See figure 2.

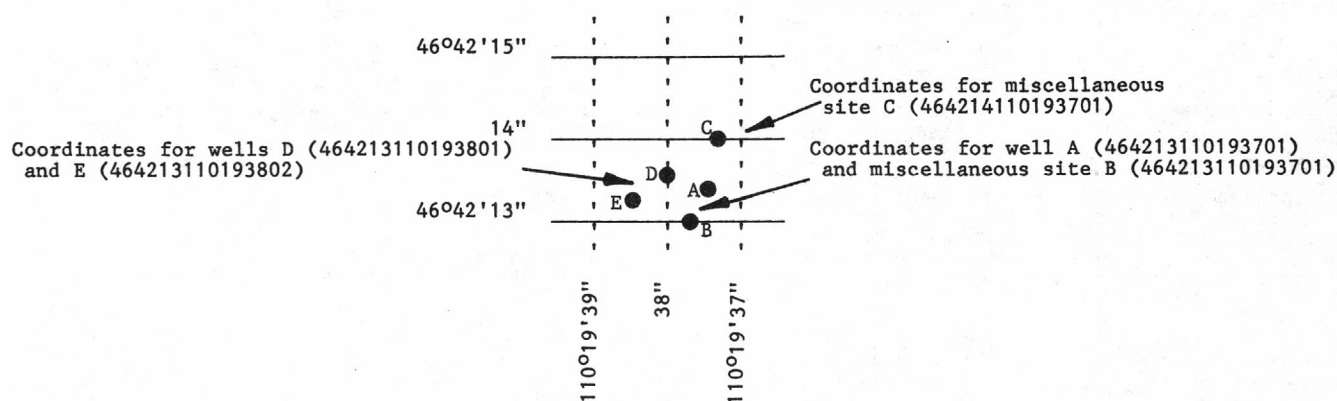


Figure 2. System for numbering wells and miscellaneous sites (latitude and longitude)

#### SPECIAL NETWORKS AND PROGRAMS

Some of the stations for which data are published in this report are included in special networks and programs. These stations are identified by their title, set in parentheses, under the station name.

National stream-quality accounting network (NASQAN) is a data collection network designed by the U.S. Geological Survey to meet many of the information demands of agencies or groups involved in national or regional water-quality planning and management. Both accounting and broad-scale monitoring objectives have been incorporated into the network design. A real configuration of the network is based on river-basin accounting units (identified by 8-digit hydrologic-unit numbers) designated by the Office of Water Data Coordination in consultation with the Water Resources Council. Primary objectives of the network are (1) to depict a real variability of streamflow and water-quality conditions nationwide on a year-by-year basis and (2) to detect and assess long-term changes in streamflow and stream quality. Stations in this network in this volume are listed below:

12353000	Clark Fork below Missoula, MT
12355000	Flathead River at Flathead, British Columbia
12363000	Flathead River at Columbia Falls, MT

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

##### Collection and Computation of Data

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 mean daily discharges and end-of-day contents commonly are published for such stations, they are referred to as "daily stations."

By contrast, partial records are obtained through discrete measurements without using a continuous stage-recording device and pertain only to a few flow characteristics, or perhaps only one. The nature of the partial record is indicated by table titles such as "Crest-stage partial records," or "Low-flow partial records." Records of miscellaneous-discharge measurements or of measurements from special studies, such as low-flow seepage studies, may be considered as partial records, but they are presented separately in this report.

The base data collected at gaging stations consist of records of stage and measurements of discharge of streams or canals, and stage, surface area, and contents of lakes or reservoirs. In addition, observation of factors affecting the stage-discharge relation or the stage-capacity relation, weather records, and other information are used to supplement base data in determining the daily flow or volume of water in storage. Records of stage are obtained from either direct readings on a nonrecording gage or from a water-stage recorder that gives either a continuous graph of the fluctuations or a tape punched at selected time intervals. Measurements of discharge are made with a current meter, using the general methods adopted by the Geological Survey. These methods are described in standard textbooks, in Water-Supply Paper 888, and in U.S. Geological Survey Techniques of Water Resources Investigations, book 3, chapter A6.

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

At some stream-gaging stations the stage-discharge relation is affected by backwater from reservoirs, tributary streams, or other sources. This necessitates the use of the slope method, in which the slope or fall in a reach of the stream is a factor in 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.

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

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

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

The data in this report generally comprise a description of the station and tabulations of daily and monthly figures. For gaging stations on streams or canals, a table showing the daily discharge and monthly and yearly discharge is given. For gaging stations on lakes and reservoirs, a monthly summary table of stage and contents or a table showing the daily contents is given. Tables of daily mean gage heights are included for some streamflow stations and for some reservoir stations. Records are published for the water year, which begins on October 1 and ends on September 30. Records for some gaging stations on streams or canals in Canada and along the international boundary are published on an irrigation season basis and the tables of daily discharge generally show data from March through October. A calendar for the current water year is shown on the reverse side of the back cover to facilitate finding the day of the week for any date.

Information is provided with each complete record of discharge or lake content. Comments to follow clarify information under the various headings.

**LOCATION.**--Information on locations is obtained from the most accurate maps available. River mileages 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 vary from one drainage basin to another, the accuracy of drainage areas likewise vary. Also, updating of drainage areas is common 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 merged 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 that only 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 Virginia have been revised during the 1983 water year would no longer be "WDR VA-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 "Definition of Terms"), and a condensed history of the types, locations, and datums of previous gages are given under this heading.

**REMARKS.**--The remarks contain 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.



**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 has accumulated following the development.

**EXTREMES OUTSIDE PERIOD OF RECORD.**--Included here is reliable 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 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 minimum daily discharge and was determined and is reported in the same manner as the maximum.

**EXTREMES FOR CURRENT YEAR.**--Extremes given here are similar to those for the period of record. For stations meeting certain criteria, information relative to peak discharges and stages greater than a selected base discharge is presented under this heading. Whereas there can be only one peak discharge for the year, there is a peak discharge for each major rise of the stream. The discharge peaks greater than the base discharge, excluding the highest one, are referred to as secondary peaks and are important in many types of detailed hydrologic studies. 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. Minimums for the current water year appear below the table of peak data.

The daily table for stream-gaging stations gives the 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. Discharges for the month also may be expressed in cubic feet per second per square mile (line headed "CFSM"), or in inches (line headed "IN"), or in acre-feet (line headed "AC-FT"). Figures 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 daily discharges for the calendar and water years.

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

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

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

#### Accuracy of Field Data and Computed Results

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

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

Figures of daily mean discharge in this report are shown to the nearest hundredth of a cubic foot per second for discharges of less than 1 ft<sup>3</sup>/s; to tenths between 1.0 and 10 ft<sup>3</sup>/s; to whole numbers between 10 and 1,000 ft<sup>3</sup>/s; and to 3 significant figures above 1,000 ft<sup>3</sup>/s. The number of significant figures used is based solely on the magnitude of the figure. No rounding rules apply to discharges listed for partial-record stations and miscellaneous sites. Listed discharges are those actually computed.

#### Other Data Available

Information of a more detailed nature than that published for most of the gaging stations, such as observations of water temperatures, discharge measurements, gage-height records, and rating tables is on file in the district office. Also most gaging-station records are available in computer-usable form and many statistical analyses have been made. Information of the availability of unpublished data or statistical analyses may be obtained from the district office.

Access to WATSTORE Data

The National Water Data Storage and Retrieval System (WATSTORE) was established for handling water data collected through the activities of the U.S. Geological Survey and to provide for more effective and efficient means of releasing the data to the public. The system is operated and maintained on the central computer facilities of the Survey at its National Center in Reston, Virginia.

WATSTORE can provide a variety of useful products ranging from simple data tables to complex statistical analyses. A minimal fee, plus the actual computer cost incurred in producing a desired product, is charged to the requester. Information about the availability of specific types of data, the acquisition of data or products, and user charges can be obtained locally from each of the Water Resources Division's district offices (see address given on the back of the title page).

General inquiries about WATSTORE may be directed to:

Chief Hydrologist  
U.S. Geological Survey  
437 National Center  
Reston, Virginia 22092

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 4.--Water-supply paper numbers containing results of stream measurements in Montana 1899-1970, including compilation reports.

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 Discharge Collected by Agencies Other than  
the Geological Survey

Records of discharge not published by the Geological Survey have been collected at numerous sites by many other Federal, State, County, City, local agencies, and by private organizations. The National Water Data Exchange, Water Resources Division, U.S. Geological Survey, National Center, Reston, VA 22092, maintains an index of such sites. Information on records at specific sites can be obtained upon request.

## EXPLANATION OF WATER-QUALITY RECORDS

Collection and Examination of Data

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

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

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

Water Analysis

Most methods for collecting and analyzing water samples are described in the U.S. Geological Survey Techniques of Water-Resources Investigations listed on a following page.

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

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

Prior to the 1968 water year, data for chemical constituents and concentrations of suspended sediment were reported in parts per million (ppm) and water temperatures were reported in degrees Fahrenheit (°F). In October 1967, the Geological Survey began reporting data for chemical constituents and concentrations of suspended sediment in milligrams per liter (mg/L) and water temperatures in degrees Celsius (°C). In waters with a density of 1.000 gram per milliliter (g/mL), parts per million and milligrams per liter can be considered equal. In waters with a density greater than 1.000 g/mL, values in parts per million should be multiplied by the density to convert to milligrams per liter.

In October 1968, the Geological Survey began reporting many of the chemical constituents as well as the minor elements in micrograms per liter instead of milligrams per liter. See "Definition of Terms" for converting English units to SI units.

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. Large streams have a small daily 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.

For stations equipped with digital monitors, the records consist of daily maximum, minimum, and mean values 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 district office.

At stations where recording instruments are used, either maximum and minimum temperatures, or maximum, minimum, and mean temperatures for each day are published.

Sediment

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

During periods of rapidly changing flow or rapidly changing concentration, samples may 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 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 loads of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately before and after the period, 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 in predicting long-term sediment-discharge characteristics of the stream.

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



Table 5.--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 drizzles)
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		

Water Quality Revisions

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 update (see the section, "Access to WATSTORE Data").

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 6.--Water-supply paper numbers and parts, water years, 1947-70.

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

## EXPLANATION OF GROUND-WATER LEVEL RECORDS

Collection of the Data

Only ground-water level data from a basic network of observation wells are published herein. This basic network contains wells so located that the most significant data are obtained from the fewest wells in the most important aquifers.

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

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

Water-level measurements in this report are given in feet with reference to either National Geodetic Vertical Datum of 1929 or land-surface datum (lsd). National Geodetic Vertical Datum of 1929 is the datum plane on which the national network of precise levels is based; land-surface datum is a datum plane that is approximately at land surface at each well. If known, the altitude of the land-surface datum above National Geodetic Vertical Datum of 1929 is given in the well description. The height, or the measuring point (MP) above or below land-surface datum is given in each well description. Water levels in wells equipped with recording gages are reported for every fifth day and the end of each month (eom).

Water levels are reported to as many significant figures as can be justified by the local conditions. For example, in a measurement of a depth 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 of a few hundredths of a foot. For lesser depths to water, the accuracy is greater. Accordingly, most measurements are reported to a hundredth of a foot, but some are given only to a tenth of a foot or a larger unit.

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 7.--Water-supply paper numbers for Northwestern United States, calendar years 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.

## PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

Thirty-seven manuals by the U.S. Geological Survey have been published to date in the series on techniques describing procedures for planning and executing specialized work in water-resources investigations. The material 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) is on 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, Branch of Distribution, 604 South Pickett St., Alexandria, VA 22304 (authorized agent of the Superintendent of Documents, Government Printing Office).

NOTE: When ordering 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-E1. *Application of borehole geophysics to water-resources investigations*, by W. S. Keys and L. M. MacCary: USGS--TWRI Book 2, Chapter E1. 1971. 126 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 and dispersion in streams by dye tracing*, by E. F. Hubbard, F. A. Kilpatrick, L. A. Martens, and J. F. Wilson, Jr.: USGS--TWRI Book 3, Chapter A9. 1982. 44 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-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-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. W. Skougstad and others, editors: USGS--TWRI Book 5, Chapter A1. 1979. 626 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 analysis of organic substances in water*, by D. F. Goerlitz and Eugene Brown: USGS--TWRI Book 5, Chapter A3. 1972. 40 pages.
- 5-A4. *Methods for collection and analysis of aquatic biological and microbiological samples*, edited by P. E. Greeson, T. A. Ehlike, G. A. Irwin, B. W. Lium, and K. V. Slack: USGS--TWRI Book 5, Chapter A4. 1977. 332 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-C1. *Laboratory theory and methods for sediment analysis*, by H. P. Guy: USGS--TWRI Book 5, Chapter C1. 1969. 58 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. Schaffranek, 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-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.



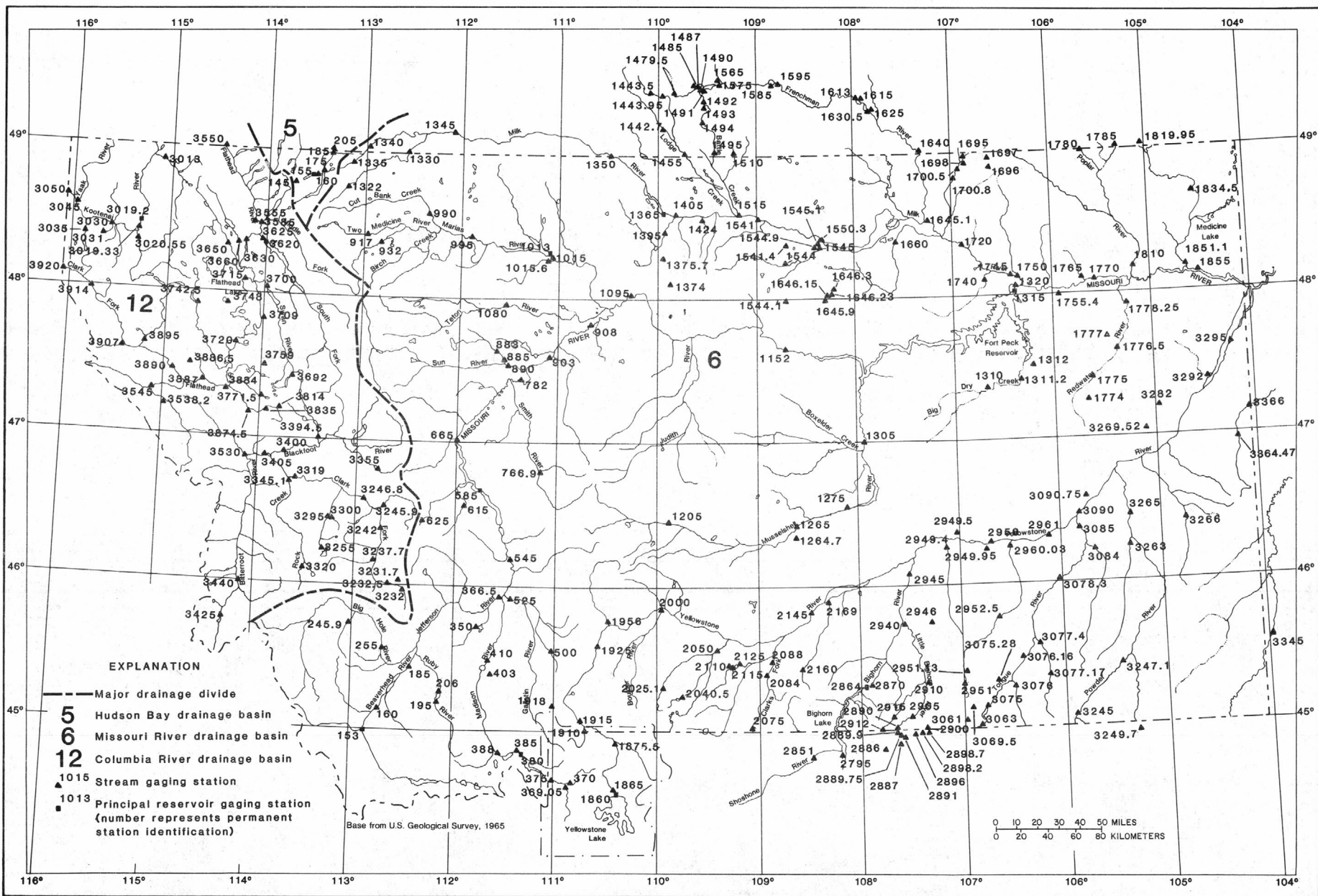


Figure 3.--Location of surface-water gaging stations, 1984 water year.

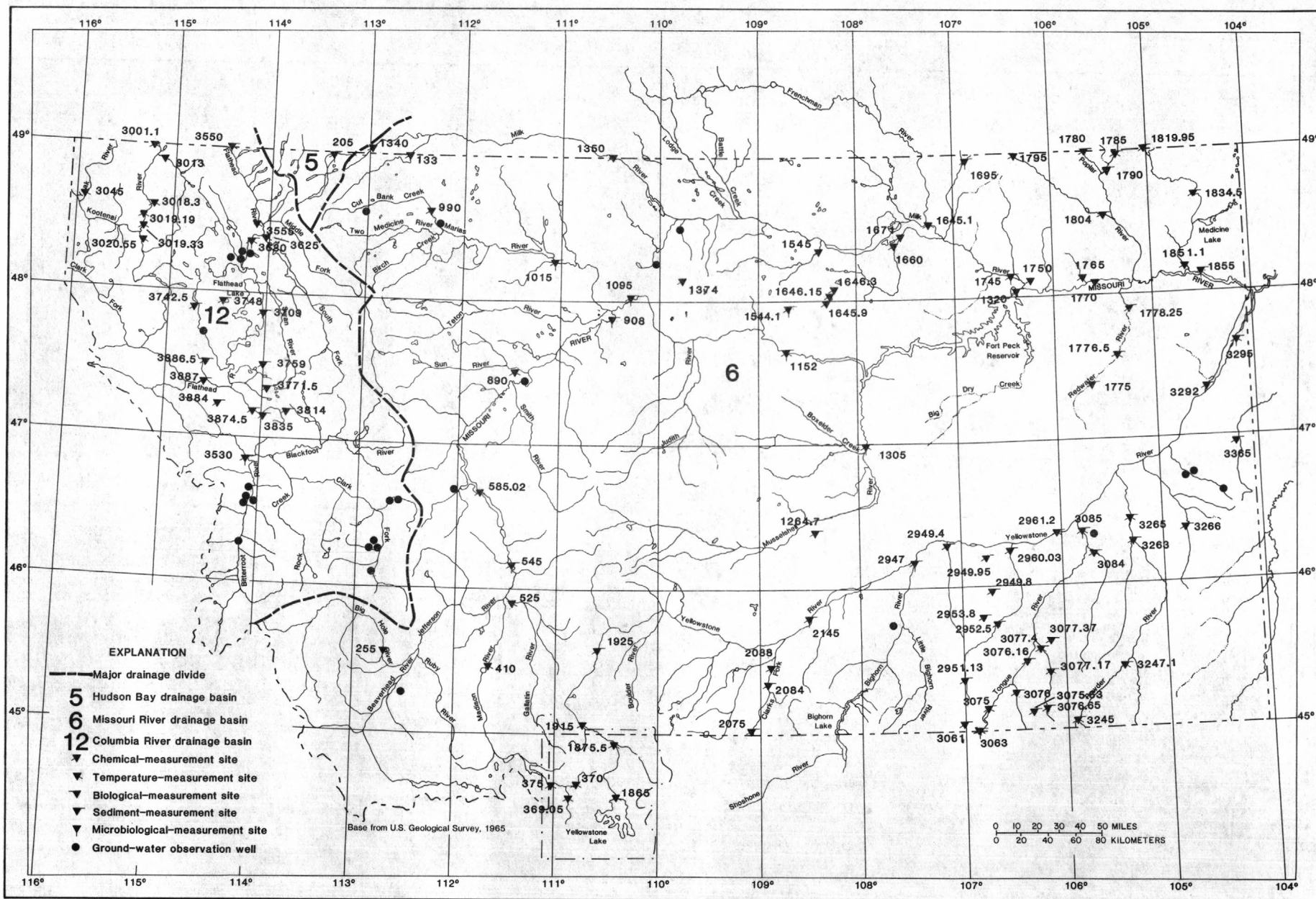


Figure 4.--Location of water-quality stations and ground-water observation wells, 1984 water year.





## PART 12. UPPER COLUMBIA RIVER BASIN

## KOOTENAI RIVER BASIN

## 12300110 LAKE KOOCANUSA AT INTERNATIONAL BOUNDARY

LOCATION.--Lat 48°59'44", long 115°10'43", in NE 1/4 SW 1/4 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.

REMARKS.--Depth-distribution profiles of primary productivity are available in file in Helena district office.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	ELEV- ATION ABOVE NGVD (FEET) (72020)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
OCT									
12...	1115	10.0	2448.97	--	205	8.4	4.0	13.3	9.6
12...	1215	116	2448.97	--	218	8.3	--	12.1	9.3
JUN									
13...	1130	10.0	2414.95	2	204	8.6	12.0	12.2	10.6
13...	1230	90.0	2414.95	3	132	7.8	--	9.3	10.6
JUL									
11...	1045	10.0	2454.98	--	211	8.7	25.0	16.4	10.5
11...	1145	137	2454.98	--	254	8.0	--	7.7	8.6
AUG									
14...	1000	10.0	2458.58	--	210	8.8	15.0	19.8	9.0
14...	1100	134	2458.58	--	251	8.1	--	8.6	7.2
SEP									
12...	1100	10.0	2452.85	2	228	8.4	12.0	16.7	8.5
12...	1200	127	2452.85	2	256	7.8	--	8.2	7.0

DATE	ALKA- LITY FIELD (MG/L AS CACO3) (00410)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, TOTAL (MG/L AS N) (00600)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
OCT								
12...	98	3.8	<.10	.40	--	<.005	<.002	1.1
12...	106	6.7	.20	.60	.80	.007	<.002	1.7
JUN								
13...	101	3.6	.10	.50	.60	<.001	<.001	2.2
13...	93	4.5	.20	.40	.60	.009	.002	1.5
JUL								
11...	98	2.1	<.10	<.20	--	.007	.011	1.5
11...	109	4.6	.10	<.20	--	.012	<.002	1.3
AUG								
14...	92	1.7	.20	.70	.90	<.005	.003	1.4
14...	104	--	<.10	<.20	--	<.005	<.002	2.7
SEP								
12...	97	1.6	<.10	.50	--	<.005	.006	1.0
12...	108	5.0	.20	.30	.50	<.005	.006	1.0

## KOOTENAI RIVER BASIN

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12300110 LAKE KOOCANUSA AT INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	LIGHT INCI- DENT PERCENT REMAIN- ING AT DEPTH (00031)	LIGHT TRANS- MISSION 1 METER PATH- LENGTH (%) (00074)
OCT								
12...	1100	.00	204	8.4	13.3	9.6	100	35
12...	1102	.50	--	--	--	--	90	--
12...	1106	2.00	205	8.4	13.3	9.6	--	35
12...	1108	2.60	--	--	--	--	60	--
12...	1110	5.00	205	8.4	13.3	9.6	--	35
12...	1115	10.0	205	8.4	13.3	9.6	--	33
12...	1117	10.5	--	--	--	--	30	--
12...	1120	15.0	205	8.4	13.3	9.6	--	33
12...	1122	20.0	205	8.4	13.3	9.6	15	33
12...	1124	25.0	205	8.4	13.3	9.6	--	33
12...	1126	30.0	205	8.4	13.3	9.6	--	33
12...	1128	35.0	205	8.4	13.3	9.6	--	33
12...	1130	35.7	--	--	--	--	5.0	--
12...	1132	40.0	205	8.4	13.3	9.6	--	33
12...	1134	45.0	205	8.4	13.3	9.6	--	33
12...	1136	50.0	205	8.4	13.3	9.6	--	32
12...	1138	52.5	--	--	--	--	1.0	--
12...	1140	55.0	205	8.4	13.2	9.6	--	30
12...	1142	60.0	--	8.4	13.2	9.5	--	30
12...	1145	62.3	--	--	--	--	.1	--
12...	1150	65.0	--	8.4	13.1	9.5	--	30
12...	1155	75.0	212	8.4	13.0	9.5	--	30
12...	1200	85.0	--	8.4	13.0	9.5	--	27
12...	1205	95.0	--	8.4	12.8	9.4	--	9.2
12...	1210	105	--	8.4	12.2	9.4	--	6.3
12...	1215	116	218	8.3	12.1	9.3	--	3.1
12...	1220	126	--	8.3	12.1	9.3	--	1.5
JUN								
13...	1115	.00	221	8.7	13.7	10.7	100	6.8
13...	1120	.50	--	--	--	--	90	--
13...	1122	2.00	218	8.7	13.3	10.7	--	6.3
13...	1124	2.40	--	--	--	--	60	--
13...	1126	5.00	219	8.6	13.1	10.8	--	5.8
13...	1128	6.90	--	--	--	--	30	--
13...	1130	10.0	204	8.6	12.2	10.6	--	3.4
13...	1132	11.5	--	--	--	--	15	--
13...	1134	15.0	207	8.4	11.4	10.5	--	1.3
13...	1136	18.4	--	--	--	--	5.0	--
13...	1138	20.0	201	8.4	10.8	10.3	--	.23
13...	1139	24.9	--	--	--	--	1.0	--
13...	1140	25.0	201	8.4	10.8	10.4	--	.16
13...	1142	30.0	192	8.4	10.6	10.3	--	.10
13...	1145	32.2	--	--	--	--	.1	--
13...	1150	35.0	187	8.3	10.6	10.4	--	.05
13...	1155	40.0	177	8.3	10.4	10.4	--	.04
13...	1200	45.0	144	8.2	10.4	10.5	--	.02
13...	1205	50.0	136	8.2	9.9	10.5	--	<.01
13...	1210	55.0	133	8.2	9.9	10.5	--	<.01
13...	1215	60.0	129	8.1	9.9	10.5	--	<.01
13...	1220	70.0	133	8.1	9.5	10.6	--	<.01
13...	1225	80.0	131	7.9	9.4	10.6	--	<.01
13...	1230	90.0	132	7.8	9.3	10.6	--	<.01
13...	1235	100	131	7.9	9.3	10.6	--	<.01

## KOOTENAI RIVER BASIN

12300110 LAKE KOOCANUSA AT INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	LIGHT INCI- DENT PERCENT REMAIN- ING AT DEPTH (00031)	LIGHT TRANS- MISSION 1 METER PATH- LENGTH (%) (00074)
JUL								
11...	1030	.00	--	8.7	18.1	10.0	100	3.1
11...	1035	.50	--	--	--	--	90	--
11...	1037	2.00	207	8.7	17.5	10.3	--	8.5
11...	1039	3.00	--	--	--	--	60	--
11...	1041	5.00	210	8.7	17.2	10.4	--	11
11...	1043	8.00	--	--	--	--	30	--
11...	1045	10.0	211	8.7	16.4	10.5	--	5.3
11...	1047	13.0	--	--	--	--	15	--
11...	1049	15.0	211	8.5	15.7	9.8	--	7.3
11...	1051	20.0	207	8.5	15.1	9.6	5.0	7.3
11...	1053	25.0	205	8.5	14.6	9.5	--	7.3
11...	1055	30.0	208	8.5	14.2	9.4	1.0	7.3
11...	1057	35.0	197	8.5	13.9	9.4	--	8.5
11...	1100	40.0	164	8.5	13.6	9.4	--	6.8
11...	1102	42.0	--	--	--	--	.1	--
11...	1104	45.0	165	8.5	13.5	9.6	--	4.9
11...	1106	50.0	173	8.5	13.4	9.6	--	1.3
11...	1108	55.0	185	8.4	13.2	9.6	--	.92
11...	1110	60.0	181	8.4	12.7	9.7	--	.71
11...	1112	65.0	173	8.4	12.7	9.7	--	.02
11...	1114	70.0	180	8.4	12.5	9.7	--	.01
11...	1116	75.0	187	8.3	12.2	9.7	--	<.01
11...	1118	80.0	175	8.2	12.2	9.8	--	<.01
11...	1120	85.0	163	8.2	11.9	9.8	--	<.01
11...	1122	90.0	172	8.1	11.5	9.7	--	<.01
11...	1124	95.0	182	8.1	11.1	9.8	--	<.01
11...	1126	100	188	8.2	10.7	9.6	--	<.01
11...	1128	105	224	8.2	9.5	9.3	--	<.01
11...	1130	110	242	8.1	8.6	9.2	--	<.01
11...	1135	120	245	8.1	7.8	8.8	--	.05
11...	1140	130	254	8.1	7.7	8.6	--	.01
11...	1145	137	254	8.0	7.7	8.6	--	<.01
11...	1150	147	258	8.0	7.8	8.7	--	<.01
AUG								
14...	0950	.00	214	8.8	19.9	9.0	100	5.8
14...	0954	.50	--	--	--	--	90	--
14...	0956	2.00	214	8.8	19.9	9.0	--	5.8
14...	0958	5.00	210	8.8	19.8	9.0	60	4.9
14...	1000	10.0	210	8.8	19.8	9.0	30	4.5
14...	1002	15.0	209	9.1	19.7	8.9	15	4.1
14...	1004	20.0	210	9.1	19.7	9.0	--	3.8
14...	1005	24.0	--	--	--	--	5.0	--
14...	1006	25.0	212	9.1	19.5	9.0	--	2.3
14...	1010	30.0	214	9.0	19.5	9.0	--	1.5
14...	1012	33.0	--	--	--	--	1.0	--
14...	1014	35.0	216	9.0	18.9	8.8	--	.92
14...	1016	40.0	217	8.7	17.8	8.5	--	6.3
14...	1018	45.0	214	8.6	16.4	8.2	--	4.5
14...	1020	46.0	--	--	--	--	.1	--
14...	1022	50.0	212	8.6	16.3	8.2	--	4.1
14...	1024	55.0	210	8.7	15.9	8.2	--	3.8
14...	1026	60.0	205	8.5	15.4	8.1	--	4.1
14...	1028	65.0	193	8.5	12.7	8.0	--	5.8
14...	1030	70.0	193	8.4	12.6	8.2	--	11
14...	1032	75.0	190	8.4	11.8	8.4	--	13
14...	1034	80.0	191	8.4	11.6	8.5	--	12
14...	1036	85.0	191	8.4	11.2	8.5	--	12
14...	1038	90.0	192	8.3	10.9	8.6	--	9.2
14...	1040	95.0	202	8.3	10.3	8.6	--	13
14...	1042	100	209	8.3	10.1	8.6	--	7.9
14...	1044	105	214	8.3	9.8	8.5	--	3.8
14...	1046	110	220	8.2	9.6	8.3	--	3.4
14...	1048	115	225	8.2	9.3	8.5	--	4.1
14...	1050	120	234	8.2	9.2	8.5	--	4.5
14...	1055	125	239	8.1	8.7	7.5	--	.81
14...	1100	134	251	8.1	8.6	7.2	--	.10
14...	1105	144	251	8.1	8.5	7.2	--	.08



## KOOTENAI RIVER BASIN

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12300110 LAKE KOOCANUSA AT INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	LIGHT INCI- DENT PERCENT REMAIN- ING AT DEPTH (00031)	LIGHT TRANS- MISSION 1 METER PATH- LENGTH (%) (00074)
SEP								
12...	1052	.00	--	8.4	16.7	8.3	100	28
12...	1054	.50	--	--	--	--	90	--
12...	1056	2.00	--	8.4	16.7	8.3	--	28
12...	1058	5.00	--	8.4	16.7	8.4	60	28
12...	1100	10.0	228	8.4	16.7	8.5	--	28
12...	1102	15.0	--	8.4	16.7	8.4	30	27
12...	1104	20.0	--	8.3	16.7	8.4	--	27
12...	1106	24.0	--	--	--	--	15	--
12...	1108	25.0	--	8.3	16.7	8.3	--	28
12...	1110	30.0	--	8.3	16.7	8.3	--	28
12...	1112	35.0	--	8.2	16.7	8.3	--	30
12...	1114	37.0	--	--	--	--	5.0	--
12...	1116	40.0	--	8.2	16.4	8.1	--	30
12...	1118	45.0	--	8.0	15.9	7.5	--	24
12...	1120	50.0	--	8.0	15.7	7.5	--	23
12...	1122	53.0	--	--	--	--	1.0	--
12...	1124	55.0	--	8.0	15.5	7.6	--	21
12...	1126	60.0	--	7.9	14.8	7.5	--	24
12...	1128	65.0	--	7.9	14.6	7.6	--	17
12...	1130	70.0	--	7.9	14.2	7.4	--	14
12...	1132	75.0	--	7.8	13.9	7.4	--	7.9
12...	1134	80.0	--	7.8	12.8	7.1	--	14
12...	1136	85.0	--	7.7	12.3	6.4	--	17
12...	1138	90.0	--	7.7	11.7	6.3	--	15
12...	1140	92.0	--	--	--	--	.1	--
12...	1142	95.0	--	7.7	10.6	6.8	--	3.1
12...	1145	100	--	7.7	9.6	7.2	--	2.6
12...	1150	105	--	7.7	8.8	7.0	--	1.9
12...	1155	115	--	7.7	8.2	7.0	--	2.1
12...	1200	127	256	7.8	8.2	7.0	--	1.3
12...	1205	137	--	7.9	8.2	6.9	--	1.2

## KOOTENAI RIVER BASIN

12301300 TOBACCO RIVER NEAR EUREKA, MT

LOCATION.--Lat 48°53'37", long 115°05'13", in NW¼SE¼ 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<sup>2</sup>.

## WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 2,518.85 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Water-discharge records good. Diversions for irrigation of about 4,500 acres above station.

AVERAGE DISCHARGE.--26 years, 270 ft<sup>3</sup>/s, 8.33 in/yr, 195,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,470 ft<sup>3</sup>/s June 18, 1974, gage height, 6.86 ft; maximum gage height, 7.12 ft May 27, 1961; minimum daily discharge, 20 ft<sup>3</sup>/s Jan. 11, 1963.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of about May 22, 1948, reached a discharge of 2,810 ft<sup>3</sup>/s, from slope-area measurement of peak flow at site 1.5 mi downstream.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 902 ft<sup>3</sup>/s May 31, June 23, gage height, 4.37 ft; minimum daily, 50 ft<sup>3</sup>/s Dec. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	88	100	89	65	132	94	130	246	715	540	147	86
2	90	104	102	70	112	96	130	246	597	505	160	82
3	92	104	130	80	110	96	128	252	549	471	149	82
4	100	152	125	90	112	92	130	249	527	430	144	82
5	102	178	125	100	119	92	142	246	563	410	144	80
6	100	178	114	110	123	92	167	237	633	383	135	86
7	96	198	108	120	110	92	176	234	619	360	132	84
8	96	178	121	115	102	96	173	231	653	357	128	96
9	94	160	123	110	104	102	178	234	717	321	123	104
10	94	157	128	105	104	110	181	246	688	300	121	100
11	92	176	119	100	102	125	178	243	639	284	116	100
12	90	191	112	100	102	130	173	255	596	271	128	102
13	90	184	110	95	104	130	167	303	624	258	123	96
14	92	176	108	90	106	130	162	332	672	246	119	90
15	92	165	108	85	102	132	167	461	764	234	114	88
16	92	160	102	85	100	135	204	544	834	219	110	86
17	92	157	70	80	96	135	313	527	840	210	108	82
18	106	155	70	90	94	132	386	483	771	201	110	78
19	102	157	65	95	106	130	418	458	719	192	106	77
20	100	152	60	100	98	130	504	576	683	189	104	98
21	96	149	55	100	98	144	642	619	738	184	102	119
22	98	142	55	105	98	173	578	537	878	178	100	116
23	121	140	55	110	96	170	536	518	835	170	96	102
24	110	135	50	115	92	170	480	540	755	165	90	96
25	106	135	55	120	94	160	419	505	754	170	86	92
26	102	130	60	125	94	150	369	467	754	192	84	90
27	100	130	65	128	92	140	328	458	744	176	82	100
28	98	123	60	135	90	130	307	458	703	173	80	98
29	92	108	55	137	92	130	290	496	658	165	84	98
30	92	102	55	128	---	130	264	681	582	152	86	92
31	94	---	60	135	---	130	---	866	---	149	86	---
TOTAL	3009	4476	2714	3223	2984	3898	8420	12748	20804	8255	3497	2782
MEAN	97.1	149	87.5	104	103	126	281	411	693	266	113	92.7
MAX	121	198	130	137	132	173	642	866	878	540	160	119
MIN	88	100	50	65	90	92	128	231	527	149	80	77
CFSM	.22	.34	.20	.24	.23	.29	.64	.93	1.58	.61	.26	.21
IN.	.25	.38	.23	.27	.25	.33	.71	1.08	1.76	.70	.30	.24
AC-FT	5970	8880	5380	6390	5920	7730	16700	25290	41260	16370	6940	5520
CAL YR 1983	TOTAL	100520	MEAN 275	MAX 1320	MIN 50	CFSM .63	IN 8.50	AC-FT 199400				
WTR YR 1984	TOTAL	76810	MEAN 210	MAX 878	MIN 50	CFSM .48	IN 6.49	AC-FT 152400				

## KOOTENAI RIVER BASIN

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12301300 TOBACCO RIVER NEAR EUREKA, MT--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1971 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: December 1970 to current year.

INSTRUMENTATION.--Temperature recorder since Dec. 8, 1970.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Maximum, 25.0°C July 23, Aug. 2, 1977; minimum, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum, 21.5°C July 26, 27; minimum, 0.0°C on many days during November to February.

## TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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



12301300 TOBACCO RIVER NEAR EUREKA, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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

## KOOTENAI RIVER BASIN

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12301300 TOBACCO RIVER NEAR EUREKA, MT--Continued

ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
NOV 04...	1140	169	272	12.0	7.5
DEC 15...	1050	103	266	-4.5	1.0
JAN 19...	1030	100	291	-11.0	.0
MAR 23...	0815	167	264	1.0	3.5
MAY 21...	1040	639	171	10.0	6.0
JUN 26...	1030	795	186	18.0	9.5
AUG 24...	0840	92	265	11.0	13.0

## KOOTENAI RIVER BASIN

12301830 LAKE KOOCANUSA AT TENMILE CREEK, NEAR LIBBY, MT

LOCATION.--Lat 48°35'06", long 115°13'52", in NW¼NE¼NW¼ 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.

REMARKS.--Depth-distribution profile of primary productivity are available in file in Helena district office.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	ELEV- ATION ABOVE NGVD (FEET) (72020)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
OCT									
11...	1300	10.0	2449.64	--	202	8.3	15.0	13.5	9.1
11...	1405	240	2449.64	--	255	7.6	--	4.5	7.6
APR									
17...	1230	10.0	2370.53	3	257	8.3	15.0	5.6	11.7
17...	1330	166	2370.53	3	289	8.2	--	3.4	10.6
MAY									
15...	1300	10.0	2379.82	3	262	8.4	9.5	7.3	12.3
15...	1400	175	2379.82	3	278	8.2	--	4.3	11.2
JUN									
12...	1230	10.0	2413.33	2	250	8.5	18.0	11.1	11.6
12...	1330	209	2413.33	2	274	8.0	--	4.4	10.5
JUL									
10...	1300	10.0	2454.76	--	225	8.6	25.0	15.8	9.9
10...	1400	244	2454.76	--	273	8.2	--	4.4	9.2
AUG									
13...	1200	10.0	2458.64	--	203	8.8	21.0	19.9	9.8
13...	1300	250	2458.64	--	258	8.0	--	4.6	9.4
SEP									
11...	1300	10.0	2452.91	1	206	8.5	14.0	16.5	9.0
11...	1400	246	2452.91	1	282	8.1	--	4.8	8.7

DATE	TIME	ALKA- LINITY FIELD (MG/L AS CACO3) (00410)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, TOTAL (MG/L AS N) (00600)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
OCT										
11...	90	3.6	<.10	--	.70	--	<.005	<.002	1.5	
11...	115	6.2	.10	--	.50	.60	<.005	<.002	.8	
APR										
17...	104	3.9	<.10	<.10	<.20	--	<.005	.006	1.0	
17...	115	4.6	<.10	<.10	<.20	--	.006	--	.9	
MAY										
15...	109	3.9	<.10	--	.40	--	<.005	<.001	1.5	
15...	117	4.8	<.10	--	.30	--	<.005	.002	1.1	
JUN										
12...	112	3.0	<.10	--	.40	--	.001	<.001	1.8	
12...	115	4.3	<.10	--	.60	--	.005	<.001	.7	
JUL										
10...	97	2.8	<.10	--	.50	--	--	--	1.9	
10...	114	4.2	.10	--	.20	.30	<.005	--	1.7	
AUG										
13...	90	--	<.10	<.10	.20	--	<.005	<.002	1.7	
13...	112	5.0	<.10	.11	.20	--	.012	.004	.9	
SEP										
11...	96	1.4	<.10	--	<.20	--	<.005	.006	1.0	
11...	119	4.8	.10	--	.40	.50	<.005	--	.6	

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902)	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)
APR								
17...	1230	10.0	130	24	35	9.8	2.8	.1
17...	1330	166	140	25	38	11	3.4	.1
AUG								
13...	1200	10.0	110	24	32	8.2	2.1	.0
13...	1300	250	150	36	41	11	3.3	.1



## KOOTENAI RIVER BASIN

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12301830 LAKE KOOCANUSA AT TENMILE CREEK, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

		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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	
APR									
	17...	.50	111	21	3.5	.10	140	.19	
	17...	.60	121	25	3.2	.10	150	.21	
AUG									
	13...	.50	93	17	1.8	.10	--	--	
	13...	.60	114	23	3.0	.20	150	.21	
DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)	DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
OCT					JUN				
	11...	1250	.50	.524		12...	1252	54.0	.339
	11...	1256	4.00	.677		12...	1304	108	.365
	11...	1308	25.0	.711		12...	1318	162	.287
	11...	1320	64.0	.617		JUL			
	11...	1330	91.0	.359		10...	1250	.50	2.19
	11...	1350	182	.071		10...	1258	9.00	2.63
	11...	1405	240	.043		10...	1308	21.0	1.95
APR						10...	1314	32.0	1.92
	17...	1222	.50	.540		10...	1320	46.0	1.33
	17...	1226	4.00	.540		10...	1330	92.0	.638
	17...	1242	33.0	.699		10...	1342	138	.310
	17...	1256	63.0	.907		AUG			
	17...	1303	84.0	.713		13...	1152	.50	1.44
	17...	1333	168	.189		13...	1201	12.0	1.70
MAY						13...	1206	30.0	3.48
	15...	1252	.50	.649		13...	1210	44.0	6.19
	15...	1302	13.0	.737		13...	1218	63.0	1.86
	15...	1308	23.0	.776		13...	1232	126	.081
	15...	1324	51.0	.922		13...	1246	189	<.020
	15...	1330	66.0	.498		SEP			
	15...	1348	132	.659		11...	1252	.50	1.44
	15...	1400	175	.774		11...	1258	7.00	.996
JUN						11...	1305	30.0	1.08
	12...	1222	.50	.462		11...	1318	65.0	.237
	12...	1232	11.0	1.46		11...	1324	89.0	.127
	12...	1242	28.0	1.39		11...	1346	178	<.100
	12...	1248	40.0	.819		11...	1400	246	<.100

PRIMARY PRODUCTIVITY IN THE EUPHOTIC ZONE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	PRIMARY PRODUCTIVITY (MG C/M <sup>2</sup> /DAY)	DATE	PRIMARY PRODUCTIVITY (MG C/M <sup>2</sup> /DAY)
OCT		JUL	
12...	120	10...	250
APR		AUG	
17...	110	13...	260
MAY		SEP	
15...	100	11...	250
JUN			
12...	270		

(carbon-14, light and dark bottle method)

## KOOTENAI RIVER BASIN

12301830 LAKE KOOCANUSA AT TENMILE CREEK, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	LIGHT INCI- DENT PERCENT REMAIN- ING AT DEPTH (00031)	LIGHT TRANS- MISSION 1 METER PATH- LENGTH (%) (00074)
OCT								
11...	1248	.00	204	--	13.5	9.0	100	50
11...	1250	.50	--	--	--	--	90	--
11...	1252	1.00	--	--	13.5	9.1	--	48
11...	1254	3.00	--	--	13.5	9.1	--	48
11...	1256	4.00	--	--	--	--	60	--
11...	1258	5.00	--	--	13.5	9.1	--	48
11...	1300	10.0	202	8.3	13.5	9.1	--	48
11...	1302	14.0	--	--	--	--	30	--
11...	1304	15.0	--	--	13.5	9.0	--	48
11...	1306	20.0	--	--	13.5	9.1	--	48
11...	1308	25.0	197	8.2	13.5	9.1	15	45
11...	1310	30.0	--	--	13.5	9.1	--	45
11...	1312	40.0	185	--	13.5	9.1	--	45
11...	1314	43.0	--	--	--	--	5	--
11...	1316	50.0	184	--	13.5	9.1	--	45
11...	1318	60.0	184	--	13.5	9.1	--	48
11...	1320	64.0	--	--	--	--	1	--
11...	1322	70.0	184	--	13.5	9.1	--	48
11...	1324	80.0	182	--	13.4	9.0	--	48
11...	1326	85.0	183	--	12.8	8.4	--	48
11...	1328	90.0	185	8.1	11.8	8.0	--	41
11...	1330	91.0	--	--	--	--	.1	--
11...	1332	100	183	8.1	11.2	8.2	--	37
11...	1334	110	186	8.1	10.5	8.5	--	33
11...	1336	120	188	8.1	9.8	8.8	--	35
11...	1338	130	205	8.1	9.0	8.5	--	30
11...	1340	140	213	8.1	8.4	8.6	--	19
11...	1342	150	219	8.1	8.0	8.4	--	18
11...	1344	160	224	8.1	7.6	8.5	--	19
11...	1346	170	228	8.0	7.4	8.4	--	19
11...	1348	180	230	7.9	6.9	8.3	--	11
11...	1352	190	238	7.8	6.6	8.2	--	5.3
11...	1354	200	244	7.7	5.6	8.1	--	1.1
11...	1356	210	252	7.6	5.0	8.0	--	4.1
11...	1358	220	253	7.6	4.7	7.8	--	11
11...	1400	230	254	7.6	4.6	7.7	--	8.5
11...	1405	240	255	7.6	4.5	7.6	--	11
11...	1410	250	257	7.8	4.5	7.6	--	6.3
APR								
17...	1220	.00	255	8.3	6.2	11.8	100	30
17...	1222	.50	--	--	--	--	90	--
17...	1224	2.00	257	8.3	6.2	11.8	--	30
17...	1226	4.00	--	--	--	--	60	--
17...	1228	5.00	258	8.3	5.6	11.7	--	28
17...	1230	10.0	257	8.3	5.6	11.7	--	28
17...	1232	15.0	257	8.3	5.5	11.5	--	28
17...	1234	20.0	257	8.4	4.6	11.4	--	27
17...	1236	23.0	--	--	--	--	30	--
17...	1238	25.0	258	8.4	4.1	11.3	--	25
17...	1240	30.0	258	8.4	4.0	11.3	--	23
17...	1242	33.0	--	--	--	--	15	--
17...	1244	35.0	258	8.4	3.9	11.2	--	21
17...	1246	40.0	259	8.4	3.8	11.2	--	20
17...	1248	45.0	261	8.4	3.8	11.1	--	19
17...	1250	46.0	--	--	--	--	5	--
17...	1252	50.0	261	8.4	3.7	11.1	--	18
17...	1254	55.0	261	8.4	3.7	11.1	--	21
17...	1256	63.0	--	--	--	--	1	--
17...	1258	65.0	262	8.4	3.7	11.2	--	23
17...	1300	75.0	262	8.4	3.6	11.0	--	23
17...	1303	84.0	--	--	--	--	.1	--
17...	1306	85.0	265	8.5	3.5	11.0	--	16
17...	1309	95.0	268	8.5	3.5	10.9	--	11
17...	1312	105	278	8.6	3.5	10.8	--	5.8
17...	1315	115	282	8.5	3.5	10.8	--	6.3
17...	1318	125	285	8.4	3.6	10.8	--	3.8
17...	1320	135	287	8.4	3.5	10.7	--	2.6
17...	1323	145	287	8.3	3.5	10.8	--	1.9
17...	1328	155	287	8.3	3.4	10.7	--	1.2
17...	1330	166	289	8.2	3.4	10.6	--	.53
17...	1335	176	289	8.2	3.4	10.5	--	.04

## KOOTENAI RIVER BASIN

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12301830 LAKE KOOCANUSA AT TENMILE CREEK, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	LIGHT INCI- DENT PERCENT REMAIN- ING AT DEPTH (00031)	LIGHT TRANS- MISSION 1 METER PATH- LENGTH (%) (00074)
MAY								
15...	1250	.00	262	8.4	7.5	12.2	100	28
15...	1252	.50	--	--	--	--	90	--
15...	1254	2.00	261	8.4	7.5	12.2	--	28
15...	1256	4.00	--	--	--	--	60	--
15...	1258	5.00	256	8.4	7.5	12.2	--	28
15...	1300	10.0	262	8.4	7.3	12.3	--	28
15...	1302	13.0	--	--	--	--	30	--
15...	1304	15.0	264	8.4	6.7	12.2	--	30
15...	1306	20.0	264	8.4	6.7	12.1	--	32
15...	1308	23.0	--	--	--	--	15	--
15...	1310	25.0	264	8.4	6.6	12.0	--	33
15...	1312	30.0	265	8.4	6.6	12.0	--	37
15...	1314	35.0	267	8.5	6.6	11.9	--	39
15...	1316	36.0	--	--	--	--	5	--
15...	1318	40.0	268	8.5	6.6	11.8	--	43
15...	1320	45.0	272	8.5	6.6	11.6	--	35
15...	1322	50.0	274	8.5	6.7	11.6	--	27
15...	1324	51.0	--	--	--	--	1	--
15...	1326	55.0	275	8.5	6.6	11.5	--	24
15...	1328	65.0	271	8.5	6.5	11.5	--	15
15...	1330	66.0	--	--	--	--	.1	--
15...	1332	75.0	264	8.5	6.5	11.5	--	16
15...	1335	85.0	263	8.5	5.7	11.7	--	23
15...	1338	95.0	267	8.4	5.0	11.6	--	24
15...	1340	105	271	8.4	4.5	11.6	--	28
15...	1342	115	271	8.3	4.4	11.5	--	9.2
15...	1345	125	272	8.3	4.4	11.5	--	6.3
15...	1350	135	275	8.2	4.3	11.4	--	3.8
15...	1353	145	275	8.2	4.2	11.3	--	1.5
15...	1356	155	276	8.1	4.2	11.3	--	1.2
15...	1358	165	278	8.1	4.3	11.3	--	.13
15...	1400	175	278	8.2	4.3	11.2	--	.04
15...	1403	185	279	8.7	4.3	10.9	--	.01
JUN								
12...	1220	.00	235	8.6	12.8	11.6	100	24
12...	1222	.50	--	--	--	--	90	--
12...	1224	2.00	246	8.6	12.3	11.7	--	20
12...	1226	4.00	--	--	--	--	60	--
12...	1228	5.00	242	8.6	11.7	11.7	--	15
12...	1230	10.0	250	8.5	11.1	11.6	--	13
12...	1231	10.5	--	--	--	--	30	--
12...	1234	15.0	257	8.5	10.7	11.3	--	14
12...	1236	17.0	--	--	--	--	15	--
12...	1238	20.0	255	8.5	10.6	11.2	--	13
12...	1240	25.0	251	8.5	10.5	11.0	--	13
12...	1242	28.0	--	--	--	--	5	--
12...	1244	30.0	250	8.5	10.4	10.9	--	11
12...	1246	35.0	251	8.5	10.1	10.8	--	8.5
12...	1248	40.0	253	8.5	9.9	10.7	1.0	5.8
12...	1250	50.0	257	8.5	9.3	10.8	--	6.3
12...	1252	54.0	--	--	--	--	.1	--
12...	1254	60.0	247	8.5	8.8	10.5	--	3.4
12...	1256	70.0	255	8.5	8.6	10.5	--	1.5
12...	1258	80.0	268	8.5	8.5	10.6	--	2.6
12...	1300	90.0	271	8.5	8.0	10.9	--	12
12...	1302	100	273	8.5	7.5	11.0	--	9.8
12...	1306	110	268	8.5	6.9	11.2	--	9.2
12...	1308	120	269	8.4	6.5	11.4	--	17
12...	1310	130	266	8.4	5.9	11.3	--	13
12...	1312	140	267	8.3	5.3	11.2	--	12
12...	1314	150	266	8.3	4.9	11.1	--	2.6
12...	1316	160	269	8.2	4.6	11.0	--	1.3
12...	1320	170	271	8.2	4.5	10.8	--	.71
12...	1322	180	272	8.1	4.5	10.8	--	.39
12...	1324	190	272	8.1	4.4	10.7	--	.16
12...	1326	200	273	8.0	4.4	10.6	--	.05
12...	1330	209	274	8.0	4.4	10.5	--	.04
12...	1335	219	274	8.0	4.4	10.2	--	.01



## KOOTENAI RIVER BASIN

12301830 LAKE KOOCANUSA AT TENMILE CREEK, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	LIGHT INCI- DENT PERCENT REMAIN- ING AT DEPTH (00031)	LIGHT TRANS- MISSION 1 METER PATH- LENGTH (%) (00074)
JUL								
10...	1248	.00	229	8.6	17.0	9.6	100	18
10...	1250	.50	--	--	--	--	90	--
10...	1252	2.00	229	8.6	16.9	9.8	--	18
10...	1254	4.00	--	--	--	--	60	--
10...	1256	5.00	227	8.6	16.1	9.8	--	15
10...	1258	9.00	--	--	--	--	30	--
10...	1300	10.0	225	8.6	15.8	9.9	--	11
10...	1302	14.0	--	--	--	--	15	--
10...	1304	15.0	225	8.6	15.5	9.8	--	11
10...	1306	20.0	227	8.5	15.2	9.7	--	11
10...	1308	21.0	--	--	--	--	5.0	--
10...	1310	25.0	224	8.5	14.7	9.5	--	14
10...	1312	30.0	218	8.3	13.4	9.2	--	14
10...	1314	32.0	--	--	--	--	1.0	--
10...	1316	35.0	201	8.2	12.5	9.2	--	7.3
10...	1318	45.0	196	8.2	11.8	9.2	--	5.3
10...	1320	46.0	--	--	--	--	.1	--
10...	1322	55.0	210	8.2	11.3	9.2	--	11
10...	1324	65.0	202	8.2	10.3	9.2	--	5.3
10...	1326	75.0	218	8.2	10.2	9.2	--	7.3
10...	1328	85.0	235	8.1	10.0	9.2	--	13
10...	1332	95.0	242	8.1	9.9	9.2	--	18
10...	1334	105	253	8.1	9.6	9.3	--	24
10...	1336	115	264	8.1	9.1	9.4	--	32
10...	1338	125	266	8.1	8.6	9.7	--	27
10...	1340	135	268	8.1	8.1	9.7	--	25
10...	1344	145	267	8.1	7.7	9.8	--	16
10...	1346	155	270	8.1	6.8	9.9	--	25
10...	1348	165	265	8.1	6.0	10.0	--	24
10...	1350	175	268	8.1	5.1	9.9	--	13
10...	1352	190	268	8.1	4.6	9.6	--	4.5
10...	1354	205	271	8.0	4.5	9.5	--	2.3
10...	1356	220	272	8.0	4.4	9.3	--	.92
10...	1358	235	272	8.1	4.4	9.3	--	1.2
10...	1400	244	273	8.2	4.4	9.2	--	1.2
10...	1405	254	274	8.2	4.4	8.9	--	.71
AUG								
13...	1150	.00	--	8.8	20.8	9.5	100	14
13...	1152	.50	--	--	--	--	90	--
13...	1154	3.00	--	8.8	20.7	9.6	--	14
13...	1156	5.00	--	8.8	20.6	9.8	--	14
13...	1158	7.00	--	--	--	--	60	--
13...	1200	10.0	203	8.8	19.9	9.8	--	12
13...	1201	12.0	--	--	--	--	30	--
13...	1202	15.0	--	8.8	19.6	9.7	--	12
13...	1203	19.0	--	--	--	--	15	--
13...	1204	20.0	--	8.8	19.3	9.8	--	11
13...	1205	25.0	--	8.7	18.6	9.8	--	11
13...	1206	30.0	--	8.6	17.5	9.5	5.0	13
13...	1207	35.0	--	8.5	17.0	9.3	--	13
13...	1208	40.0	--	8.4	16.0	9.2	--	16
13...	1210	44.0	--	--	--	--	1.0	--
13...	1212	45.0	202	8.2	14.9	9.0	--	19
13...	1214	50.0	--	8.2	13.9	8.8	--	20
13...	1216	60.0	--	8.2	12.9	8.8	--	25
13...	1218	63.0	--	--	--	--	.1	--
13...	1220	70.0	--	8.2	12.1	8.9	--	43
13...	1222	80.0	200	8.3	11.6	9.2	--	48
13...	1224	90.0	--	8.3	10.9	9.3	--	50
13...	1226	100	--	8.4	10.3	9.5	--	50
13...	1228	110	--	8.4	9.8	9.6	--	52
13...	1230	120	256	8.4	9.6	9.7	--	50
13...	1234	130	--	8.4	9.0	9.7	--	52
13...	1236	140	--	8.3	8.4	9.9	--	50
13...	1238	150	--	8.3	7.8	10.0	--	50
13...	1240	160	--	8.2	7.2	9.9	--	45
13...	1242	170	--	8.2	6.6	10.0	--	43
13...	1244	180	256	8.1	6.0	10.2	--	39
13...	1248	190	--	8.1	5.3	9.9	--	25
13...	1250	200	--	8.0	5.1	9.8	--	18
13...	1252	210	--	8.0	4.8	9.6	--	16
13...	1254	220	--	8.0	4.7	9.5	--	11
13...	1256	230	--	8.0	4.6	9.5	--	9.8
13...	1258	240	--	8.0	4.6	9.4	--	8.5
13...	1300	250	258	8.0	4.6	9.4	--	2.3
13...	1302	260	--	8.0	4.6	9.3	--	5.3

12301830 LAKE KOOCANUSA AT TENMILE CREEK, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	LIGHT INCI- DENT PERCENT REMAIN- ING AT DEPTH (00031)	LIGHT TRANS- MISSION 1 METER PATH- LENGTH (%) (00074)
SEP								
11...	1250	.00	--	8.6	17.0	8.0	100	52
11...	1252	.50	--	--	--	--	90	--
11...	1254	2.00	--	8.6	16.9	7.9	--	50
11...	1256	5.00	--	8.6	16.6	7.9	--	45
11...	1258	7.00	--	--	--	--	60	--
11...	1300	10.0	206	8.5	16.5	9.0	--	45
11...	1301	15.0	--	8.5	16.5	8.9	--	45
11...	1302	20.0	--	8.5	16.5	8.9	--	45
11...	1303	22.0	--	--	--	--	30	--
11...	1304	25.0	--	8.5	16.5	8.9	--	45
11...	1305	30.0	--	8.5	16.5	8.8	15	45
11...	1306	35.0	--	8.5	16.5	8.8	--	45
11...	1308	40.0	--	8.5	16.5	8.9	--	45
11...	1310	45.0	--	8.5	16.5	8.9	--	48
11...	1312	50.0	--	8.5	16.2	8.7	--	48
11...	1314	55.0	--	8.5	15.8	8.5	--	48
11...	1316	60.0	--	8.5	15.1	8.7	--	43
11...	1318	65.0	--	8.5	13.8	8.2	1.0	39
11...	1320	75.0	--	8.5	13.2	8.1	--	39
11...	1322	85.0	200	8.5	12.0	8.0	--	50
11...	1324	89.0	--	--	--	--	.1	--
11...	1326	95.0	--	8.6	11.1	8.3	--	52
11...	1328	105	--	8.6	10.3	8.5	--	52
11...	1330	115	--	8.5	9.8	8.8	--	52
11...	1332	125	--	8.5	9.2	8.8	--	52
11...	1334	135	--	8.4	8.9	8.8	--	41
11...	1336	145	255	8.4	8.2	8.8	--	33
11...	1338	155	--	8.4	7.6	8.8	--	27
11...	1340	165	268	8.3	6.6	9.0	--	33
11...	1342	175	--	8.3	6.3	9.2	--	35
11...	1348	185	--	8.2	5.9	9.1	--	32
11...	1350	195	--	8.2	5.6	9.1	--	30
11...	1352	205	--	8.2	5.1	8.9	--	27
11...	1354	215	--	8.1	5.0	8.8	--	23
11...	1356	225	--	8.1	4.9	8.8	--	21
11...	1358	235	--	8.1	4.8	8.7	--	18
11...	1400	246	282	8.1	4.8	8.7	--	15
11...	1402	256	--	8.1	4.8	8.7	--	12

## KOOTENAI RIVER BASIN

12301919 LAKE KOOCANUSA AT FOREBAY, NEAR LIBBY, MT

LOCATION---Lat 48°24'43", long 115°18'33", in SW¼NW¼NE¼ 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.

REMARKS---Depth-distribution profiles of primary productivity are available in file in Helena district office.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	ELEV- ATION ABOVE NGVD (FEET) (72020)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
OCT									
13...	1000	10.0	2448.34	2	181	8.2	8.0	13.5	9.0
13...	1100	301	2448.34	2	258	7.6	--	3.9	7.7
APR									
18...	0900	10.0	2370.88	3	253	8.3	--	4.1	12.0
18...	1000	225	2370.88	3	284	8.1	10.0	3.1	10.1
MAY									
16...	0930	10.0	2380.54	1	260	8.4	8.0	5.5	12.2
16...	1030	233	2380.54	1	269	8.1	--	3.8	11.3
JUN									
14...	0930	10.0	2416.79	--	262	8.3	15.0	13.9	11.3
14...	1030	268	2416.79	--	280	7.9	--	4.0	9.4
JUL									
12...	0930	10.0	2455.17	1	217	8.5	21.0	15.4	11.3
12...	1030	305	2455.17	1	280	7.9	--	4.0	9.1
AUG									
16...	1000	10.0	2458.41	--	208	8.9	21.0	21.6	8.8
16...	1100	312	2458.41	--	271	8.0	--	4.1	8.9
SEP									
13...	1000	10.0	2452.74	40	210	8.4	8.0	15.9	8.7
13...	1100	302	2452.74	40	288	7.6	--	4.3	8.3

DATE	ALKA- LITY FIELD (MG/L AS CAC03) (00410)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, TOTAL (MG/L AS N) (00600)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
OCT								
13...	89	3.6	<.10	.50	--	<.005	<.002	1.7
13...	116	6.2	.20	.50	.70	<.005	.006	2.8
APR								
18...	106	4.4	<.10	.20	--	<.005	.001	1.4
18...	116	5.6	.10	<.20	--	.009	.007	.9
MAY								
16...	108	4.2	<.10	--	--	<.005	<.001	1.1
16...	112	5.1	<.10	.50	--	.005	<.001	1.4
JUN								
14...	130	2.5	<.10	<.20	--	.003	<.001	1.1
14...	114	4.8	.10	<.20	--	.008	.003	.8
JUL								
12...	97	2.5	<.10	.30	--	.008	<.002	2.0
12...	111	4.8	.10	.20	.30	.018	.004	.9
AUG								
16...	89	1.5	<.10	.80	--	<.005	.006	2.3
16...	107	5.0	.10	<.20	--	<.005	--	.8
SEP								
13...	99	1.6	<.10	<.20	--	<.005	.006	1.0
13...	116	4.9	.10	<.20	--	<.005	.005	.8



## KOOTENAI RIVER BASIN

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12301919 LAKE KOOCANUSA AT FOREBAY, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	LIGHT INCI- DENT PERCENT REMAIN- ING AT DEPTH (00031)	LIGHT TRANS- MISSION 1 METER PATH- LENGTH (%) (00074)
OCT								
13...	0950	.00	181	8.2	13.5	9.0	100	50
13...	0952	.50	--	--	--	--	90	--
13...	0954	2.00	182	8.2	13.5	9.0	--	50
13...	0956	5.00	182	8.2	13.5	9.0	--	48
13...	0958	6.60	--	--	--	--	60	--
13...	1000	10.0	181	8.2	13.5	9.0	--	48
13...	1001	15.0	181	8.2	13.5	9.0	--	48
13...	1002	17.1	--	--	--	--	30	--
13...	1003	20.0	181	8.2	13.5	9.0	--	48
13...	1004	25.0	181	8.2	13.5	8.9	--	48
13...	1005	27.6	--	--	--	--	15	--
13...	1006	30.0	181	8.2	13.5	8.9	--	48
13...	1007	35.0	181	8.2	13.5	8.9	--	48
13...	1008	40.0	182	8.2	13.5	8.9	--	48
13...	1009	43.3	--	--	--	--	5.0	--
13...	1010	45.0	182	8.2	13.5	8.9	--	48
13...	1011	50.0	182	8.2	13.5	8.9	--	48
13...	1012	55.0	182	8.2	13.5	8.9	--	48
13...	1013	59.7	--	--	--	--	1.0	--
13...	1014	60.0	182	8.2	13.5	8.9	--	48
13...	1016	65.0	179	8.2	13.4	8.9	--	48
13...	1018	70.0	181	8.2	13.4	8.9	--	48
13...	1019	74.2	--	--	--	--	.1	--
13...	1022	75.0	178	8.0	12.8	8.0	--	50
13...	1024	85.0	175	8.0	12.6	8.0	--	52
13...	1026	95.0	177	8.0	12.2	8.2	--	52
13...	1028	105	178	8.0	11.5	8.4	--	52
13...	1030	115	190	8.0	10.5	8.7	--	52
13...	1032	125	205	8.0	9.6	8.9	--	50
13...	1034	135	222	8.0	9.1	9.0	--	50
13...	1036	145	228	8.0	8.5	9.1	--	52
13...	1038	155	232	7.9	8.3	9.1	--	48
13...	1040	165	236	7.9	7.7	9.1	--	52
13...	1042	175	240	7.8	7.3	9.2	--	50
13...	1044	185	240	7.8	6.9	9.2	--	52
13...	1046	195	246	7.6	6.3	9.1	--	37
13...	1048	210	248	7.6	5.3	8.8	--	41
13...	1050	225	251	7.5	4.7	8.6	--	39
13...	1052	240	252	7.5	4.2	8.5	--	48
13...	1054	255	253	7.5	4.1	8.5	--	41
13...	1056	270	254	7.5	4.0	8.3	--	35
13...	1058	285	255	7.6	3.9	8.1	--	30
13...	1100	301	258	7.6	3.9	7.7	--	24
13...	1105	311	259	7.6	3.9	7.3	--	13

## KOOTENAI RIVER BASIN

12301919 LAKE KOOCANUSA AT FOREBAY, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	LIGHT INCI- DENT PERCENT REMAIN- ING AT DEPTH (00031)	LIGHT TRANS- MISSION 1 METER PATH- LENGTH (%) (00074)
APR								
18...	0850	.00	253	8.3	5.2	12.0	100	32
18...	0852	.50	--	--	--	--	90	--
18...	0854	2.00	252	8.3	5.1	12.0	--	32
18...	0856	5.00	256	8.3	5.1	12.2	--	28
18...	0858	6.00	--	--	--	--	60	--
18...	0900	10.0	253	8.3	4.1	12.0	--	28
18...	0902	15.0	256	8.3	3.8	11.8	--	30
18...	0904	19.0	--	--	--	--	30	--
18...	0906	20.0	258	8.3	3.6	11.5	--	30
18...	0908	25.0	258	8.3	3.8	11.6	--	28
18...	0910	29.0	--	--	--	--	15	--
18...	0912	30.0	258	8.3	3.6	11.3	--	28
18...	0914	35.0	258	8.4	3.6	11.3	--	28
18...	0916	40.0	259	8.4	3.8	11.2	--	28
18...	0918	42.0	--	--	--	--	5.0	--
18...	0920	45.0	260	8.4	3.7	11.1	--	25
18...	0922	50.0	262	8.4	3.5	11.1	--	25
18...	0924	55.0	262	8.4	3.5	11.0	--	24
18...	0926	59.0	--	--	--	--	1.0	--
18...	0928	65.0	262	8.4	3.4	11.0	--	21
18...	0930	75.0	264	8.3	3.3	11.2	--	20
18...	0932	77.0	--	--	--	--	.1	--
18...	0934	85.0	266	8.3	3.2	11.1	--	18
18...	0936	95.0	266	8.3	3.2	11.1	--	16
18...	0938	105	268	8.3	3.2	11.0	--	14
18...	0940	115	268	8.3	3.2	11.1	--	13
18...	0942	125	269	8.3	3.2	11.1	--	9.2
18...	0944	135	274	8.2	3.1	11.0	--	7.9
18...	0946	150	278	8.2	3.0	10.8	--	3.4
18...	0948	165	279	8.1	3.0	10.9	--	2.1
18...	0950	180	280	8.1	3.1	11.0	--	1.7
18...	0952	195	281	8.0	3.1	11.0	--	1.3
18...	0955	210	282	8.0	3.1	10.7	--	.81
18...	1000	225	284	8.1	3.1	10.1	--	.39
18...	1002	235	284	8.3	3.1	10.2	--	.10

## KOOTENAI RIVER BASIN

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12301919 LAKE KOOCANUSA AT FOREBAY, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	LIGHT INCI- DENT PERCENT REMAIN- ING AT DEPTH (00031)	LIGHT TRANS- MISSION 1 METER PATH- LENGTH (%) (00074)
MAY								
16...	0920	.00	260	8.4	5.5	12.2	100	25
16...	0922	.50	--	--	--	--	90	--
16...	0924	2.00	259	8.4	5.5	12.2	--	25
16...	0926	4.00	--	--	--	--	60	--
16...	0928	5.00	260	8.4	5.5	12.2	--	24
16...	0930	10.0	260	8.4	5.5	12.2	--	24
16...	0932	15.0	259	8.4	5.5	12.2	30	24
16...	0934	20.0	259	8.4	5.5	12.2	--	24
16...	0936	25.0	258	8.4	5.5	12.2	15	24
16...	0938	30.0	258	8.4	5.3	12.1	--	24
16...	0940	36.7	--	--	--	--	5.0	--
16...	0942	40.0	260	8.4	5.2	12.0	--	25
16...	0944	50.0	261	8.4	5.1	11.8	--	27
16...	0946	54.5	--	--	--	--	1.0	--
16...	0950	60.0	262	8.4	5.0	12.0	--	20
16...	0952	70.0	262	8.3	4.9	12.0	--	21
16...	0955	75.5	--	--	--	--	.1	--
16...	0958	80.0	262	8.3	4.7	11.7	--	20
16...	1000	90.0	261	8.3	4.6	11.9	--	20
16...	1003	100	262	8.3	4.5	11.9	--	18
16...	1006	110	263	8.2	4.3	11.9	--	17
16...	1009	120	265	8.2	4.1	11.7	--	18
16...	1012	130	267	8.2	3.8	11.6	--	11
16...	1015	145	267	8.1	3.8	11.5	--	8.5
16...	1018	160	268	8.1	3.7	11.4	--	4.9
16...	1020	175	268	8.1	3.8	11.4	--	2.6
16...	1023	190	268	8.1	3.8	11.4	--	.92
16...	1026	205	269	8.0	3.8	11.4	--	.53
16...	1029	220	269	8.0	3.8	11.4	--	.23
16...	1030	233	269	8.1	3.8	11.3	--	.16
16...	1033	243	270	8.2	3.8	11.3	--	.04
JUN								
14...	0920	.00	261	8.3	14.0	11.1	100	21
14...	0922	.50	--	--	--	--	90	--
14...	0924	2.00	262	8.3	14.0	11.3	--	20
14...	0926	4.00	--	--	--	--	60	--
14...	0928	5.00	265	8.3	14.0	11.3	--	20
14...	0930	10.0	262	8.3	13.9	11.3	--	20
14...	0931	11.8	--	--	--	--	30	--
14...	0932	15.0	264	8.3	13.9	11.3	--	20
14...	0933	19.7	--	--	--	--	15	--
14...	0934	20.0	259	8.3	13.7	11.6	--	18
14...	0936	25.0	262	8.4	12.3	11.9	--	16
14...	0938	30.0	259	8.4	11.8	12.1	--	13
14...	0940	33.5	--	--	--	--	5.0	--
14...	0942	40.0	265	8.4	10.6	12.1	--	13
14...	0944	50.0	264	8.4	10.3	12.1	--	13
14...	0946	60.0	268	8.3	9.7	11.9	--	13
14...	0948	67.3	--	--	--	--	1.0	--
14...	0950	70.0	268	8.3	9.3	11.3	--	17
14...	0952	80.0	269	8.3	9.2	11.4	--	18
14...	0954	90.0	270	8.3	9.0	11.5	--	17
14...	0956	100	268	8.3	8.7	11.6	--	21
14...	0958	110	265	8.4	7.7	11.4	--	16
14...	1000	120	267	8.3	6.9	11.3	--	14
14...	1002	130	263	8.3	6.2	11.2	--	18
14...	1004	140	266	8.2	5.4	11.2	--	15
14...	1006	150	266	8.2	5.0	11.2	--	17
14...	1008	160	268	8.1	4.7	11.0	--	17
14...	1010	170	270	8.1	4.3	10.8	--	14
14...	1012	180	271	8.1	4.2	10.8	--	11
14...	1014	190	273	8.0	4.0	10.6	--	6.8
14...	1016	200	273	8.0	4.0	10.5	--	3.4
14...	1018	210	274	8.0	4.0	10.3	--	.53
14...	1020	220	275	7.9	4.0	10.2	--	.81
14...	1022	230	276	7.9	4.0	10.1	--	.28
14...	1024	240	277	7.9	4.0	9.9	--	.23
14...	1026	250	278	7.9	4.0	9.8	--	.08
14...	1028	260	279	7.9	4.0	9.6	--	.03
14...	1030	268	280	7.9	4.0	9.4	--	.01
14...	1035	278	281	7.9	4.0	9.0	--	<.01



## KOOTENAI RIVER BASIN

12301919 LAKE KOOCANUSA AT FOREBAY, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	LIGHT INCI- DENT PERCENT REMAIN- ING AT DEPTH (00031)	LIGHT TRANS- MISSION 1 METER PATH- LENGTH (%) (00074)
JUL								
12...	0920	.00	230	8.5	18.4	10.3	100	21
12...	0922	.50	--	--	--	--	90	--
12...	0924	2.00	230	8.5	18.3	10.4	--	21
12...	0926	4.30	--	--	--	--	60	--
12...	0928	5.00	232	8.5	17.2	11.1	--	17
12...	0930	10.0	217	8.5	15.4	11.3	--	11
12...	0931	10.2	--	--	--	--	30	--
12...	0932	15.0	217	8.4	14.1	11.1	--	9.2
12...	0933	15.7	--	--	--	--	15	--
12...	0934	20.0	217	8.4	13.6	10.9	--	8.5
12...	0935	23.0	--	--	--	--	5.0	--
12...	0936	25.0	217	8.3	13.3	10.6	--	8.5
12...	0937	30.0	216	8.3	12.9	10.3	--	9.2
12...	0938	33.5	--	--	--	--	1.0	--
12...	0939	35.0	215	8.2	12.8	10.2	--	14
12...	0940	40.0	215	8.2	12.6	10.0	--	14
12...	0942	46.3	--	--	--	--	.1	--
12...	0944	50.0	220	8.1	12.5	10.0	--	18
12...	0946	60.0	224	8.1	12.1	10.1	--	18
12...	0948	70.0	227	8.1	11.4	9.9	--	19
12...	0950	80.0	239	8.1	10.6	9.8	--	18
12...	0952	90.0	249	8.1	10.3	9.9	--	23
12...	0954	100	256	8.1	10.0	10.0	--	24
12...	0956	110	266	8.1	9.8	10.2	--	28
12...	0958	120	268	8.1	9.4	10.4	--	32
12...	1000	130	267	8.1	9.1	10.5	--	33
12...	1002	140	268	8.1	8.6	10.7	--	41
12...	1004	150	271	8.1	8.1	10.8	--	41
12...	1006	155	269	8.1	7.8	10.8	--	41
12...	1008	160	268	8.1	7.2	10.9	--	48
12...	1010	165	268	8.0	6.8	10.9	--	32
12...	1012	170	267	8.0	5.9	11.0	--	33
12...	1014	185	265	8.0	5.1	11.0	--	41
12...	1016	200	268	8.0	4.5	10.7	--	35
12...	1018	215	271	7.9	4.1	10.6	--	24
12...	1020	230	272	7.9	4.0	10.4	--	19
12...	1022	245	274	7.9	4.0	10.1	--	20
12...	1024	260	275	7.9	4.0	9.8	--	13
12...	1026	275	276	7.9	3.9	9.6	--	13
12...	1028	290	277	7.9	3.9	9.4	--	12
12...	1030	305	280	7.9	4.0	9.1	--	7.9
12...	1035	315	280	7.9	4.0	8.9	--	6.3

## KOOTENAI RIVER BASIN

41

12301919 LAKE KOOCANUSA AT FOREBAY, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	LIGHT INCI- DENT PERCENT REMAIN- ING AT DEPTH (00031)	LIGHT TRANS- MISSION 1 METER PATH- LENGTH (%) (00074)
AUG								
16...	0950	.00	211	8.9	21.8	--	100	23
16...	0952	.50	--	--	--	--	90	--
16...	0954	2.00	210	8.9	21.8	--	--	23
16...	0056	4.00	--	--	--	--	60	--
16...	0958	5.00	210	8.9	21.8	--	--	20
16...	1000	10.0	208	8.9	21.6	8.8	--	20
16...	1001	13.0	--	--	--	--	30	--
16...	1002	15.0	209	8.9	21.2	--	--	18
16...	1003	20.0	208	8.9	19.5	--	--	9.2
16...	1004	21.0	--	--	--	--	15	--
16...	1005	25.0	208	8.9	18.6	--	--	9.2
16...	1006	29.0	--	--	--	--	5.0	--
16...	1007	30.0	208	8.9	17.3	--	--	11
16...	1008	35.0	206	8.8	16.9	--	--	15
16...	1009	40.0	206	8.8	16.1	--	--	18
16...	1010	43.0	--	--	--	--	1.0	--
16...	1011	45.0	206	8.7	15.5	--	--	21
16...	1012	50.0	205	8.6	14.8	8.6	--	28
16...	1014	55.0	201	8.6	14.4	--	--	25
16...	1016	60.0	201	8.5	12.9	--	--	30
16...	1018	68.0	--	--	--	--	.1	--
16...	1020	70.0	207	8.5	12.3	--	--	39
16...	1022	80.0	208	8.6	11.6	8.7	--	48
16...	1024	90.0	220	8.7	11.1	--	--	50
16...	1026	100	232	8.7	10.3	--	--	50
16...	1028	110	250	8.7	10.0	--	--	50
16...	1030	120	255	8.7	9.4	9.7	--	50
16...	1032	130	262	8.7	8.9	--	--	50
16...	1034	140	264	8.7	8.1	--	--	50
16...	1036	150	263	8.6	7.6	--	--	50
16...	1038	165	264	8.5	6.5	--	--	50
16...	1040	180	262	8.4	5.7	--	--	50
16...	1042	195	261	8.3	5.3	10.7	--	50
16...	1044	210	263	8.3	4.9	10.6	--	50
16...	1046	225	265	8.2	4.5	10.3	--	48
16...	1048	240	266	8.2	4.3	10.1	--	43
16...	1050	255	268	8.1	4.2	9.8	--	43
16...	1052	270	269	8.1	4.1	9.7	--	41
16...	1054	285	269	8.1	4.1	9.5	--	37
16...	1056	295	271	8.1	4.1	9.4	--	35
16...	1058	300	271	8.0	4.1	9.2	--	33
16...	1100	312	271	8.0	4.1	8.9	--	25
16...	1102	322	271	8.0	4.1	8.7	--	20

## KOOTENAI RIVER BASIN

12301919 LAKE KOOCANUSA AT FOREBAY, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	LIGHT INCI- DENT PERCENT REMAIN- ING AT DEPTH (00031)	LIGHT TRANS- MISSION 1 METER PATH- LENGTH (%) (00074)
SEP								
13...	0955	.00	211	8.3	15.9	8.6	100	33
13...	0957	.50	--	--	--	--	90	--
13...	0958	2.00	211	8.4	15.9	8.7	--	33
13...	0959	5.00	210	8.4	15.9	8.7	60	30
13...	1000	10.0	210	8.4	15.9	8.7	--	30
13...	1002	13.0	--	--	--	--	30	--
13...	1004	15.0	210	8.4	15.9	8.6	--	30
13...	1006	20.0	210	8.4	15.9	8.6	--	30
13...	1008	22.0	--	--	--	--	15	--
13...	1010	25.0	210	8.4	15.9	8.6	--	30
13...	1012	30.0	--	8.4	15.9	8.6	--	30
13...	1014	35.0	198	8.4	15.9	8.6	--	30
13...	1016	37.0	--	--	--	--	5.0	--
13...	1018	40.0	203	8.4	15.9	8.6	--	30
13...	1020	45.0	--	8.3	15.8	8.6	--	32
13...	1022	50.0	204	8.1	15.3	8.5	--	32
13...	1024	52.0	--	8.1	15.1	7.7	--	33
13...	1026	55.0	--	8.0	15.1	7.7	--	33
13...	1028	57.0	--	--	--	--	1.0	--
13...	1030	60.0	--	8.0	14.6	7.6	--	33
13...	1032	70.0	--	7.9	14.1	7.4	--	37
13...	1034	80.0	--	7.9	13.4	7.4	--	37
13...	1036	90.0	--	7.8	11.8	7.6	--	41
13...	1038	93.0	--	--	--	--	.1	--
13...	1040	100	--	7.8	10.7	8.2	--	41
13...	1042	110	--	7.8	9.7	8.6	--	45
13...	1044	120	--	7.8	8.8	8.9	--	45
13...	1046	130	--	7.7	8.4	9.1	--	45
13...	1047	140	--	7.7	8.0	9.2	--	48
13...	1048	150	--	7.7	7.7	9.3	--	45
13...	1049	160	277	7.7	7.2	9.3	--	48
13...	1050	175	--	7.7	6.2	9.3	--	48
13...	1052	190	--	7.6	5.1	9.2	--	45
13...	1053	205	--	7.6	4.7	9.0	--	39
13...	1054	220	--	7.6	4.5	8.8	--	33
13...	1055	235	--	7.6	4.5	8.6	--	32
13...	1056	250	--	7.6	4.4	8.7	--	28
13...	1057	265	--	7.6	4.3	8.5	--	28
13...	1058	280	--	7.6	4.3	8.5	--	25
13...	1059	295	--	7.6	4.3	8.4	--	23
13...	1100	302	288	7.6	4.3	8.3	--	20
13...	1101	312	--	7.7	4.3	8.3	--	18

## 12301920 LAKE KOOCANUSA NEAR LIBBY, MT

LOCATION.--Lat 48°24'38", long 115°18'47", in NW¼ 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 mile 221.9.

DRAINAGE AREA.--8,985 mi<sup>2</sup>, 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 furnished 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 YEAR.--Maximum contents, 5,748,000 acre-ft July 31, elevation, 2,459.00 ft; minimum, 2,499,000 acre-ft Apr. 15, elevation, 2,370.32 ft.

Capacity table (elevation, in feet, and contents, in acre-ft)

Elevation	Contents	Elevation	Contents
2,360	2,232,000	2,420	4,085,000
2,380	2,765,000	2,440	4,899,000
2,400	3,367,000	2,460	5,795,000

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
INSTANTANEOUS OBSERVATIONS AT 2400

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2453.12	2441.77	2433.67	2406.38	2379.79	2372.64	2370.77	2376.38	2397.96	2447.66	2458.86	2454.29
2	2453.10	2441.82	2432.86	2405.43	2378.70	2372.54	2370.67	2376.62	2399.51	2448.64	2458.64	2454.25
3	2452.68	2441.85	2432.07	2404.47	2377.75	2372.49	2370.62	2376.70	2400.80	2449.36	2458.36	2454.15
4	2452.34	2442.14	2431.20	2403.41	2377.74	2372.37	2370.56	2376.94	2401.95	2450.16	2458.52	2453.98
5	2451.92	2442.50	2430.39	2403.07	2377.69	2372.29	2370.53	2377.16	2403.12	2450.97	2458.74	2453.75
6	2451.51	2442.77	2429.50	2403.14	2377.62	2372.20	2370.47	2377.35	2404.35	2451.88	2458.83	2453.41
7	2451.07	2442.95	2428.66	2403.24	2377.20	2372.06	2370.48	2377.49	2405.64	2452.91	2458.68	2453.11
8	2450.92	2443.10	2427.75	2403.27	2376.17	2372.01	2370.45	2377.67	2407.14	2453.79	2458.47	2453.02
9	2450.73	2443.24	2426.90	2402.98	2375.11	2371.91	2370.44	2377.84	2408.84	2454.44	2458.22	2453.01
10	2450.29	2443.35	2426.08	2402.11	2374.18	2371.81	2370.43	2378.15	2410.47	2454.76	2458.25	2453.02
11	2449.64	2443.44	2425.26	2401.25	2374.15	2371.77	2370.40	2378.39	2411.84	2454.98	2458.46	2452.91
12	2448.97	2443.57	2425.59	2400.35	2374.09	2371.68	2370.36	2378.69	2413.33	2455.17	2458.69	2452.85
13	2448.34	2443.65	2423.95	2399.42	2374.02	2371.68	2370.35	2378.92	2414.95	2455.44	2458.64	2452.74
14	2447.63	2443.47	2423.38	2398.42	2374.00	2371.63	2370.35	2379.26	2416.79	2455.85	2458.58	2452.65
15	2446.95	2443.30	2422.67	2397.39	2373.96	2371.59	2370.32	2379.82	2418.98	2456.19	2458.50	2452.69
16	2446.30	2443.12	2421.81	2396.38	2373.88	2371.52	2370.33	2380.54	2421.19	2456.48	2458.41	2452.76
17	2445.64	2442.76	2420.90	2395.31	2373.79	2371.43	2370.53	2381.43	2423.65	2456.78	2458.32	2452.62
18	2444.99	2442.61	2420.01	2394.28	2373.69	2371.36	2370.88	2382.26	2425.73	2457.01	2458.49	2452.24
19	2444.37	2442.33	2419.07	2393.18	2373.60	2371.29	2371.35	2383.08	2427.49	2457.04	2458.53	2451.89
20	2443.69	2441.70	2418.10	2392.14	2373.52	2371.26	2371.89	2384.25	2429.06	2456.96	2458.34	2451.57
21	2443.00	2440.99	2417.12	2391.05	2373.41	2371.19	2372.42	2385.39	2430.71	2457.13	2457.88	2451.44
22	2442.84	2440.28	2416.07	2389.98	2373.33	2371.11	2373.06	2386.45	2432.37	2457.31	2457.36	2451.49
23	2442.67	2439.61	2415.15	2388.94	2373.27	2371.11	2373.58	2387.38	2433.87	2457.37	2456.93	2451.55
24	2442.47	2438.91	2414.17	2387.91	2373.22	2371.08	2374.12	2388.42	2435.37	2457.52	2456.42	2451.44
25	2442.24	2438.19	2413.24	2386.95	2373.14	2371.08	2374.68	2389.32	2437.00	2457.64	2455.88	2451.14
26	2441.97	2437.48	2412.25	2385.90	2373.06	2371.03	2375.05	2390.13	2438.75	2457.79	2455.46	2450.94
27	2442.01	2436.73	2411.28	2384.92	2372.98	2371.00	2375.35	2390.92	2440.53	2458.01	2455.05	2450.66
28	2442.03	2436.04	2410.32	2383.93	2372.87	2370.97	2375.71	2391.71	2442.35	2458.35	2454.81	2450.36
29	2442.03	2435.28	2409.33	2382.96	2372.79	2370.91	2375.95	2392.58	2444.05	2458.79	2454.60	2450.23
30	2441.97	2434.49	2408.36	2381.92	---	2370.88	2376.16	2393.80	2445.97	2458.94	2454.50	2450.24
31	2442.00	---	2407.41	2380.85	---	2370.84	---	2395.85	---	2459.00	2454.31	---
MAX	2453.12	2443.65	2433.67	2406.38	2379.79	2372.64	2376.16	2395.85	2445.97	2459.00	2458.86	2454.29
MIN	2441.97	2434.49	2407.41	2380.85	2372.79	2370.84	2370.32	2376.38	2397.96	2447.66	2454.31	2450.23

CAL YR 1983 MAX 2458.81 MIN 2348.28

WTR YR 1984 MAX 2459.00 MIN 2370.32

† 4,985 4,667 3,619 2,789 2,566 2,513 2,658 3,234 5,158 5,748 5,532 5,348  
†† -496,000 -318,000 -1,048,000 -830,000 -223,000 -53,000 +145,000 +576,000 +1,924,000 +590,000 -216,000 -184,000

CAL YR 1983..... †† -26,000

WTR YR 1984..... †† -133,000

† 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 SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  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 mile 221.0.

DRAINAGE AREA.--8,985 mi<sup>2</sup>, approximately.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1971 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,100.00 ft 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.--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 above station in Canada and the United States.

AVERAGE DISCHARGE.--13 years, 11,320 ft<sup>3</sup>/s 17.10 in/yr, 8,201,000 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<sup>3</sup>/s Aug. 5, 1974, gage height, 27.50 ft; minimum daily, 1,900 ft<sup>3</sup>/s Jan. 29, 1972.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 23,000 ft<sup>3</sup>/s Oct. 13, gage height, 23.32 ft; minimum daily, 2,850 ft<sup>3</sup>/s June 1, 2.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5860	10300	20700	21000	19600	4440	4220	4210	2850	3910	16300	7520
2	5880	4010	20800	21000	19600	4510	4230	4190	2850	8250	17700	7420
3	13700	3900	20800	21000	18800	4240	4230	4160	2860	13200	18200	7420
4	13700	3900	20900	21000	4260	4250	4200	4160	2880	7820	17700	9270
5	14200	3890	21000	14100	4200	4250	4180	4160	2930	7680	3990	8810
6	13900	3880	21000	4210	4200	4240	4210	4160	2900	6090	9870	14100
7	14000	3910	21100	4200	10000	4250	4190	4160	3350	3820	15200	13900
8	7540	3900	21100	4200	18300	4260	4210	4160	3950	3810	15900	7200
9	7520	3890	21200	11300	18400	4220	4210	4180	3840	6370	15800	5630
10	15200	3900	21200	20800	17200	4190	4210	4180	3890	12000	8050	7410
11	19200	3910	21400	20600	4160	4140	4200	4170	4240	14900	3880	7450
12	19400	3900	16700	20400	4170	4160	4250	4160	4030	15200	3650	7350
13	19500	3890	16800	20600	4180	4220	4220	4160	3940	13900	10300	7770
14	19500	9700	16700	20600	4180	4220	4220	4290	3880	10800	9810	9210
15	19500	9720	17300	20500	4190	4210	4220	4020	3780	10800	9780	3740
16	19500	9690	20900	20400	4190	4190	4260	3730	6530	10700	9740	3640
17	18900	12900	20900	20400	4200	4230	4210	3720	3980	11000	9440	9130
18	19100	9710	20900	20500	4210	4220	4220	3710	4010	12100	3850	13900
19	18400	13300	21000	20400	4210	4260	4220	3700	4060	17700	5530	14200
20	19300	19900	21200	20300	4220	4270	4210	3690	3930	19100	12700	14500
21	19300	20000	21500	20300	4300	4240	4210	3440	4030	11700	19000	11400
22	7750	20200	21600	20200	4430	4350	4200	3140	4010	11200	19000	6980
23	7710	20200	21300	20100	4270	4270	4200	3090	3900	11500	16500	3740
24	9720	20300	21300	20100	4210	4230	3890	2910	3910	9100	19100	9420
25	9770	20300	21100	20000	4220	4200	3550	2900	4010	9230	19200	12000
26	9520	20400	21200	20000	4220	4230	3530	2910	3960	9280	15900	10900
27	3800	20400	21300	19900	4230	4230	3530	2900	3990	9070	14200	11300
28	3820	20400	21300	19800	4370	4220	3550	2890	3910	4000	13900	11900
29	3860	20500	21300	19900	4330	4220	3560	2890	3950	3790	12100	7860
30	3870	20600	20900	19800	---	4220	3840	2900	3980	10200	9400	4920
31	3880	---	20900	19700	---	4220	---	2870	---	11500	9340	---
TOTAL	386800	345400	637300	567310	215050	131600	122380	113910	114330	309720	375100	269990
MEAN	12480	11510	20560	18300	7416	4245	4079	3675	3811	9991	12100	9000
MAX	19500	20600	21600	21000	19600	4510	4260	4290	6530	19100	19200	14500
MIN	3800	3880	16700	4200	4160	4140	3530	2870	2850	3790	3650	3640
AC-FT	767200	685100	1264000	1125000	426600	261000	242700	225900	226800	614300	744000	535500
MEAN †	4411	6169	3513	4798	3540	3383	6515	13041	36145	19586	8587	5907
CFM †	0.49	0.69	0.39	0.53	0.39	0.38	0.73	1.45	4.02	2.18	0.96	0.66
IN †	0.57	0.77	0.45	0.62	0.42	0.43	0.81	1.67	4.49	2.51	1.10	0.73
AC-FT †	271200	367100	216000	295000	203600	208000	387700	801900	2150800	1204300	528000	351500

## OBSERVED

CAL YR 1983	TOTAL	4021450	MEAN	11018	MAX	21600	MIN	3800	AC-FT	7976000
WTR YR 1984	TOTAL	3588890	MEAN	9806	MAX	21600	MIN	2850	AC-FT	7118000

## ADJUSTED

CAL YR 1983	TOTAL	4008066	MEAN	10981	CFM	1.22	IN	16.59	AC-FT	7950000
WTR YR 1984	TOTAL	3521603	MEAN	9622	CFM	1.07	IN	14.58	AC-FT	6985000

(†) 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.

REMARKS.--"Prior to March 25, 1974, at site 3.2 mi downstream."

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	CLOUD COVER (PER- CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)
OCT 12...	1600	19100	10	1	209	8.1	15.5	10.0	708	9.4
NOV 15...	1015	13400	99	2	227	8.0	5.5	10.0	701	9.0
DEC 14...	1300	10200	100	3	242	8.0	.0	8.0	704	9.6
JAN 17...	1200	20300	80	1	262	8.1	-10.0	4.5	716	11.0
FEB 15...	1030	4180	70	1	180	8.1	2.0	3.5	705	11.5
MAR 16...	1100	4180	80	1	252	8.1	8.0	3.5	704	11.7
APR 18...	1300	4200	100	3	255	8.1	12.0	4.0	699	11.9
MAY 16...	1300	3720	100	58	256	8.2	9.5	5.0	704	12.9
JUN 14...	1300	3800	50	2	265	8.3	23.0	9.5	704	12.2
JUL 12...	1315	19600	30	1	234	8.3	25.5	12.0	702	10.6
AUG 16...	1330	13200	10	1	214	8.4	25.0	14.0	706	9.7
SEP 13...	1500	9810	80	1	217	8.3	17.0	13.5	712	8.8

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, TOTAL (MG/L AS N) (00600)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
OCT 12...	90	4.6	<.10	--	.50	--	<.005	<.002	1.2
NOV 15...	87	4.7	.10	--	.40	.50	<.005	<.002	1.0
DEC 14...	88	5.2	.10	--	.40	.50	<.005	.004	1.0
JAN 17...	91	4.5	<.10	--	.30	--	--	.005	1.4
FEB 15...	94	4.5	<.10	--	.50	--	<.005	.004	1.0
MAR 16...	95	4.5	<.10	--	.20	--	<.005	<.001	1.2
APR 18...	99	4.6	<.10	<.10	.20	--	<.005	.003	.9
MAY 16...	109	4.4	<.10	--	.30	--	<.005	<.001	1.2
JUN 14...	116	3.2	<.10	--	.60	--	.001	<.001	1.1
JUL 12...	107	3.1	<.10	--	.40	--	.005	.008	1.7
AUG 16...	102	2.7	<.10	<.10	.20	--	<.005	.006	1.4
SEP 13...	91	2.5	<.10	--	<.20	--	<.005	.006	.9

DATE	TIME	HARD- NESS (MG/L AS CaCO3) (00900)	HARD- NESS NONCAR- BONATE (MG/L AS CaCO3) (95902)	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 18...	1300	130	23	36	10	3.0	.1	.60
AUG 16...	1330	110	17	32	8.3	2.3	.0	.50

## KOOTENAI RIVER BASIN

12301933 KOOTENAI RIVER BELOW LIBBY DAM, NEAR LIBBY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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)	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 18...	108	23	7.0	.10	150	.20	1690
AUG 16...	97	18	2.2	.30	120	.17	4440

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)
APR 18...	1300	<1	60	3	20	<10
AUG 16...	1330	<1	40	3	<10	10

## KOOTENAI RIVER BASIN

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12302055 FISHER RIVER NEAR LIBBY, MT

LOCATION.--Lat 48°21'20", long 115°18'50", in NW¼NE¼NW¼ 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<sup>2</sup>.

## WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 2,134.10 ft National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark).

REMARKS.--Water-discharge records good except those for Dec. 18 to Feb. 8, which are poor. Diversions of about 700 acres above station.

AVERAGE DISCHARGE.--17 years, 491 ft<sup>3</sup>/s, 7.96 in/yr, 355,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,720 ft<sup>3</sup>/s Jan. 16, 1974, gage height, 9.29 ft; minimum, 29 ft<sup>3</sup>/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<sup>3</sup>/s, by slope-area measurement at site 0.5 mi upstream.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,500 ft<sup>3</sup>/s May 20, gage height, 5.36 ft; maximum gage height, 6.93 ft Jan. 26, result of ice jam; minimum daily discharge, 60 ft<sup>3</sup>/s Dec. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	104	145	104	110	180	165	313	547	990	502	138	91
2	104	145	122	120	190	176	301	547	816	460	138	89
3	104	150	157	130	190	176	293	601	740	434	138	86
4	104	257	162	200	200	167	290	601	714	405	133	84
5	105	317	165	280	200	165	301	577	760	391	133	80
6	104	246	157	300	200	165	317	559	823	382	131	82
7	104	424	173	280	210	167	338	524	753	355	126	94
8	102	297	214	250	220	167	342	508	720	321	120	91
9	104	243	195	230	239	173	351	524	701	301	111	94
10	107	220	181	220	223	184	359	553	694	286	109	98
11	109	236	178	210	214	204	364	553	669	271	105	94
12	107	317	162	200	201	233	359	626	656	260	109	96
13	105	278	152	180	207	278	346	727	694	250	113	96
14	105	253	147	150	214	305	329	845	720	236	102	94
15	105	243	142	130	201	321	321	1070	816	223	100	93
16	105	229	133	100	198	329	359	1040	837	217	96	93
17	105	229	105	80	192	342	559	927	781	210	94	89
18	109	236	80	70	181	338	753	845	701	204	94	86
19	113	233	75	70	173	334	795	830	650	192	93	84
20	113	229	70	70	187	334	998	1210	620	184	91	93
21	109	226	65	90	181	346	1210	1310	927	176	89	104
22	109	214	65	100	181	382	1120	1080	1280	170	87	105
23	122	207	65	110	178	382	1050	1020	1090	157	86	100
24	124	201	60	120	176	396	958	1110	950	152	84	100
25	118	198	65	130	173	391	919	982	896	147	84	98
26	116	187	70	140	170	386	874	904	859	150	82	96
27	113	181	75	150	167	373	795	904	795	151	79	98
28	111	176	65	160	167	355	720	874	720	145	75	94
29	113	165	65	160	165	342	669	896	650	147	75	94
30	118	131	70	170	---	329	589	1150	595	150	75	93
31	133	---	90	170	---	321	---	1290	---	170	82	---
TOTAL	3404	6813	3629	4880	5578	8726	17292	25734	23617	7799	3172	2789
MEAN	110	227	117	157	192	281	576	830	787	252	102	93.0
MAX	133	424	214	300	239	396	1210	1310	1280	502	138	105
MIN	102	131	60	70	165	165	290	508	595	145	75	80
CFSM	.13	.27	.14	.19	.23	.34	.69	.99	.94	.30	.12	.11
IN.	.15	.30	.16	.22	.25	.39	.77	1.14	1.05	.35	.14	.12
AC-FT	6750	13510	7200	9680	11060	17310	34300	51040	46840	15470	6290	5530
CAL YR 1983	TOTAL	157130	MEAN 430	MAX 2060	MIN 60	CFSM .51	IN 6.98	AC-FT 311700				
WTR YR 1984	TOTAL	113433	MEAN 310	MAX 1310	MIN 60	CFSM .37	IN 5.04	AC-FT 225000				



## KOOTENAI RIVER BASIN

12302055 FISHER RIVER NEAR LIBBY, MT--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1967 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: September 1967 to current year.

INSTRUMENTATION.--Temperature recorder since September 1967.

REMARKS.--Periods of missing record due to sensing and recording equipment malfunctions. Record for period Mar. 16 to June 13 considered fair.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Maximum (water year, 1967-82, 1984), 26.0°C July 23, 1977; minimum, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum recorded, 22.5°C July 26; minimum, 0.0°C on many days during November to February.

## TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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

## KOOTENAI RIVER BASIN

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12302055 FISHER RIVER NEAR LIBBY, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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

## KOOTENAI RIVER BASIN

12302055 FISHER RIVER NEAR LIBBY, MT--Continued

ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
OCT					
05...	1050	108	216	5.0	8.5
NOV					
15...	1215	238	151	6.0	5.5
JAN					
05...	1140	279	168	8.0	.0
FEB					
15...	1340	201	157	3.0	2.0
MAY					
25...	1305	980	85	11.0	8.0
JUN					
13...	1540	709	81	20.0	10.5
JUL					
11...	1540	277	134	31.0	21.0
AUG					
23...	1130	88	208	24.0	17.5

## KOOTENAI RIVER BASIN

51

## 12303000 KOOTENAI RIVER AT LIBBY, MT

LOCATION.--Lat 48°24'03", long 115°33'08", in SW¼SE¼SW¼ 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 mile 204.3.

DRAINAGE AREA.--10,240 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--October 1910 to current year. 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 National Geodetic Vertical Datum of 1929. Prior to Apr. 28, 1931, nonrecording gages at site 1,800 ft upstream at different datum.

REMARKS.--Records excellent except those below 10,000 ft<sup>3</sup>/s, which are good. Flow regulated by Lake Koocanusa (station number 12301920) since Mar. 21, 1972. Diversions for irrigation of about 14,500 acres from tributaries above station in Canada and the United States. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report. AVERAGE DISCHARGE.--74 years, 12,130 ft<sup>3</sup>/s, 16.08 in/yr, 8,790,000 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<sup>3</sup>/s June 21, 1916, gage height, 20.7 ft, present datum, derived from gage-relation study; minimum observed, 895 ft<sup>3</sup>/s Jan. 11, 1930, result of discharge measurement.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 22,200 ft<sup>3</sup>/s Jan. 5, gage height, 7.25 ft; minimum daily, 4,020 ft<sup>3</sup>/s Aug. 12, Sept. 16.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6770	9200	21300	21500	20300	4710	4830	5140	5000	5030	15200	8020
2	5900	5780	21400	21500	20100	4780	4830	5150	4590	8190	17700	7590
3	12500	4320	21500	21500	20100	4570	4810	5210	4460	13800	19400	7570
4	13900	5220	21600	21400	6190	4540	4780	5170	4420	9200	8830	9050
5	14100	4890	21600	17800	4630	4540	4790	5140	4570	8630	5100	8210
6	14100	4810	21700	5200	4590	4540	4840	5090	4690	7450	8600	14200
7	14100	5020	21700	5260	8290	4560	4850	5030	4740	4940	14400	14400
8	8860	4720	21800	5240	18500	4600	4880	5010	5420	4630	16000	8690
9	7630	4560	21900	9250	18700	4580	4890	5080	5280	6390	16000	5970
10	13600	4490	21900	21800	18700	4560	4900	5140	5180	11800	9970	7380
11	19500	4590	22000	21500	5800	4590	4910	5130	5400	15100	4980	7740
12	19700	4750	17200	21200	4590	4680	4920	5420	5430	15700	4020	7620
13	19800	4620	17200	21300	4580	4790	4900	5640	5410	15400	9070	7660
14	19800	9800	17200	21200	4580	4840	4870	6130	5510	11600	10300	9550
15	19900	9530	17700	21000	4560	4880	4880	6400	5830	11300	9920	4860
16	19900	10100	21500	21100	4550	4890	5020	5760	8560	11100	9780	4020
17	19300	13300	21400	20900	4550	4930	5500	5440	5920	11400	9630	8070
18	19400	10400	21400	20900	4530	4910	5750	5250	5650	11500	5290	14100
19	18800	12400	21500	20800	4550	4920	5790	5350	5560	17300	5100	14600
20	19700	20800	21700	20600	4570	4930	6120	6700	5400	19800	11200	14900
21	20100	20700	21900	20800	4610	4940	6400	6290	6720	12500	19300	12300
22	9120	20900	21900	20800	4730	5070	6230	5280	6940	11800	19300	8120
23	7860	21000	21700	20700	4580	5000	6110	5280	6120	11200	16800	4210
24	9510	21000	21800	20600	4530	4970	5730	5240	5870	9590	19400	8310
25	9830	21100	21600	20700	4540	4940	5170	4890	6010	9360	19500	12300
26	9810	21100	21700	20900	4520	4970	5050	4700	6000	9500	16800	11300
27	4860	21100	21800	20700	4520	4940	4900	4690	5900	9310	14400	11600
28	4130	21100	21800	20700	4640	4890	4800	4650	5650	5530	14100	12300
29	4150	21200	21800	20800	4580	4880	4700	4800	5590	4230	13000	8960
30	4170	21200	21400	20600	---	4860	4760	5860	5390	8660	9500	5750
31	4190	---	21400	20400	---	4840	---	6020	---	12300	9450	---
TOTAL	394990	363700	654000	588650	228210	148640	154910	166080	167210	324240	382040	279350
MEAN	12740	12120	21100	18990	7869	4795	5164	5357	5574	10460	12320	9312
MAX	20100	21200	22000	21800	20300	5070	6400	6700	8560	19800	19500	14900
MIN	4130	4320	17200	5200	4520	4540	4700	4650	4420	4230	4020	4020
AC-FT	783500	721400	1297000	1168000	452700	294800	307300	329400	331700	643100	757800	554100
MEAN †	4,676	6,779	4,050	5,497	3,993	3,932	7,601	14,720	37,910	20,050	8,811	6,220
CFSM †	0.46	0.66	0.40	0.54	0.39	0.38	0.74	1.44	3.70	1.96	0.86	0.61
IN †	0.53	0.74	0.46	0.62	0.42	0.44	0.83	1.66	4.13	2.26	0.99	0.68
AC-FT †	287,500	403,400	249,000	338,000	229,700	241,800	452,300	905,400	2,255,700	1,233,100	541,800	370,100

## OBSERVED

CAL YR 1983	TOTAL 4,295,370	MEAN 11,770	MAX 22,000	MIN 4,130	AC-FT 8,520,000
WTR YR 1984	TOTAL 3,852,020	MEAN 10,520	MAX 22,000	MIN 4,020	AC-FT 7,641,000

## ADJUSTED

CAL YR 1983	TOTAL 4,282,279	MEAN 11,730	CFSM 1.15	IN 15.55	AC-FT 8,494,000
WTR YR 1984	TOTAL 3,785,128	MEAN 10,340	CFSM 1.01	IN 13.75	AC-FT 7,508,000

(†) 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 NW¼SE¼SE¼ 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 mile 4.5 mi.

DRAINAGE AREA---11.1 mi<sup>2</sup>.

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

REVISED RECORDS---WDR MT-1972: Drainage area.

GAGE---Water-stage recorder. Altitude of gage is 2,866 ft, from topographic map.

REMARKS---Records good. No known regulation or diversion above station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE---24 years, 27.0 ft<sup>3</sup>/s, 33.02 in/yr, 19,560 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD---Maximum discharge, 709 ft<sup>3</sup>/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<sup>3</sup>/s Nov. 20, 1979; minimum gage height, 1.35 ft Jan. 11, 1975.

EXTREMES FOR CURRENT YEAR---Peak discharges above base of 200 ft<sup>3</sup>/s and maximums (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 30	2230	286	3.55	June 21	1600	*495	*4.07

Minimum discharge, 5.6 ft<sup>3</sup>/s Sept. 5, gage height, 1.64 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.9	9.6	9.0	6.2	11	6.9	9.9	19	96	62	12	6.2
2	6.9	9.6	8.0	6.0	11	6.9	9.9	21	77	57	12	6.0
3	6.6	14	8.3	6.4	11	6.6	9.6	22	75	54	11	5.8
4	7.3	91	8.6	12	10	6.4	9.9	21	78	50	11	5.8
5	7.1	45	8.9	25	9.9	6.6	11	20	77	49	10	5.8
6	6.9	50	9.2	22	9.6	6.6	11	19	73	46	11	8.0
7	6.9	44	9.4	21	9.6	6.4	11	19	69	42	9.9	6.9
8	6.6	33	9.6	19	9.3	6.6	11	20	66	38	9.3	6.9
9	6.6	26	9.6	17	9.1	6.9	11	20	58	34	9.1	6.9
10	6.6	23	9.6	16	9.1	7.3	11	25	52	32	8.8	8.8
11	6.4	31	9.6	15	8.8	8.8	11	25	54	29	8.3	7.3
12	6.4	30	9.3	14	8.8	9.6	11	42	62	28	8.3	7.5
13	6.2	25	8.8	13	9.1	10	10	48	80	26	8.0	6.9
14	6.2	23	8.5	12	8.8	11	11	77	92	24	7.8	6.6
15	6.0	21	8.3	11	8.5	11	13	81	124	23	7.3	6.4
16	6.0	20	8.0	10	8.5	11	25	59	149	21	7.1	6.2
17	6.2	20	7.7	9.5	8.3	11	44	45	119	20	7.3	6.0
18	6.4	19	7.4	9.0	8.0	11	43	43	98	19	7.3	5.8
19	6.2	18	7.2	8.5	8.3	11	43	56	86	18	7.1	5.8
20	6.0	17	7.0	8.0	7.8	11	52	139	81	17	6.9	7.5
21	6.0	16	6.8	8.5	7.8	13	50	91	290	16	6.6	9.9
22	7.1	15	6.6	9.5	7.8	13	44	64	194	16	6.4	8.8
23	7.8	14	6.3	9.9	7.5	13	43	77	124	16	6.4	8.3
24	6.9	14	6.2	10	7.5	13	37	71	109	15	6.4	8.0
25	6.4	13	6.4	15	7.5	12	32	57	117	15	6.2	7.8
26	6.4	13	6.9	12	7.3	12	27	50	117	14	6.2	7.8
27	6.2	12	6.9	12	7.1	11	23	48	111	14	6.0	7.5
28	6.2	12	6.6	12	7.1	11	22	52	98	14	6.0	7.1
29	6.2	11	6.2	12	7.1	11	21	81	96	13	6.0	6.9
30	6.2	10	6.2	11	---	11	20	194	81	13	6.0	6.9
31	8.0	---	6.2	11	---	10	---	164	---	12	6.0	---
TOTAL	203.8	699.2	243.3	383.5	251.2	302.6	687.3	1770	3003	847	247.7	212.1
MEAN	6.57	23.3	7.85	12.4	8.66	9.76	22.9	57.1	100	27.3	7.99	7.07
MAX	8.0	91	9.6	25	11	13	52	194	290	62	12	9.9
MIN	6.0	9.6	6.2	6.0	7.1	6.4	9.6	19	52	12	6.0	5.8
CFSM	.59	2.10	.71	1.12	.78	.88	2.06	5.14	9.01	2.46	.72	.64
IN.	.68	2.34	.82	1.29	.84	1.01	2.30	5.93	10.06	2.84	.83	.71
AC-FT	404	1390	483	761	498	600	1360	3510	5960	1680	491	421

CAL YR 1983	TOTAL	10103.0	MEAN 27.7	MAX 190	MIN 6.0	CFSM 2.50	IN 33.86	AC-FT 20040
WTR YR 1984	TOTAL	8850.7	MEAN 24.2	MAX 290	MIN 5.8	CFSM 2.18	IN 29.66	AC-FT 17560

## KOOTENAI RIVER BASIN

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## 12303500 LAKE CREEK AT TROY, MT

LOCATION.--Lat 48°26'49", long 115°52'34" in SE¼NW¼SW¼ 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, 0.4 mi upstream from mouth, 0.6 mi downstream from Montana Light and Power Company Dam (Troy Dam), and 1.3 mi southeast of Troy.

DRAINAGE AREA.--210 mi<sup>2</sup>.

PERIOD OF RECORD.--January 1945 to September 1957, October 1982 to current year.

REVISED RECORDS.--WSP 1216: Drainage area.

GAGE.--Water-stage recorder. Altitude of gage is 1,900 ft, 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.--Records good except those for Dec. 3 to Jan. 4 and Jan. 29 to Mar. 6, 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 and published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--14 years (1946-57, 1982-84), 497 ft<sup>3</sup>/s, 360,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,250 ft<sup>3</sup>/s May 30, 1948, gage height, 8.28 ft; minimum, 2.0 ft<sup>3</sup>/s Sept. 1, 1947, Sept. 15, 1948.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,720 ft<sup>3</sup>/s May 31, gage height, 4.44 ft; minimum daily, 79 ft<sup>3</sup>/s Sept. 27.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	151	148	223	170	255	175	219	354	1130	705	226	149
2	154	150	217	170	250	180	213	383	994	670	218	142
3	151	163	190	160	240	175	216	396	935	637	223	150
4	154	436	195	165	230	185	206	374	929	615	214	155
5	150	302	210	270	230	185	226	373	926	557	206	146
6	148	317	200	250	235	180	219	353	944	571	217	137
7	146	366	190	246	240	175	222	349	918	522	203	156
8	158	301	190	250	235	168	226	342	887	512	202	139
9	140	262	195	236	210	171	222	361	872	460	192	150
10	146	260	210	228	220	179	229	364	821	447	193	164
11	144	358	205	226	230	188	229	362	781	427	185	147
12	143	393	210	225	220	219	222	412	784	411	177	143
13	144	352	200	213	230	225	229	447	859	390	198	141
14	137	339	190	209	230	226	229	545	910	372	191	123
15	141	329	185	202	225	226	226	656	1030	356	177	150
16	136	325	175	213	220	219	246	643	1110	352	191	133
17	145	354	180	197	215	226	319	607	1070	333	170	151
18	142	351	145	197	210	226	341	574	1010	323	173	166
19	142	338	160	187	200	222	377	590	943	310	167	142
20	138	330	165	201	210	226	469	1020	913	301	170	146
21	137	316	110	210	190	232	474	980	1110	291	163	145
22	141	299	110	200	195	239	480	856	1110	277	166	112
23	152	286	125	204	200	236	499	917	950	272	163	109
24	148	281	140	222	190	246	473	973	917	287	147	147
25	138	271	135	316	190	242	452	896	921	260	150	140
26	140	262	125	270	195	242	423	841	951	251	153	198
27	137	253	135	266	175	236	408	825	933	240	149	79
28	136	246	155	266	185	236	389	826	876	251	155	91
29	137	234	140	260	170	232	376	906	852	236	150	125
30	137	229	145	260	---	229	364	1240	794	246	141	124
31	140	---	160	255	---	222	---	1460	---	228	137	---
TOTAL	4453	8851	5315	6944	6225	6568	9423	20225	28180	12110	5567	4200
MEAN	144	295	171	224	215	212	314	652	939	391	180	140
MAX	158	436	223	316	255	246	499	1460	1130	705	226	198
MIN	136	148	110	160	170	168	206	342	781	228	137	79
CFSM	.69	1.41	.81	1.07	1.02	1.01	1.50	3.11	4.47	1.86	.86	.67
IN.	.79	1.57	.94	1.23	1.10	1.16	1.67	3.58	4.99	2.15	.99	.74
AC-FT	8830	17560	10540	13770	12350	13030	18690	40120	55900	24020	11040	8330
CAL YR 1983	TOTAL	158763	MEAN 435	MAX 1930	MIN 110	CFSM 2.07	IN 28.12	AC-FT 314900				
WTR YR 1984	TOTAL	118061	MEAN 323	MAX 1460	MIN 79	CFSM 1.54	IN 20.91	AC-FT 234200				

## KOOTENAI RIVER BASIN

12304500 YAAK RIVER NEAR TROY, MT

LOCATION.--Lat 48°33'43", long 115°58'09", in NE¼SE¼SE¼ 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, 0.2 mi upstream from mouth, and 7.7 mi northwest of Troy.

DRAINAGE AREA.--766 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

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 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.--Water-discharge records good except those for Dec. 18 to Feb. 3, which are poor. Diversions for irrigation of about 30 acres above station.

AVERAGE DISCHARGE.--28 years, 897 ft<sup>3</sup>/s, 15.90 in/yr, 649,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,100 ft<sup>3</sup>/s May 21, 1956, gage height, 9.70 ft, in gage well, 10.8 ft, from outside gage; minimum daily, 50 ft<sup>3</sup>/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<sup>3</sup>/s. Flood in May 1954 reached a stage of 11.4 ft from floodmarks; discharge, 13,400 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,260 ft<sup>3</sup>/s May 30, gage height, 6.97 ft, no peak above base of 5,000 ft<sup>3</sup>/s; minimum, 114 ft<sup>3</sup>/s Sept. 20, gage height, 3.01 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	162	275	225	180	430	292	605	1190	3040	1140	279	127
2	159	296	211	200	440	300	587	1280	2560	1050	263	127
3	159	398	292	230	450	296	587	1450	2380	996	259	127
4	171	1530	353	265	468	288	593	1340	2310	927	259	124
5	168	1100	372	285	447	279	667	1270	2470	874	255	122
6	162	823	367	310	436	292	802	1210	2440	838	248	129
7	159	919	349	340	426	292	809	1180	2360	774	236	134
8	156	726	358	330	416	300	795	1200	2690	713	225	132
9	156	599	367	320	401	317	816	1280	2990	674	214	140
10	153	534	367	310	396	358	802	1330	2900	629	207	156
11	151	605	344	295	382	426	781	1320	2610	593	197	151
12	148	740	326	280	372	478	740	1430	2470	557	190	145
13	148	687	317	270	386	500	713	1550	2450	528	187	142
14	148	636	309	260	386	511	687	1800	2500	495	177	140
15	148	605	300	250	372	528	733	2060	2740	468	174	134
16	148	617	259	240	363	569	996	2130	2790	447	168	129
17	148	740	197	230	335	605	1560	2080	2560	421	165	124
18	159	767	185	220	331	605	1780	1960	2280	401	159	119
19	162	706	170	210	317	587	2020	2110	2050	382	159	117
20	162	661	155	200	331	581	2940	3210	1880	363	153	122
21	165	599	145	230	335	629	3190	3180	2290	349	151	190
22	187	551	135	270	331	726	2820	2710	2990	335	145	222
23	300	517	130	310	322	740	2590	2920	2380	326	142	229
24	304	495	120	330	313	802	2250	3020	2080	322	140	184
25	259	473	130	350	304	781	1940	2610	1940	313	137	159
26	225	452	140	360	304	747	1710	2420	1800	300	132	151
27	211	441	155	375	296	713	1520	2490	1690	296	127	145
28	207	421	145	390	292	687	1430	2470	1520	288	122	140
29	194	363	135	400	292	661	1330	2790	1400	292	129	137
30	190	296	145	410	---	642	1250	3600	1300	309	129	134
31	211	---	165	420	---	617	---	3810	---	300	127	---
TOTAL	5580	18572	7368	9070	10674	16149	40043	64400	69860	16700	5655	4332
MEAN	180	619	238	293	368	521	1335	2077	2329	539	182	144
MAX	304	1530	372	420	468	802	3190	3810	3040	1140	279	229
MIN	148	275	120	180	292	279	587	1180	1300	288	122	117
CFSM	.24	.81	.31	.38	.48	.68	1.74	2.71	3.04	.70	.24	.19
IN.	.27	.90	.36	.44	.52	.78	1.94	3.13	3.39	.81	.27	.21
AC-FT	11070	36840	14610	17990	21170	32030	79430	127700	138600	33120	11220	8590

CAL YR 1983 TOTAL 366007 MEAN 1003 MAX 5680 MIN 120 CFSM 1.31 IN 17.77 AC-FT 726000  
WTR YR 1984 TOTAL 268403 MEAN 733 MAX 3810 MIN 117 CFSM .96 IN 13.03 AC-FT 532400

## KOOTENAI RIVER BASIN

12304500 YAAK RIVER NEAR TROY, MT--Continued

## WATER-QUALITY RECORDS

## PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Seasonally 1963-73, March 1975 to current year.

INSTRUMENTATION.--Temperature recorder since Mar. 25, 1975.

REMARKS.--Periods of missing record Nov. 26 to Dec. 16 and Sept. 19-30 due to battery failure. Prior to Mar. 25, 1975 records furnished by Corps of Engineers, U.S. Army.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Maximum, 26.0°C July 19, Aug. 1, 2, 10, 1979; minimum, 0.0°C on many days during winter periods.

## EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum, 23.0°C July 27; minimum, 0.0°C on many days during December to February.

## TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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



12304500 YAAK RIVER NEAR TROY, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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

## KOOTENAI RIVER BASIN

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12304500 YAAK RIVER NEAR TROY, MT--Continued

ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
OCT 04...	1030	170	118	11.0	9.0
JAN 04...	1155	268	100	4.0	.0
MAR 06...	1110	304	87	3.0	2.0
APR 16...	1055	1020	73	14.0	6.0
MAY 29...	1025	2590	50	11.0	6.5
JUN 27...	1140	1640	54	24.0	12.5
AUG 17...	0810	161	116	16.5	18.0

## KOOTENAI RIVER BASIN

12305000 KOOTENAI RIVER AT LEONIA, ID

LOCATION.--Lat 48°37'04", long 116°02'47", in NW¼NW¼NW¼ sec.20, T.33 N., R.34 W., Principal meridian, Lincoln County, MT, 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<sup>2</sup>, approximately.

PERIOD OF RECORD.--March 1928 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,790.25 ft 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.--Records good. Diversions upstream from station for irrigation of about 14,600 acres. Flow regulated by Lake Koocanusa since Mar. 21, 1972. U.S. Army Corps of Engineers radio telemeter at station.

AVERAGE DISCHARGE.--56 years, 13,950 ft<sup>3</sup>/s, 16.14 in/yr, 10,110,000 acre-ft/yr (flows not adjusted for storage change in upstream reservoir).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 123,000 ft<sup>3</sup>/s May 28, 1948, gage height, 33.40 ft; minimum, 996 ft<sup>3</sup>/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 ft and 31.6 ft, respectively, present datum, from information by Great Northern Railway.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 22,100 ft<sup>3</sup>/s, gage height, 17.05 ft Jan. 5; minimum, 4,340 ft<sup>3</sup>/s Sept. 17, gage height, 10.27 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9650	6340	20700	20400	20000	4990	5660	7100	11000	7760	13600	9300
2	6720	9710	20900	20400	19800	5090	5600	7410	9580	8970	18000	8380
3	9840	5160	21100	20500	19700	5070	5580	7650	9060	14300	19700	8360
4	13900	8180	21200	20500	10100	4870	5560	7470	8880	12900	12400	9350
5	14100	7650	21300	20500	5300	4880	5660	7300	9120	10800	7100	8590
6	14200	6870	21300	6880	5190	4850	5900	7120	9430	9530	6460	13800
7	14200	7540	21400	6200	5560	4850	5920	6990	9040	7960	13600	14700
8	11900	6700	21400	6220	17800	4900	5960	6990	10200	6370	16300	11000
9	8400	6140	21900	6520	18400	4900	6000	7190	10400	6830	16300	6800
10	11300	5830	20900	21100	18500	4960	6000	7340	10100	11400	13300	7690
11	18900	6260	21000	21200	9580	5070	6000	7320	9790	14900	6660	8570
12	19100	6830	17500	20700	5230	5270	5920	7740	9910	16300	4500	8480
13	19300	6570	16400	20700	5230	5440	5880	8250	9910	17200	6830	8300
14	19200	8210	16300	20400	5190	5600	5790	9250	10100	12600	10700	10500
15	19300	10800	16500	20200	5140	5660	5870	10300	10900	11900	10400	6810
16	19300	11600	19900	20400	5090	5700	6380	9740	12800	11900	10300	4410
17	18800	13000	20100	20200	5040	5810	7870	9140	11900	12000	9870	5790
18	19000	13700	20000	20200	4980	5810	8610	8710	10200	11900	9140	14200
19	18400	12100	20200	20200	4980	5770	9090	9040	9700	16700	4500	14900
20	19000	21200	20200	20200	5010	5790	10700	12500	9250	20100	9790	15200
21	19500	21100	20500	20200	5030	5880	11400	12500	11200	15100	18300	14200
22	12700	21200	20600	20100	5120	6100	10900	10500	13100	12700	19200	9890
23	8910	21100	20600	20100	5070	6120	10500	10800	11000	11500	16800	6030
24	9900	21200	20700	20000	4980	6200	9740	11100	10200	10800	19200	6320
25	10600	21200	20500	20800	4930	6140	8520	9950	10100	10100	19400	12800
26	10600	21100	20600	21000	4900	6080	8000	9350	10000	10300	17900	11900
27	7490	21100	20700	20700	4880	6020	7540	9350	9600	10100	14700	12300
28	4640	21100	20700	20500	4900	5900	7250	9300	9180	8090	14600	12900
29	4590	21100	20700	20600	4960	5850	6990	9920	8770	5030	14000	11200
30	4600	20900	20400	20400	---	5770	6710	12700	8530	6660	10600	7490
31	4670	---	20300	20200	---	5700	---	13800	---	14000	10300	---
TOTAL	402710	391490	626500	578220	240590	171040	217500	283820	302950	356700	394450	300160
MEAN	12990	13050	20210	18650	8296	5517	7250	9155	10100	11510	12720	10010
MAX	19500	21200	21900	21200	20000	6200	11400	13800	13100	20100	19700	15200
MIN	4590	5160	16300	6200	4880	4850	5560	6990	8530	5030	4500	4410
AC-FT	798800	776500	1243000	1147000	477200	339300	431400	563000	600900	707500	782400	595400
CAL YR 1983	TOTAL	5002960	MEAN	13710	MAX	23100	MIN	4590	AC-FT	9923000		
WTR YR 1984	TOTAL	4266130	MEAN	11660	MAX	21900	MIN	4410	AC-FT	8462000		

PEND OREILLE RIVER BASIN

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12323170 SILVER BOW CREEK ABOVE BLACKTAIL CREEK, AT BUTTE, MT

LOCATION.--Lat 46°00'08", long 112°30'43", in SE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec.19, T.3 N., R.7 W., Silverbow County, Hydrologic Unit 17010201, on right bank in Butte, about 200 ft west of Continental Drive and Texas Avenue, 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 mile 22.7.

DRAINAGE AREA.--Indeterminate.

PERIOD OF RECORD.--October 1983 to September 1984.

GAGE.--Water-stage recorder. Altitude of gage is 5,470 ft, from topographic map.

REMARKS.--Records good except those prior to June, which are poor. Flow regulated by Anaconda Minerals Company operations.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3.6 ft<sup>3</sup>/s June 11, 1984, gage height, 2.33 ft; no flow on many days most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3.6 ft<sup>3</sup>/s June 11, gage height, 2.33 ft; no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.16	.15	.05	.02	.01	.00	.01	.33	1.1	.21	.01	.07
2	.15	.16	.05	.04	.01	.00	.01	.32	1.2	.19	.01	.00
3	.14	.18	.05	.06	.01	.00	.02	.31	.56	.18	.00	.00
4	.14	.19	.05	.10	.01	.00	.02	.29	.31	.15	.00	.00
5	.13	.20	.05	.10	.00	.00	.03	.30	.34	.13	.00	.00
6	.12	.20	.05	.10	.00	.00	.03	.26	.41	.15	.00	.00
7	.12	.20	.05	.09	.00	.00	.03	.28	.36	.25	.00	.00
8	.12	.19	.05	.07	.00	.00	.04	.24	.35	.21	.00	.00
9	.11	.17	.05	.06	.00	.00	.05	.26	.34	.14	.00	.00
10	.11	.15	.05	.05	.00	.00	.07	.30	.37	.10	.00	.00
11	.11	.13	.04	.04	.00	.00	.06	.40	1.3	.06	.00	.00
12	.12	.10	.04	.03	.01	.00	.05	.50	.44	.04	.00	.00
13	.13	.08	.04	.02	.02	.00	.05	.60	.39	.04	.00	.00
14	.25	.06	.04	.01	.02	.00	.26	.80	.38	.04	.00	.00
15	.20	.06	.03	.00	.01	.00	.38	1.0	.36	.03	.00	.00
16	.20	.06	.03	.00	.00	.00	.55	.80	.53	.02	.00	.00
17	.23	.06	.02	.00	.00	.00	.74	.50	.57	.01	.00	.00
18	.20	.06	.02	.00	.00	.00	.76	.33	.49	.00	.00	.00
19	.15	.06	.02	.00	.00	.00	.71	.30	.51	.03	.00	.00
20	.15	.06	.02	.00	.00	.02	.91	.38	.71	.01	.00	.00
21	.17	.06	.01	.00	.00	.05	.71	.42	1.1	.02	.00	.00
22	.20	.06	.00	.00	.00	.04	.76	.33	.52	.00	.00	.00
23	.30	.06	.00	.00	.00	.04	.71	.45	.40	.01	.00	.06
24	.25	.06	.00	.02	.00	.04	.61	.74	.36	.01	.00	.04
25	.23	.06	.00	.03	.00	.03	.42	.83	.33	.00	.00	.03
26	.23	.05	.00	.03	.00	.02	.27	.91	.35	.02	.00	.04
27	.25	.05	.00	.02	.00	.01	.36	.28	.36	.10	.00	.06
28	.27	.05	.00	.03	.00	.01	.38	.21	.28	.02	.00	.06
29	.25	.05	.00	.03	.00	.01	.59	.19	.25	.15	.00	.07
30	.20	.05	.00	.02	---	.01	.35	.20	.23	.10	.00	.10
31	.15	---	.00	.02	---	.01	---	.28	---	.02	.21	---
TOTAL	5.54	3.07	.81	.99	.10	.29	9.94	13.34	15.20	2.44	.23	.53
MEAN	.18	.10	.026	.032	.003	.009	.33	.43	.51	.079	.007	.018
MAX	.30	.20	.05	.10	.02	.05	.91	1.0	1.3	.25	.21	.10
MIN	.11	.05	.00	.00	.00	.00	.01	.19	.23	.00	.00	.00
AC-FT	11	6.1	1.6	2.0	.2	.6	20	26	30	4.8	.5	1.1

WTR YR 1984 TOTAL 52.48 MEAN .14 MAX 1.3 MIN .00 AC-FT 104



## PEND OREILLE RIVER BASIN

12323200 BLACKTAIL CREEK NEAR BUTTE, MT

LOCATION.--Lat 45°53'22", long 112°27'50", in SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec.27, T.2 N., R.7 W., Silverbow County, Hydrologic Unit 17010201, on left bank, at road leading into Eagles Nest Campground in Thompson Park, 1.7 mi upstream of Little Blacktail Creek, and 5.8 mi south of Butte, MT.

DRAINAGE AREA.--14.7 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1983 to September 1984.

GAGE.--Water-stage recorder. Altitude of gage is 5,720 ft, from topographic map.

REMARKS.--Records good except those for November to January and those for April, which are poor. No known regulation or diversions above gage. Several observations of water temperature and specific conductance were made during the water year and are published as miscellaneous water-quality data in the back of this report.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40 ft<sup>3</sup>/s May 15, 1984, gage height, 1.96 ft; maximum gage height, 2.19 ft Jan. 4, 1984 (backwater from ice); minimum discharge, 0.93 ft<sup>3</sup>/s Aug. 19, 21, 1984, gage height, 1.01 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 40 ft<sup>3</sup>/s May 15, gage height, 1.96 ft, only peak above base of 40 ft<sup>3</sup>/s; maximum gage height, 2.19 ft Jan. 4 (backwater from ice); minimum discharge, 0.93 ft<sup>3</sup>/s Aug. 19, 21, gage height, 1.01 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.2	3.4	2.7	2.0	2.6	2.3	2.9	6.1	13	8.4	2.2	3.3
2	4.0	3.3	2.6	1.7	2.5	2.3	3.0	6.8	13	8.0	2.4	2.7
3	3.6	3.6	2.6	1.8	2.5	2.3	3.7	6.4	13	7.7	2.3	1.9
4	3.2	3.5	2.6	2.0	2.5	2.3	3.7	6.6	13	7.3	2.7	1.7
5	2.9	3.3	2.6	4.0	2.5	2.3	4.0	5.4	14	7.4	3.4	1.4
6	2.7	3.7	2.7	10	2.5	2.3	4.1	4.8	15	7.5	5.0	1.7
7	2.6	3.4	3.0	6.0	2.6	2.3	4.1	7.3	15	8.3	3.7	1.9
8	3.2	3.2	3.0	4.7	2.4	2.4	4.1	8.2	14	6.8	2.6	2.0
9	3.2	2.9	3.0	3.5	2.4	2.6	4.5	12	13	6.7	2.1	1.8
10	3.1	2.8	2.9	3.2	2.4	2.6	5.0	13	14	5.9	1.8	1.7
11	3.1	3.9	2.8	3.2	2.4	2.6	4.5	15	28	5.8	1.9	1.8
12	2.9	3.5	2.8	3.0	2.5	2.6	4.0	19	24	5.0	2.0	1.7
13	2.9	3.4	2.8	2.9	2.5	2.6	4.0	21	20	4.9	2.2	1.7
14	5.1	3.6	2.8	2.8	2.5	2.6	4.0	26	18	4.5	1.7	1.7
15	5.2	3.2	2.7	2.6	2.2	2.5	4.8	34	17	4.3	2.0	1.7
16	4.4	3.0	2.7	2.7	2.2	2.5	9.0	29	17	3.9	1.6	1.6
17	4.1	3.1	2.4	2.6	2.2	2.5	7.0	23	16	3.7	1.9	1.5
18	4.9	3.1	2.3	2.4	2.2	2.6	6.0	21	15	3.2	1.8	1.5
19	4.2	3.1	2.3	2.3	2.3	2.6	5.5	23	15	3.7	1.2	1.4
20	4.1	3.0	2.3	2.2	2.3	2.9	5.0	22	18	3.2	1.3	1.5
21	4.4	2.7	1.9	2.4	2.3	3.5	4.5	20	18	3.1	1.2	2.2
22	4.5	2.5	1.7	2.4	2.4	3.0	5.0	17	18	2.9	1.1	2.4
23	5.9	2.4	1.4	2.4	2.3	3.2	4.5	18	16	2.7	1.1	2.4
24	4.6	3.0	1.2	2.5	2.3	3.4	5.0	18	14	3.1	1.6	2.7
25	4.0	3.2	1.5	2.7	2.3	3.2	5.0	15	13	2.6	2.5	2.5
26	3.7	3.0	1.8	2.8	2.3	3.0	4.5	16	11	2.6	2.3	2.7
27	4.0	3.0	1.6	2.5	2.3	2.8	4.5	16	11	2.4	1.8	3.3
28	3.7	3.0	1.3	2.9	2.3	3.2	5.0	14	10	2.2	1.4	3.0
29	3.7	3.0	1.4	2.9	2.3	2.8	5.8	14	9.4	2.3	1.3	3.1
30	3.6	2.8	1.5	2.6	---	3.0	5.6	14	8.7	3.9	1.3	3.3
31	3.5	---	1.7	2.6	---	3.2	---	14	---	2.5	2.8	---
TOTAL	119.2	94.6	70.6	94.3	69.0	84.0	142.3	485.6	454.1	146.5	64.2	63.8
MEAN	3.85	3.15	2.28	3.04	2.38	2.71	4.74	15.7	15.1	4.73	2.07	2.13
MAX	5.9	3.9	3.0	10	2.6	3.5	9.0	34	28	8.4	5.0	3.3
MIN	2.6	2.4	1.2	1.7	2.2	2.3	2.9	4.8	8.7	2.2	1.1	1.4
AC-FT	236	188	140	187	137	167	282	963	901	291	127	127

WTR YR 1984 TOTAL 1888.2 MEAN 5.16 MAX 34 MIN 1.1 AC-FT 3750

PEND OREILLE RIVER BASIN

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12323250 SILVER BOW CREEK BELOW BLACKTAIL CREEK, AT BUTTE, MT

LOCATION.--Lat 45°59'49", long 112°33'43", in SW¼SE¼NW¼ sec.23, T.3 N., R.8 W., Silverbow 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 mile 20.2.

DRAINAGE AREA.--103 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1983 to September 1984.

GAGE.--Water-stage recorder. Altitude of gage is 5,420 ft, from topographic map.

REMARKS.--Records good. Flow slightly regulated by Silverbow County sewage treatment plant.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 190 ft<sup>3</sup>/s June 11, 1984, gage height, 2.77 ft; minimum daily, 20 ft<sup>3</sup>/s Aug. 29, 1984.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 190 ft<sup>3</sup>/s June 11, gage height, 2.77 ft; minimum daily, 20 ft<sup>3</sup>/s Aug. 29.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	27	24	22	23	23	27	34	32	24	23	22
2	27	27	23	21	22	22	27	36	33	24	22	21
3	26	27	23	23	22	22	27	38	35	24	22	21
4	25	28	23	33	22	22	28	36	34	24	22	22
5	24	27	22	48	22	21	32	35	35	23	22	21
6	23	28	22	48	22	23	35	33	44	24	24	22
7	23	28	23	32	23	23	33	32	41	25	23	22
8	24	26	23	30	22	24	33	33	38	23	22	22
9	24	24	23	26	22	26	36	40	36	23	22	21
10	24	26	24	24	22	27	36	43	35	23	21	22
11	24	27	23	25	22	26	34	39	89	22	22	22
12	25	27	24	24	22	26	31	39	71	23	21	22
13	25	28	24	23	23	25	31	43	63	22	22	21
14	33	27	23	23	23	25	30	53	51	21	21	21
15	30	25	24	22	22	24	34	65	43	21	21	22
16	29	26	23	23	21	26	45	72	38	22	23	21
17	28	26	22	22	22	26	57	59	34	22	23	21
18	28	26	23	22	21	25	56	59	33	22	23	21
19	28	26	23	21	21	25	52	49	36	23	22	21
20	28	25	22	21	21	26	59	50	52	22	22	22
21	27	25	22	22	22	31	46	50	66	22	22	23
22	27	24	22	22	22	30	47	50	66	21	21	22
23	30	23	22	22	21	28	48	50	58	22	24	23
24	29	24	22	23	21	32	42	44	40	22	26	23
25	28	25	22	27	22	28	37	40	35	22	22	23
26	28	25	22	24	22	28	33	42	33	26	21	24
27	27	24	22	23	22	27	32	42	30	23	21	26
28	27	24	21	27	23	27	32	42	28	23	21	24
29	26	24	22	24	22	27	33	41	27	36	20	24
30	26	23	22	24	---	27	31	36	26	25	27	24
31	27	---	22	24	---	26	---	36	---	23	35	---
TOTAL	828	772	702	795	637	798	1124	1361	1282	722	703	666
MEAN	26.7	25.7	22.6	25.6	22.0	25.7	37.5	43.9	42.7	23.3	22.7	22.2
MAX	33	28	24	48	23	32	59	72	89	36	35	26
MIN	23	23	21	21	21	21	27	32	26	21	20	21
AC-FT	1640	1530	1390	1580	1260	1580	2230	2700	2540	1430	1390	1320

WTR YR 1984 TOTAL 10390 MEAN 28.4 MAX 89 MIN 20 AC-FT 20610

## PEND OREILLE RIVER BASIN

12323770 WARM SPRINGS CREEK AT WARM SPRINGS, MT

LOCATION.--Lat 46°10'51", long 112°47'07", in SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  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 mile 0.9.

DRAINAGE AREA.--163 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1983 to September 1984.

GAGE.--Water-stage recorder. Datum of gage is 4,811.25 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for August and September, which are fair, and those for December and January which are poor. Numerous diversions above station for irrigation and municipal use.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 462 ft<sup>3</sup>/s June 21, 1984, gage height, 4.61 ft; minimum daily, 9.0 ft<sup>3</sup>/s Dec. 24, 1983.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 462 ft<sup>3</sup>/s June 21, gage height, 4.61 ft; minimum daily, 9.0 ft<sup>3</sup>/s Dec. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	75	66	55	35	67	40	46	62	223	226	21	48
2	73	66	50	50	67	41	45	61	190	226	21	41
3	72	65	45	70	63	41	45	63	184	213	20	38
4	71	67	40	95	54	42	46	62	177	191	76	36
5	72	69	35	100	51	44	47	62	184	186	31	34
6	71	69	35	75	50	44	49	61	179	176	24	35
7	70	72	35	69	49	44	48	59	175	174	27	36
8	66	68	35	64	48	44	49	60	166	157	23	35
9	71	67	35	62	53	50	49	67	158	142	20	36
10	70	82	35	64	48	46	49	69	158	131	17	35
11	70	87	35	60	46	46	50	67	185	122	17	34
12	68	87	35	60	46	46	49	72	176	118	17	39
13	68	87	35	60	46	46	49	89	176	117	15	36
14	73	85	35	50	46	46	49	109	201	104	15	36
15	63	84	30	50	46	46	52	167	223	75	13	36
16	60	86	25	50	46	47	55	208	237	63	13	35
17	60	86	20	50	46	46	61	171	257	34	15	33
18	61	88	20	50	45	46	65	155	263	31	12	32
19	59	89	15	50	44	46	73	158	278	29	13	32
20	59	89	15	50	42	46	74	192	312	24	12	32
21	58	78	15	50	41	48	66	196	402	23	14	39
22	58	75	15	50	41	48	67	179	436	29	15	39
23	64	75	15	54	43	46	70	183	346	23	17	43
24	67	75	9.0	58	48	48	65	181	290	23	22	42
25	67	75	10	62	42	47	65	169	311	21	25	39
26	67	75	10	70	41	47	65	164	351	23	19	41
27	66	75	10	74	40	55	64	158	348	21	17	42
28	66	70	10	76	41	48	63	149	333	20	20	40
29	67	65	11	73	40	47	63	146	341	21	25	41
30	66	60	15	68	---	47	61	180	329	21	24	41
31	66	---	20	68	---	46	---	242	---	19	45	---
TOTAL	2064	2282	805.0	1917	1380	1424	1699	3961	7589	2783	665	1126
MEAN	66.6	76.1	26.0	61.8	47.6	45.9	56.6	128	253	89.8	21.5	37.5
MAX	75	89	55	100	67	55	74	242	436	226	76	48
MIN	58	60	9.0	35	40	40	45	59	158	19	12	32
AC-FT	4090	4530	1600	3800	2740	2820	3370	7860	15050	5520	1320	2230

WTR YR 1984 TOTAL 27695.0 MEAN 75.7 MAX 436 MIN 9.0 AC-FT 54930

PEND OREILLE RIVER BASIN

63

12324200 CLARK FORK AT DEER LODGE, MT

LOCATION.--Lat 46°23'52", long 112°44'31", in SW¼SW¼SW¼ 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 mile 461.2.

DRAINAGE AREA.--1,005 mi<sup>2</sup>.

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

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 4,502.24 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Water-discharge records good except those for winter period, which are poor. Diversions above station for irrigation of about 31,000 acres. Some regulation by settling ponds on Silver Bow Creek near Anaconda.

AVERAGE DISCHARGE.--6 years, 362 ft<sup>3</sup>/s, 262,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,500 ft<sup>3</sup>/s May 23, 1981, gage height, 5.35 ft; minimum daily, 68 ft<sup>3</sup>/s Aug. 8, 1979.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,730 ft<sup>3</sup>/s June 22, gage height, 4.67 ft, only peak above base of 1,000 ft<sup>3</sup>/s; maximum gage height, 4.84 ft Dec. 21 (backwater from ice); minimum daily discharge, 94 ft<sup>3</sup>/s July 22.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	350	342	300	220	351	283	306	312	570	727	134	258
2	360	339	302	250	332	287	304	306	482	669	172	241
3	370	341	317	300	318	287	286	307	462	607	155	226
4	370	348	316	400	328	290	274	307	442	538	168	225
5	370	348	320	700	327	280	276	304	489	514	171	221
6	366	355	330	575	303	292	283	301	468	494	147	223
7	366	378	330	513	298	288	290	300	479	493	152	220
8	362	356	340	472	289	270	292	290	443	457	165	225
9	372	342	340	369	292	285	284	296	412	417	163	227
10	381	345	342	297	276	290	284	303	397	369	144	218
11	380	372	333	294	273	291	284	308	551	348	142	213
12	355	374	335	295	267	285	284	315	734	330	157	213
13	350	379	336	290	280	285	277	350	657	300	158	221
14	384	380	330	245	291	294	258	419	673	261	148	220
15	427	367	338	230	279	291	259	611	692	221	145	225
16	409	371	332	220	283	291	280	849	726	200	134	224
17	392	362	300	210	284	295	321	814	762	169	144	228
18	407	363	250	210	281	292	378	672	729	136	155	229
19	394	365	210	200	288	287	419	622	738	120	163	226
20	368	364	190	200	290	297	507	640	804	113	159	228
21	370	352	180	200	295	326	494	708	1120	106	157	246
22	369	332	170	210	295	333	449	656	1590	94	157	256
23	368	332	160	220	285	320	423	597	1440	108	153	279
24	385	336	150	250	291	328	396	598	1060	114	161	313
25	371	354	150	300	290	349	364	535	951	130	183	332
26	350	359	160	350	290	324	346	496	944	128	180	334
27	354	371	170	400	274	343	348	501	967	133	164	342
28	343	359	180	380	279	336	338	465	916	125	158	354
29	346	340	180	360	267	316	339	418	860	139	160	359
30	346	307	190	345	---	324	322	437	853	145	164	356
31	349	---	200	338	---	318	---	549	---	141	216	---
TOTAL	11484	10633	8081	9843	8496	9377	9965	14586	22411	8846	4929	7682
MEAN	370	354	261	318	293	302	332	471	747	285	159	256
MAX	427	380	342	700	351	349	507	849	1590	727	216	359
MIN	343	307	150	200	267	270	258	290	397	94	134	213
AC-FT	22780	21090	16030	19520	16850	18600	19770	28930	44450	17550	9780	15240
CAL YR 1983	TOTAL	120885	MEAN	331	MAX	884	MIN	126	AC-FT	239800		
WTR YR 1984	TOTAL	126333	MEAN	345	MAX	1590	MIN	94	AC-FT	250600		



## PEND OREILLE RIVER BASIN

12324590 LITTLE BLACKFOOT RIVER NEAR GARRISON, MT

LOCATION.--Lat 46°32'12", long 112°43'33", in SE¼NE¼ 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 mile 4.0.

DRAINAGE AREA.--398 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1972 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 4,430 ft, from topographic map.

REMARKS.--Records good except those for December and January, which are fair. A few minor irrigation holding reservoirs in upper reaches of drainage. Diversions for irrigation of about 10,500 acres. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--12 years, 189 ft<sup>3</sup>/s, 136,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,650 ft<sup>3</sup>/s May 21, 1981, gage height, 8.79 ft, from floodmark; minimum, 6.0 ft<sup>3</sup>/s Aug. 24, 1977, gage height, 2.94 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 900 ft<sup>3</sup>/s and maximums (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 5	--	1,300	a*6.30	June 21	1415	1,130	5.09
May 16	0515	*1,540	5.54				

a Backwater from ice.

Minimum daily discharge, 30 ft<sup>3</sup>/s Dec. 24, 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	100	97	56	50	77	85	106	308	624	232	109	56
2	108	101	60	55	75	100	102	319	580	217	114	55
3	107	102	74	70	73	92	101	328	524	196	112	53
4	113	103	79	200	72	86	105	307	500	167	106	53
5	116	104	73	800	70	82	117	302	603	135	104	52
6	107	105	82	508	69	87	143	291	549	131	101	50
7	101	108	79	272	70	92	145	282	537	123	98	51
8	99	106	90	177	70	116	144	278	467	109	86	52
9	102	99	92	136	69	146	159	312	426	102	57	56
10	108	100	88	117	70	138	148	350	397	100	43	54
11	105	104	84	111	69	141	137	352	537	102	46	53
12	104	107	76	102	70	119	127	411	720	101	53	51
13	102	105	72	90	73	106	128	526	649	97	54	50
14	109	103	72	60	95	203	127	674	617	95	49	50
15	128	96	72	55	81	164	163	1160	538	95	50	50
16	118	94	70	50	79	132	276	1440	496	114	45	50
17	113	96	65	46	78	122	395	1130	460	119	47	48
18	120	96	60	43	77	107	432	919	438	116	47	47
19	115	92	55	40	74	102	503	822	409	124	43	46
20	110	92	50	40	77	108	616	894	446	114	60	48
21	106	88	45	43	78	148	496	878	872	107	59	53
22	103	79	40	46	78	137	506	791	621	111	53	53
23	99	77	35	50	77	119	540	744	484	124	49	52
24	100	82	30	60	77	135	450	716	424	121	47	57
25	100	85	30	80	79	124	414	652	380	117	46	60
26	98	84	33	90	79	120	377	619	327	118	41	59
27	97	84	36	85	76	115	353	650	310	113	40	62
28	96	83	40	80	79	111	340	582	285	115	39	62
29	96	73	40	95	81	110	324	535	261	122	38	62
30	95	61	43	84	---	111	302	546	247	123	38	63
31	96	---	46	79	---	108	---	618	---	114	48	---
TOTAL	3271	2806	1867	3814	2192	3666	8276	18736	14728	3874	1922	1608
MEAN	106	93.5	60.2	123	75.6	118	276	604	491	125	62.0	53.6
MAX	128	108	92	800	95	203	616	1440	872	232	114	63
MIN	95	61	30	40	69	82	101	278	247	95	38	46
AC-FT	6490	5570	3700	7570	4350	7270	16420	37160	29210	7680	3810	3190

CAL YR 1983	TOTAL	59977	MEAN 164	MAX 891	MIN 30	AC-FT 119000
WTR YR 1984	TOTAL	66760	MEAN 182	MAX 1440	MIN 30	AC-FT 132400

## PEND OREILLE RIVER BASIN

65

## 12324680 CLARK FORK AT GOLDCREEK, MT

LOCATION.--Lat 46°35'26", long 112°55'40", in SE¼NW¼SW¼ sec.25, T.10 N., R.11 W., Powell County, Hydrologic Unit 17010203, 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 mile 436.9.

DRAINAGE AREA.--1,704 mi<sup>2</sup>.

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

GAGE.--Water-stage recorder. Datum of gage is 4,172.80 ft National Geodetic Vertical Datum of 1929. June 13 to Oct. 21, 1982, nonrecording gage at site 350 ft downstream at same datum.

REMARKS.--Records good except those for the winter period, which are fair. Some regulation by settling ponds on Silver Bow Creek near Anaconda. Diversions for irrigation of about 40,100 acres above station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--7 years, 716 ft<sup>3</sup>/s, 518,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft<sup>3</sup>/s May 22, 1981, gage height, 11.17 ft, from flood-marks, from rating curve extended above 6,500 ft<sup>3</sup>/s on basis of contracted-opening measurement of peak flow; minimum, 108 ft<sup>3</sup>/s Aug. 10, 11, 1979, gage height, 3.64 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,800 ft<sup>3</sup>/s June 21, gage height, 7.42 ft; maximum gage height, 8.81 ft Jan. 5 (backwater from ice); minimum daily discharge, 270 ft<sup>3</sup>/s Dec. 23, 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	598	541	393	400	544	420	484	749	1630	1320	324	401
2	600	537	400	430	492	456	476	755	1420	1140	346	400
3	580	543	400	450	504	443	471	754	1310	1010	357	386
4	573	557	410	550	496	429	472	740	1280	913	332	375
5	564	567	420	1500	490	411	487	718	1430	817	362	368
6	559	572	430	2030	490	425	525	700	1380	752	333	369
7	544	594	430	1260	465	431	544	686	1340	728	333	368
8	548	571	440	946	474	461	538	674	1190	687	327	367
9	556	544	450	788	473	516	551	705	1100	645	314	377
10	572	544	460	644	458	517	535	772	1040	607	278	377
11	568	574	470	612	439	533	519	776	1320	568	278	365
12	542	589	470	589	435	514	507	841	1990	546	297	364
13	549	597	460	579	444	491	501	1000	1740	531	302	370
14	564	597	460	409	506	590	489	1230	1760	504	291	384
15	620	576	450	380	450	588	519	1960	1720	471	298	371
16	617	575	440	360	436	543	639	2840	1770	444	275	376
17	601	575	380	340	434	528	815	2610	1800	407	285	364
18	617	577	330	330	425	496	924	2080	1710	376	288	360
19	609	580	300	320	406	481	1080	1840	1640	360	290	355
20	579	580	290	320	418	489	1330	1970	1720	330	302	362
21	564	564	280	330	424	556	1210	2090	2990	301	301	383
22	568	531	280	340	417	547	1130	1920	3250	287	286	386
23	556	558	270	360	405	530	1150	1760	2880	305	282	403
24	586	559	270	390	410	547	1040	1690	2200	331	289	440
25	579	562	280	440	420	549	943	1500	1920	338	301	474
26	551	558	300	500	412	536	877	1360	1810	339	307	478
27	551	568	320	560	403	531	840	1440	1800	332	286	484
28	540	557	330	590	412	534	817	1310	1700	336	275	500
29	545	521	340	608	413	517	804	1220	1570	340	275	506
30	545	423	360	572	---	500	759	1290	1510	350	273	514
31	544	---	380	548	---	493	---	1630	---	352	344	---
TOTAL	17689	16791	11693	18475	12995	15602	21976	41610	51920	16767	9431	12027
MEAN	571	560	377	596	448	503	733	1342	1731	541	304	401
MAX	620	597	470	2030	544	590	1330	2840	3250	1320	362	514
MIN	540	423	270	320	403	411	471	674	1040	287	273	355
AC-FT	35090	33300	23190	36650	25780	30950	43590	82530	103000	33260	18710	23860
CAL YR 1983	TOTAL	226399	MEAN 620	MAX 2130	MIN 263	AC-FT 449100						
WTR YR 1984	TOTAL	246976	MEAN 675	MAX 3250	MIN 270	AC-FT 489900						

## PEND OREILLE RIVER BASIN

12325500 FLINT CREEK NEAR SOUTHERN CROSS, MT

LOCATION.--Lat 46°13'59", long 113°17'56", in SE¼NW¼ 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 mile 36.8.

DRAINAGE AREA.--52.6 mi<sup>2</sup>.

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. Altitude of gage is 5,630 ft, 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.--Records good. Flow regulated by Georgetown Lake (station number 12325000). Several observations of water temperature and specific conductance were made during the water year and are published as miscellaneous water-quality data in the back of this report. Flow may be augmented by transbasin diversion from Silver Lake to Georgetown Lake or reduced by pumping from Georgetown Lake to Silver Lake.

AVERAGE DISCHARGE.--44 years, 30.3 ft<sup>3</sup>/s, 21,950 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 174 ft<sup>3</sup>/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, 115 ft<sup>3</sup>/s June 21, gage height, 2.08 ft; minimum daily, 27 ft<sup>3</sup>/s on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	27	72	63	27	27	27	27	30	111	110	56	50
2	27	72	63	27	27	27	28	30	110	110	56	49
3	27	72	63	27	27	27	28	30	110	109	56	49
4	27	72	63	28	27	27	28	30	111	109	55	50
5	27	72	63	28	27	27	28	29	112	109	55	50
6	27	72	49	28	27	27	29	29	111	109	55	50
7	30	79	29	28	27	27	28	30	111	109	55	50
8	39	86	29	28	27	27	28	30	111	108	55	50
9	40	86	28	28	27	27	29	30	110	109	54	49
10	51	86	28	27	27	27	29	31	110	111	54	50
11	68	86	27	27	27	27	29	31	111	112	54	50
12	72	86	27	27	27	27	29	32	111	112	54	50
13	72	86	27	27	27	27	29	33	111	112	54	50
14	73	86	27	27	27	27	28	36	111	112	54	50
15	72	86	27	27	27	27	28	40	111	112	54	49
16	72	86	27	27	27	27	30	49	110	112	53	49
17	73	85	27	27	27	27	30	57	110	112	53	50
18	73	60	27	27	27	27	31	56	110	93	52	50
19	73	29	27	27	27	27	31	55	110	54	52	50
20	72	28	27	27	27	27	31	63	111	53	52	50
21	72	28	27	27	27	28	31	74	113	53	52	50
22	72	27	27	27	27	28	31	72	112	53	52	50
23	72	27	27	27	27	28	32	80	111	54	52	50
24	72	27	27	28	27	27	32	99	111	54	52	50
25	73	29	27	28	27	27	31	110	112	54	51	50
26	72	38	27	28	27	28	31	113	112	55	51	50
27	72	39	27	28	27	28	30	113	111	55	51	50
28	72	45	27	27	27	28	30	112	110	55	51	50
29	72	57	27	27	27	28	30	112	110	55	50	50
30	72	63	27	28	---	28	30	111	110	55	50	50
31	73	---	27	27	---	27	---	111	---	47	50	---
TOTAL	1836	1867	1045	848	783	845	886	1858	3325	2667	1645	1495
MEAN	59.2	62.2	33.7	27.4	27.0	27.3	29.5	59.9	111	86.0	53.1	49.8
MAX	73	86	63	28	27	28	32	113	113	112	56	50
MIN	27	27	27	27	27	27	27	29	110	47	50	49
AC-FT	3640	3700	2070	1680	1550	1680	1760	3690	6600	5290	3260	2970

CAL YR 1983 TOTAL 14574 MEAN 39.9 MAX 95 MIN 22 AC-FT 28910  
WTR YR 1984 TOTAL 19100 MEAN 52.2 MAX 113 MIN 27 AC-FT 37880

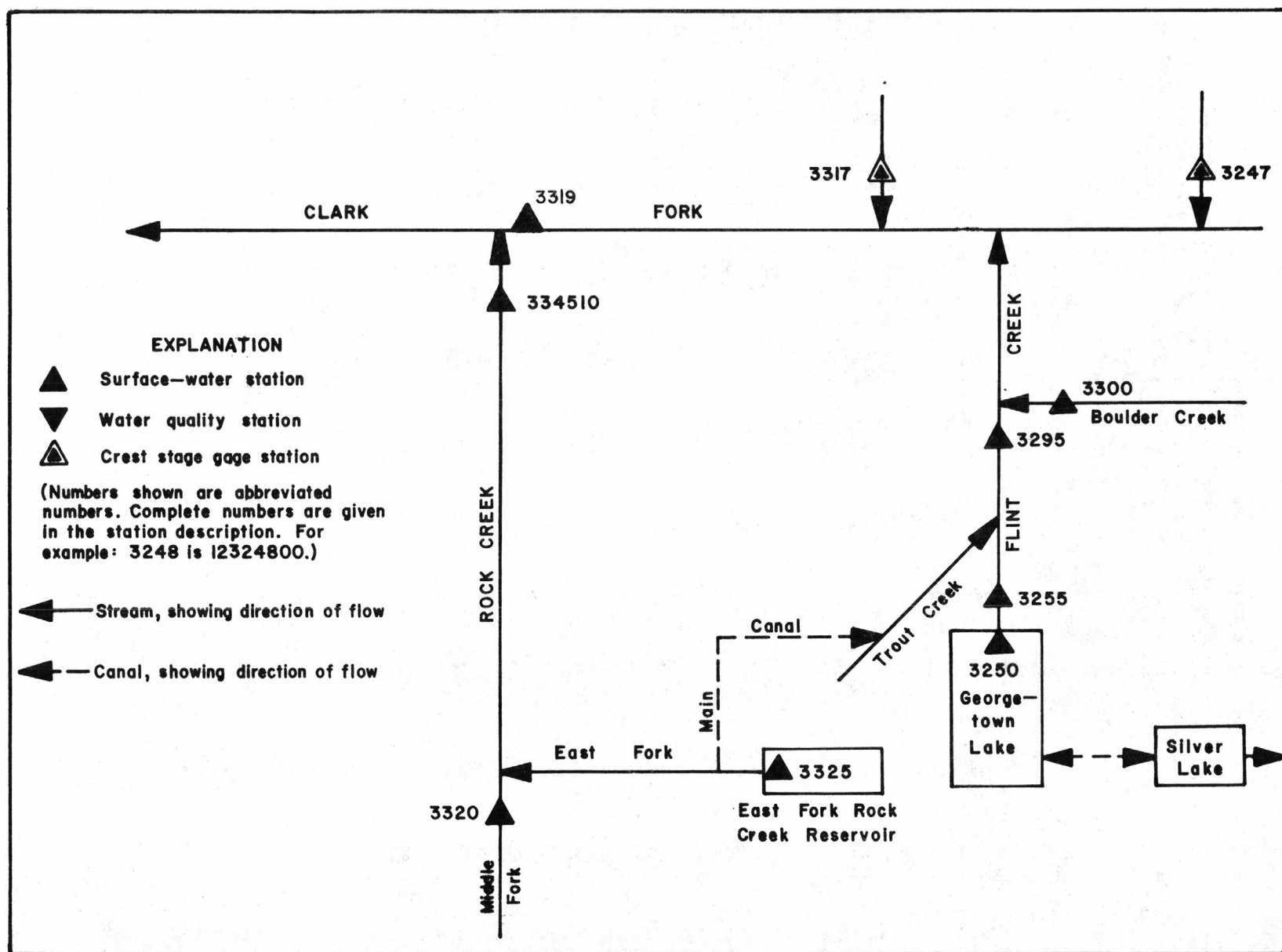


Figure 6. Schematic diagram showing diversion from Rock Creek basin to Flint Creek basin.



## PEND OREILLE RIVER BASIN

## 12329500 FLINT CREEK AT MAXVILLE, MT

LOCATION.--Lat 46°27'50", long 113°14'20", in NE $\frac{1}{4}$ SW $\frac{1}{4}$  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<sup>2</sup>.

PERIOD OF RECORD.--August 1941 to current year. April 1939 to September 1941 at site 0.5 mi upstream (above Maxville siding); records not equivalent owing to diversions.

REVISED RECORDS.--WSP 1216: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 4,828.38 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for December through January, which are poor. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report. Some regulation by Georgetown Lake (station number 12325000). Diversions for irrigation of about 8,200 acres above 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.--43 years, 102 ft<sup>3</sup>/s, 73,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,680 ft<sup>3</sup>/s Mar. 28, 1943, gage height, 6.79 ft, from rating curve extended above 600 ft<sup>3</sup>/s; maximum gage height, 8.08 ft Feb. 4, 1963 (backwater from ice); minimum daily discharge, 15 ft<sup>3</sup>/s Feb. 25, 1962.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 672 ft<sup>3</sup>/s June 22, gage height, 5.65 ft; minimum daily, 45 ft<sup>3</sup>/s Dec. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	108	133	70	80	75	64	71	107	291	255	197	190
2	104	133	60	100	75	66	70	104	253	223	220	148
3	99	132	65	130	70	63	70	99	195	200	214	138
4	97	135	65	150	70	62	72	97	199	191	200	129
5	96	137	65	150	70	60	75	96	265	190	200	119
6	95	137	65	160	70	62	84	94	258	188	193	114
7	93	141	70	150	70	64	79	90	250	193	187	120
8	97	142	70	130	66	69	78	87	223	176	173	118
9	109	139	70	110	64	77	82	99	214	174	177	112
10	110	141	75	100	64	76	82	110	225	165	170	113
11	120	144	75	90	62	75	79	108	273	164	156	127
12	125	143	75	90	62	71	77	112	319	160	156	128
13	126	143	75	90	65	69	75	136	286	159	161	129
14	143	142	75	85	73	84	73	158	316	165	147	131
15	140	138	75	85	63	79	78	289	318	175	146	134
16	133	140	75	65	65	76	90	380	327	172	151	132
17	132	141	70	50	63	74	108	314	324	172	159	131
18	138	137	60	50	61	70	131	261	308	189	156	137
19	133	99	60	55	74	69	185	241	286	179	160	133
20	133	93	55	60	75	75	204	268	322	177	155	151
21	131	89	55	60	63	110	183	283	423	185	153	173
22	131	81	50	60	62	81	167	246	538	183	164	164
23	140	93	50	60	60	77	159	242	410	186	160	154
24	138	105	45	60	61	80	142	268	346	187	160	145
25	135	105	50	65	61	75	131	248	347	184	160	144
26	132	103	50	65	61	74	122	237	360	171	157	137
27	131	98	50	65	60	75	117	232	346	169	150	138
28	131	97	50	65	61	73	115	219	338	171	143	143
29	132	95	55	70	64	72	110	210	323	183	139	139
30	132	80	55	70	---	72	103	246	301	203	139	137
31	132	---	60	75	---	71	---	296	---	187	214	---
TOTAL	3796	3636	1940	2695	1910	2265	3212	5977	9184	5676	5217	4108
MEAN	122	121	62.6	86.9	65.9	73.1	107	193	306	183	168	137
MAX	143	144	75	160	75	110	204	380	538	255	220	190
MIN	93	80	45	50	60	60	70	87	195	159	139	112
AC-FT	7530	7210	3850	5350	3790	4490	6370	11860	18220	11260	10350	8150

CAL YR 1983 TOTAL 40639 MEAN 111 MAX 454 MIN 45 AC-FT 80610  
WTR YR 1984 TOTAL 49616 MEAN 136 MAX 538 MIN 45 AC-FT 98410

# PEND OREILLE RIVER BASIN

69

12330000 BOULDER CREEK AT MAXVILLE, MT

LOCATION.--Lat 46°28'20", long 113°13'59", in SE¼NE¼SW¼ 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<sup>2</sup>.

PERIOD OF RECORD.--April 1939 to current year. Monthly discharge only for some periods, published in WSP 1316.

GAGE.--Water-stage recorder. Altitude of gage is 4,750 ft, from topographic map. Apr. 15, 1939, to July 7, 1941, nonrecording gage at site 75 ft upstream at different datum. July 8-20, 1941, nonrecording gage at site 175 ft upstream at datum 1.03 ft higher.

REMARKS.--Records good except those for the winter period, which are poor. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report. Diversions for irrigation of about 238 acres, all of which lies below station.

AVERAGE DISCHARGE.--45 years, 48.8 ft<sup>3</sup>/s, 35,360 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,460 ft<sup>3</sup>/s June 19, 1975, gage height, 4.55 ft, in gage well, 4.80 ft, from floodmarks; minimum, 3.0 ft<sup>3</sup>/s about Mar. 24, 1964, gage height, 0.73 ft, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 220 ft<sup>3</sup>/s and maximums (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 16	0030	389	3.29	June 5	0330	267	2.92
May 20	1100	312	3.07	June 11	1900	346	3.17
May 31	0500	444	3.43	June 21	1230	*1,140	*4.39

Minimum discharge, 18 ft<sup>3</sup>/s Sept. 19, gage height, 1.25 ft.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34	37	27	25	23	23	24	45	268	213	48	42
2	35	38	28	25	24	23	24	45	223	190	50	30
3	34	37	29	26	24	23	24	44	207	175	47	26
4	34	39	30	28	25	22	24	42	204	161	46	24
5	36	39	30	30	25	22	25	42	257	150	44	23
6	33	40	30	30	24	22	27	41	232	140	40	24
7	32	43	30	30	24	22	25	40	211	131	34	24
8	30	39	32	28	24	23	26	42	183	121	33	23
9	34	36	33	27	24	24	26	52	165	111	31	23
10	38	37	35	26	24	24	25	54	173	102	29	22
11	35	38	34	26	24	24	25	54	296	96	30	21
12	33	37	33	25	24	25	25	71	280	90	32	21
13	32	37	32	25	24	25	25	97	282	86	34	21
14	36	35	31	25	24	25	26	149	316	81	29	21
15	35	33	31	25	23	25	30	275	334	77	28	20
16	33	33	30	24	23	25	36	356	337	74	28	20
17	32	33	28	24	23	24	44	258	341	70	31	19
18	35	33	26	24	23	24	54	208	316	70	28	19
19	33	34	26	23	23	24	66	217	321	69	27	19
20	32	35	26	23	23	25	65	296	367	63	25	20
21	32	32	25	23	23	30	59	258	828	60	24	38
22	33	32	23	23	23	27	62	203	496	58	24	29
23	44	30	21	24	23	25	64	212	350	53	24	27
24	42	32	20	24	23	25	60	196	330	47	25	25
25	40	32	21	25	23	24	56	166	348	46	24	24
26	39	33	22	25	23	24	53	153	356	45	22	25
27	38	33	22	26	23	24	50	146	339	44	21	24
28	38	33	22	26	23	24	48	147	306	42	21	23
29	38	30	22	26	23	24	46	184	289	48	20	24
30	37	27	23	25	---	24	45	313	257	51	21	24
31	37	---	24	24	---	24	---	390	---	49	42	---
TOTAL	1094	1047	846	790	682	749	1189	4796	9212	2813	962	725
MEAN	35.3	34.9	27.3	25.5	23.5	24.2	39.6	155	307	90.7	31.0	24.2
MAX	44	43	35	30	25	30	66	390	828	213	50	42
MIN	30	27	20	23	23	22	24	40	165	42	20	19
AC-FT	2170	2080	1680	1570	1350	1490	2360	9510	18270	5580	1910	1440

CAL YR 1983	TOTAL	19264	MEAN 52.8	MAX 431	MIN 16	AC-FT	38210
WTR YR 1984	TOTAL	24905	MEAN 68.0	MAX 828	MIN 19	AC-FT	49400

## PEND OREILLE RIVER BASIN

12331900 CLARK FORK NEAR CLINTON, MT

LOCATION.--Lat 46°43'05", long 113°35'17", in SE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$  sec.10, T.11 N., R.16 W., Missoula County, Hydrologic Unit 17010201, on downstream side of county road bridge, 4.5 mi above Rock Creek, 6.5 mi southeast of Clinton, and at mile 386.6.

DRAINAGE AREA.--2,629 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1979 to current year.

REVISED RECORDS.--WDR MT-81-2: Drainage area.

GAGE.--Nonrecording gage and crest-stage gage. Altitude of gage is 3,580 ft, from topographic map.

REMARKS.--Records good except those for December to January, which are poor. Several observations of specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report. 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 88,400 acres above station.

AVERAGE DISCHARGE.--5 years, 1,105 ft<sup>3</sup>/s, 800,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,000 ft<sup>3</sup>/s May 24, 1981, gage height, 10.90 ft, from flood-marks; minimum daily, 200 ft<sup>3</sup>/s Aug. 10, 1979.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,540 ft<sup>3</sup>/s June 22, gage height, 8.09 ft; minimum daily, 300 ft<sup>3</sup>/s Dec. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	895	887	600	1500	797	655	755	1150	2390	2070	548	686
2	967	895	600	2000	804	694	748	1150	2280	1550	559	741
3	942	895	650	1900	762	694	727	1120	1960	1430	594	700
4	942	903	740	1800	776	681	727	1100	1880	1340	594	650
5	918	903	750	1800	700	655	727	1090	2070	1280	600	636
6	910	918	750	4270	687	630	796	1060	2160	1240	582	668
7	887	934	760	2490	714	655	819	1000	2060	1160	564	668
8	887	926	780	1860	687	694	820	975	1900	1100	553	668
9	918	910	783	1370	668	776	826	959	1880	1040	533	726
10	950	895	776	1150	720	783	819	1050	1760	993	514	682
11	967	895	714	1060	720	810	804	1080	1890	943	483	668
12	967	942	741	1060	700	804	776	1090	2890	903	483	661
13	975	934	727	856	710	776	783	1240	2720	864	514	661
14	983	926	720	769	841	804	755	1540	2760	834	493	661
15	1000	895	650	612	748	942	769	2220	2950	770	509	655
16	992	895	500	640	707	864	878	4020	2940	734	493	655
17	980	918	400	600	700	864	1110	4180	2880	700	535	657
18	975	903	340	570	694	810	1370	3370	2650	668	525	649
19	975	872	370	570	612	769	1690	2970	2550	668	514	649
20	950	841	400	580	618	769	1990	3010	2670	642	520	668
21	934	826	380	600	668	895	1970	3360	2540	600	536	761
22	934	769	330	640	636	879	1850	2900	4480	588	509	762
23	934	769	315	720	636	834	1890	2670	4690	563	488	811
24	950	734	300	741	630	840	1740	2670	3890	588	525	816
25	934	720	370	849	668	856	1630	2340	3190	576	547	826
26	918	734	500	1090	636	841	1480	2230	2850	559	500	849
27	918	748	480	1030	636	826	1420	2170	2770	525	509	872
28	903	745	460	942	624	826	1380	2010	2550	547	472	879
29	910	741	450	1040	630	826	1330	1820	2490	559	447	879
30	903	660	500	910	---	783	1210	1820	2280	617	467	879
31	887	---	800	864	---	776	---	2400	---	588	640	---
TOTAL	29105	25533	17636	36883	20129	24311	34589	61764	78970	27239	16350	21743
MEAN	939	851	569	1190	694	784	1153	1992	2632	879	527	725
MAX	1000	942	800	4270	841	942	1990	4180	4690	2070	640	879
MIN	887	660	300	570	612	630	727	959	1760	525	447	636
AC-FT	57730	50640	34980	73160	39930	48220	68610	122500	156600	54030	32430	43130
CAL YR 1983	TOTAL	331589	MEAN	908	MAX	3380	MIN	300	AC-FT	657700		
WTR YR 1984	TOTAL	394252	MEAN	1077	MAX	4690	MIN	300	AC-FT	782000		

## 12332000 MIDDLE FORK ROCK CREEK NEAR PHILIPSBURG, MT

LOCATION.--Lat 46°11'42", long 113°30'00", in SW¼SE¼ sec.8, T.5 N., R.15 W., Granite County, Hydrologic Unit 17010202, on right bank 0.3 mi upstream from East Fork, 2.3 mi upstream from West Fork, and 13.7 mi southwest of Philipsburg.

DRAINAGE AREA.--123 mi<sup>2</sup>.

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 5,385.84 ft National Geodetic Vertical Datum of 1929. Sept. 21, 1937, to May 10, 1942, nonrecording gage at site 600 ft upstream at different datum. May 11, 1942, to May 11, 1954, nonrecording gages at site 400 ft downstream at different datum. May 12, 1954, to Sept. 30, 1955, nonrecording gage at site 300 ft upstream at datum 5.74 ft higher.

REMARKS.--Records good except those for the winter period, which are poor. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report. A few small diversions for irrigation above station.

AVERAGE DISCHARGE.--47 years, 124 ft<sup>3</sup>/s, 13.69 in/yr, 89,840 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,680 ft<sup>3</sup>/s June 16, 1974, gage height, 5.58 ft; minimum daily, 5.3 ft<sup>3</sup>/s Feb. 9, 1953.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 650 ft<sup>3</sup>/s and maximums (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 16	0330	784	4.19	June 21	1800	*1,110	*4.77
May 31	0900	850	4.31	June 26	0600	674	3.99

Minimum daily discharge, 15 ft<sup>3</sup>/s Dec. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	60	50	25	22	24	22	27	68	691	419	110	89
2	61	51	25	24	24	22	28	71	590	373	121	72
3	58	53	26	28	24	22	30	72	533	348	105	65
4	54	53	27	35	24	22	32	69	502	318	99	61
5	54	56	28	60	23	22	35	69	564	306	95	58
6	52	58	29	80	23	22	37	66	531	290	91	62
7	50	73	30	90	23	24	34	63	499	278	90	66
8	50	62	31	80	23	26	35	67	435	259	85	62
9	53	55	32	70	23	28	35	88	386	238	80	62
10	61	56	33	60	23	30	35	94	395	216	78	58
11	57	60	34	55	22	32	35	92	517	203	79	56
12	54	61	35	50	22	32	34	122	527	194	80	54
13	52	58	35	45	22	32	34	168	500	186	76	53
14	63	55	35	40	22	32	35	254	548	177	72	52
15	63	54	35	35	21	32	40	549	589	167	74	51
16	57	53	30	30	21	30	57	710	621	159	75	50
17	55	53	25	25	21	30	72	557	670	153	78	49
18	58	52	20	22	21	30	81	491	635	149	72	48
19	55	51	18	20	20	30	93	482	640	145	72	47
20	54	50	18	20	20	35	93	570	732	140	68	49
21	53	47	16	21	21	36	83	563	974	135	65	59
22	53	44	16	22	22	33	90	486	831	129	63	57
23	58	40	16	23	22	31	96	500	640	128	61	58
24	58	40	15	24	22	32	86	467	575	128	61	56
25	53	40	16	25	21	31	81	399	594	121	61	54
26	52	40	17	25	21	29	80	367	634	116	59	55
27	52	40	18	25	21	28	79	343	591	114	57	57
28	51	40	18	25	21	27	79	339	566	112	56	54
29	51	35	18	25	21	27	78	384	550	115	54	54
30	50	30	19	25	---	27	71	588	526	118	55	54
31	50	---	20	24	---	27	---	803	---	107	85	---
TOTAL	1702	1510	760	1155	638	883	1725	9961	17586	6041	2377	1722
MEAN	54.9	50.3	24.5	37.3	22.0	28.5	57.5	321	586	195	76.7	57.4
MAX	63	73	35	90	24	36	96	803	974	419	121	89
MIN	50	30	15	20	20	22	27	63	386	107	54	47
CFSM	.45	.41	.20	.30	.18	.23	.47	2.61	4.76	1.59	.62	.47
IN.	.51	.46	.23	.35	.19	.27	.52	3.01	5.32	1.83	.72	.52
AC-FT	3380	3000	1510	2290	1270	1750	3420	19760	34880	11980	4710	3420

CAL YR 1983	TOTAL	39473	MEAN 108	MAX 811	MIN 15	CFSM .88	IN 11.94	AC-FT 78290
WTR YR 1984	TOTAL	46060	MEAN 126	MAX 974	MIN 15	CFSM 1.02	IN 13.93	AC-FT 91360



## PEND OREILLE RIVER BASIN

12334510 ROCK CREEK NEAR CLINTON, MT

LOCATION.--Lat 46°43'21", long 113°40'56", in NE $\frac{1}{4}$ SW $\frac{1}{4}$  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<sup>2</sup>.

PERIOD OF RECORD.--October 1972 to current year.

GAGE.--Water-stage recorder. Datum of gage is 3,519.46 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Water-discharge records good except those for December and January, 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.--12 years, 607 ft<sup>3</sup>/s, 9.31 in/yr, 439,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,520 ft<sup>3</sup>/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, 45 ft<sup>3</sup>/s Jan. 3, 1974, gage height, 1.65 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1972 reached a stage of 8.52 ft, from floodmark, discharge, 6,500 ft<sup>3</sup>/s; local residents report flood of 1927 reached a stage of about 9.5 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 1,610 ft<sup>3</sup>/s and maximums (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 16	1000	*3,420	*7.21	June 22	0530	3,290	7.12
May 31	1700	3,350	7.15				

Minimum daily discharge, 110 ft<sup>3</sup>/s Dec. 23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	329	257	175	170	223	211	241	611	3010	1720	557	413		
2	324	257	180	180	229	218	237	618	2610	1530	624	361		
3	319	261	200	185	221	213	230	611	2390	1390	581	316		
4	309	280	220	210	223	203	235	591	2270	1270	536	296		
5	296	292	210	350	214	189	261	564	2400	1200	508	284		
6	285	300	200	450	209	191	317	543	2350	1140	487	303		
7	277	332	205	446	216	200	318	508	2250	1090	465	322		
8	272	345	215	412	217	210	307	498	2070	1020	442	329		
9	287	304	240	372	206	232	311	607	1890	981	421	341		
10	320	289	250	332	213	250	305	770	1810	927	405	352		
11	328	304	260	315	223	258	298	790	1980	874	406	340		
12	305	319	255	304	219	256	283	889	2300	844	430	335		
13	292	315	245	278	226	242	272	1200	2190	811	423	326		
14	299	302	245	223	245	276	273	1660	2390	788	394	329		
15	327	288	245	170	231	294	306	2750	2430	776	384	319		
16	308	280	230	170	210	275	428	3310	2530	747	380	309		
17	291	283	170	160	225	269	652	2880	2550	707	386	302		
18	295	281	135	160	216	247	798	2540	2480	693	376	295		
19	298	273	138	170	194	238	1020	2460	2360	729	371	292		
20	285	273	140	230	188	256	1210	2710	2430	700	357	311		
21	280	267	135	270	218	348	1080	2940	2790	676	345	360		
22	274	237	125	300	221	323	1020	2620	3150	639	337	384		
23	279	198	110	305	207	289	1050	2520	2620	626	324	384		
24	293	237	115	295	198	297	975	2550	2320	613	323	365		
25	282	279	120	290	204	288	881	2290	2220	596	328	355		
26	271	270	130	288	202	278	803	2060	2220	574	319	363		
27	267	262	120	278	194	268	728	1990	2170	590	306	379		
28	257	254	118	270	198	258	689	1870	2080	594	288	369		
29	259	230	115	270	208	249	649	1930	1980	598	266	352		
30	260	210	120	253	---	246	617	2390	1910	617	261	346		
31	259	---	140	229	---	241	---	3090	---	571	335	---		
TOTAL	9027	8279	5506	8335	6198	7813	16794	53360	70150	26631	12365	10132		
MEAN	291	276	178	269	214	252	560	1721	2338	859	399	338		
MAX	329	345	260	450	245	348	1210	3310	3150	1720	624	413		
MIN	257	198	110	160	188	189	230	498	1810	571	261	284		
CFSM	.33	.31	.20	.30	.24	.29	.63	1.95	2.64	.97	.45	.38		
IN.	.38	.35	.23	.35	.26	.33	.71	2.24	2.95	1.12	.52	.43		
AC-FT	17910	16420	10920	16530	12290	15500	33310	105800	139100	52820	24530	20100		
CAL YR 1983	TOTAL	177645	MEAN	486	MAX	2780	MIN	110	CFSM	.55	IN	7.46	AC-FT	352500
WTR YR 1984	TOTAL	234590	MEAN	641	MAX	3310	MIN	110	CFSM	.72	IN	9.86	AC-FT	465300

## 12335500 NEVADA CREEK ABOVE RESERVOIR, NEAR FINN, MT

LOCATION.--Lat 46°46'42", long 112°46'00", SW 1/4 SW 1/4 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, and 4.0 mi west of Finn.

DRAINAGE AREA.--116 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1939 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 4,640 ft, from topographic map. Prior to Apr. 30, 1942, non-recording gage at site 1.0 mi 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.--Records good except those for winter period, which are poor. Diversions for irrigation of about 2,900 acres above station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--45 years, 38.7 ft<sup>3</sup>/s, 28,040 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,800 ft<sup>3</sup>/s June 2, 1953, gage height, 6.00 ft, site and datum then in use, from rating curve extended above 400 ft<sup>3</sup>/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<sup>3</sup>/s at times in 1944, 1957, 1972, and 1973.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 290 ft<sup>3</sup>/s and maximums (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 4	1600	Ice Jam	*4.97	May 16	0330	407	3.21
Jan. 5		*Unknown		June 21	1430	384	3.15

Minimum daily discharge, 6.0 ft<sup>3</sup>/s Dec. 24, 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	23	14	20	18	23	21	52	161	49	31	22
2	21	22	14	29	17	26	20	49	132	49	35	17
3	19	22	13	30	19	28	21	46	112	45	30	15
4	20	25	15	300	19	24	22	45	105	43	28	14
5	19	25	15	550	18	24	24	42	136	41	26	13
6	19	27	15	180	17	22	31	39	115	38	25	14
7	19	28	15	70	17	37	30	37	120	36	24	12
8	19	23	14	41	17	55	29	35	101	35	23	12
9	24	22	14	29	18	56	29	42	94	33	22	12
10	24	21	15	25	19	41	28	43	87	34	21	11
11	23	21	16	21	19	40	27	48	104	34	22	10
12	20	22	18	21	20	31	22	60	100	31	23	11
13	20	23	17	20	22	28	22	91	98	27	21	10
14	23	24	17	19	25	80	21	139	105	28	21	9.5
15	23	22	17	19	20	56	24	265	91	27	21	9.3
16	20	21	17	15	18	39	30	374	90	26	20	8.9
17	21	21	16	13	17	30	31	275	81	26	22	8.2
18	24	21	16	12	17	25	46	193	77	27	21	8.3
19	22	20	12	11	17	24	83	166	74	26	21	7.6
20	21	20	13	12	17	31	160	194	77	25	19	8.6
21	21	20	14	13	18	35	104	197	272	25	19	11
22	20	20	12	15	18	29	84	165	143	27	19	8.8
23	22	19	9.0	18	17	27	82	148	115	29	16	10
24	20	18	6.0	22	19	31	74	132	101	29	14	9.9
25	20	19	6.0	27	18	26	68	120	89	30	13	9.5
26	20	19	7.0	31	18	26	66	115	77	29	11	10
27	20	19	10	28	19	26	61	109	71	27	10	13
28	19	18	14	27	21	24	56	90	65	27	9.9	12
29	20	16	13	26	20	22	50	82	57	30	9.9	13
30	20	15	11	24	---	22	46	108	51	29	11	13
31	20	---	17	20	---	21	---	156	---	27	25	---
TOTAL	645	636	422.0	1688	539	1009	1412	3657	3101	989	633.8	343.6
MEAN	20.8	21.2	13.6	54.5	18.6	32.5	47.1	118	103	31.9	20.4	11.5
MAX	24	28	18	550	25	80	160	374	272	49	35	22
MIN	19	15	6.0	11	17	21	20	35	51	25	9.9	7.6
AC-FT	1280	1260	837	3350	1070	2000	2800	7250	6150	1960	1260	682

CAL YR 1983	TOTAL	11863.0	MEAN 32.5	MAX 253	MIN 6.0	AC-FT 23530
WTR YR 1984	TOTAL	15075.4	MEAN 41.2	MAX 550	MIN 6.0	AC-FT 29900

## PEND OREILLE RIVER BASIN

12339450 CLEARWATER RIVER NEAR CLEARWATER, MT

LOCATION.--Lat 47°01'09", long 113°23'12", in NW1/4NW1/4 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 mile 4.9.

DRAINAGE AREA.--345 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1974 to current year.

GAGE.--Water-stage recorder. Datum of gage is 3,814.23 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for Dec. 16 to Feb. 10, which are fair. A few minor diversions for irrigation above station. During summer months Elbow Lake, 1.5 mi upstream, maybe regulated for recreational purposes. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--10 years, 300 ft<sup>3</sup>/s, 11.81 in/yr, 217,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,900 ft<sup>3</sup>/s May 17, 1975, gage height, 7.85 ft; minimum, 27 ft<sup>3</sup>/s Aug. 25, 26, 1977, gage height, 3.69 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,370 ft<sup>3</sup>/s Apr. 24, gage height, 6.61 ft; minimum, 44 ft<sup>3</sup>/s Sept. 6, 7, gage height, 3.89 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	47	77	106	73	114	78	236	629	1160	617	100	51
2	48	75	97	74	110	78	236	589	1100	552	102	48
3	49	73	93	76	108	78	236	565	1010	502	104	47
4	50	73	88	78	106	80	238	550	929	464	104	47
5	51	73	84	82	104	80	244	534	886	433	104	46
6	53	72	82	84	103	79	260	512	861	407	103	45
7	53	74	82	86	102	78	284	488	834	373	101	44
8	52	74	83	90	100	78	313	465	799	342	100	46
9	55	73	82	94	100	79	347	452	758	308	98	47
10	59	73	80	100	98	80	376	459	694	281	96	49
11	62	75	81	105	96	82	396	479	649	263	94	51
12	63	77	82	110	95	88	402	490	628	251	91	51
13	64	78	82	110	95	91	406	500	646	237	89	51
14	66	79	82	105	96	101	403	534	703	223	89	52
15	65	80	82	100	95	108	398	650	764	195	88	52
16	65	82	82	96	96	112	400	847	826	200	86	51
17	64	83	80	94	96	120	440	967	880	194	83	50
18	64	84	80	90	96	125	555	963	893	185	81	50
19	64	86	78	88	93	129	762	929	866	171	77	50
20	63	90	76	88	91	136	1020	944	833	126	75	53
21	63	95	74	90	90	145	1220	1010	861	128	75	55
22	63	96	74	90	89	162	1290	1030	967	132	74	58
23	63	94	74	92	88	182	1310	999	980	131	74	60
24	65	95	72	98	87	195	1320	952	916	127	72	62
25	76	116	72	105	86	210	1200	908	872	104	71	63
26	82	148	72	115	84	226	1060	858	849	96	67	64
27	85	158	72	120	83	235	940	816	816	96	63	64
28	85	150	72	120	81	240	840	783	778	98	61	65
29	83	136	72	120	80	241	757	765	728	99	60	65
30	81	120	72	118	---	241	686	814	681	100	59	64
31	78	---	72	116	---	239	---	1000	---	100	56	---
TOTAL	1981	2759	2480	3007	2762	4196	18575	22481	25167	7535	2597	1601
MEAN	63.9	92.0	80.0	97.0	95.2	135	619	725	839	243	83.8	53.4
MAX	85	158	106	120	114	241	1320	1030	1160	617	104	65
MIN	47	72	72	73	80	78	236	452	628	96	56	44
CFSM	.19	.27	.23	.28	.28	.39	1.79	2.10	2.43	.70	.24	.16
IN.	.21	.30	.27	.32	.30	.45	2.00	2.42	2.71	.81	.28	.17
AC-FT	3930	5470	4920	5960	5480	8320	36840	44590	49920	14950	5150	3180

CAL YR 1983 TOTAL 82707 MEAN 227 MAX 1230 MIN 46 CFSM .66 IN 8.92 AC-FT 164000  
WTR YR 1984 TOTAL 95141 MEAN 260 MAX 1320 MIN 44 CFSM .75 IN 10.26 AC-FT 188700

## PEND OREILLE RIVER BASIN

75

## 12340000 BLACKFOOT RIVER NEAR BONNER, MT

LOCATION.--Lat 46°53'59", long 113°45'20", in SE¼SE¼NW¼ 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 mile 7.3.

DRAINAGE AREA.--2,290 mi<sup>2</sup>.

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 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.--Records good except those for December and January which are poor. Diversions for irrigation of about 20,000 acres above station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--48 years (water years 1900-01, 1904, 1940-84), 1,645 ft<sup>3</sup>/s, 9.75 in/yr 1,192,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,200 ft<sup>3</sup>/s June 10, 1964, gage height, 10.89 ft; minimum daily, 200 ft<sup>3</sup>/s Jan. 4, 5, 1950, Dec. 23, 24, 1983.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,610 ft<sup>3</sup>/s May 31, gage height, 6.70 ft; minimum daily, 200 ft<sup>3</sup>/s Dec. 23, 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	714	667	450	350	660	545	838	1840	6280	3220	1010	844
2	715	669	430	400	640	563	825	1800	5540	2980	979	902
3	719	669	500	450	633	565	816	1750	4950	2770	969	827
4	713	676	580	500	648	571	816	1750	4620	2630	957	780
5	711	682	560	1000	646	552	835	1720	4610	2490	955	757
6	708	694	540	1500	626	540	901	1660	4620	2380	958	748
7	701	725	520	2000	613	540	958	1610	4460	2320	925	734
8	694	714	540	1500	628	553	990	1550	4200	2150	905	755
9	724	698	580	1200	613	581	1020	1570	3960	2050	882	760
10	741	686	570	1000	599	611	1060	1660	3720	1940	845	751
11	733	707	560	900	583	641	1080	1740	3590	1860	835	747
12	712	718	540	850	583	668	1070	1830	3890	1760	851	728
13	708	720	540	800	607	667	1060	2000	4000	1650	871	718
14	714	712	540	700	648	728	1030	2350	4270	1560	847	715
15	708	701	520	500	626	792	1030	3630	4500	1490	816	709
16	707	691	500	480	619	780	1090	5110	4730	1390	794	702
17	702	692	450	450	602	780	1270	5420	4850	1350	794	690
18	705	698	350	400	579	764	1550	5130	4650	1310	794	679
19	701	694	310	380	562	744	2080	4960	4380	1230	794	668
20	694	696	320	390	569	756	2850	5320	4190	1200	772	689
21	687	701	270	400	566	807	3240	5750	4720	1160	757	725
22	682	655	230	450	561	846	3170	5390	5970	1130	750	730
23	680	646	200	600	557	846	3090	5040	5500	1120	757	745
24	674	681	200	650	544	863	3040	5030	4920	1120	764	727
25	677	694	220	750	544	870	2880	4660	4510	1100	757	722
26	680	705	250	800	538	893	2620	4290	4270	1050	757	726
27	680	720	300	850	531	892	2410	4100	4070	1010	743	726
28	680	715	280	850	535	881	2230	3900	3860	1020	729	721
29	680	663	250	800	535	870	2080	3830	3630	1070	683	716
30	674	540	270	750	---	862	1960	4320	3450	1080	680	713
31	672	---	300	700	---	848	---	5980	---	1030	741	---
TOTAL	21690	20629	12670	23350	17195	22419	49889	106690	134910	51620	25671	22154
MEAN	700	688	409	753	593	723	1663	3442	4497	1665	828	738
MAX	741	725	580	2000	660	893	3240	5980	6280	3220	1010	902
MIN	672	540	200	350	531	540	816	1550	3450	1010	680	668
CFSM	.31	.30	.18	.33	.26	.32	.73	1.50	1.96	.73	.36	.32
IN.	.35	.34	.21	.38	.28	.36	.81	1.73	2.19	.84	.42	.36
AC-FT	43020	40920	25130	46310	34110	44470	98950	211600	267600	102400	50920	43940

CAL YR 1983	TOTAL	476594	MEAN	1306	MAX	7550	MIN	200	CFSM	.57	IN	7.74	AC-FT	945300
WTR YR 1984	TOTAL	508887	MEAN	1390	MAX	6280	MIN	200	CFSM	.61	IN	8.27	AC-FT	1009000



## PEND OREILLE RIVER BASIN

12340500 CLARK FORK ABOVE MISSOULA, MT

LOCATION.--Lat 46°52'38", long 113°55'53", in NW¼NW¼ 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 mile 361.6.

DRAINAGE AREA.--5,999 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1929 to current year. Monthly discharge only for some period, 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 National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to May 27, 1929, nonrecording gage.

REMARKS.--Water-discharge records good except those for December and January, which are fair. Diurnal fluctuation caused by powerplant at Milltown. Diversions for irrigation of about 120,000 acres above station.

AVERAGE DISCHARGE.--55 years, 3,051 ft<sup>3</sup>/s, 2,211,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,300 ft<sup>3</sup>/s June 21, 1975, gage height, 13.75 ft; minimum, 115 ft<sup>3</sup>/s Oct. 25, 1943, gage height, 0.64 ft, powerplant shutdown; minimum daily, 340 ft<sup>3</sup>/s Sept. 27, 1937.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1908 reached a discharge of 48,000 ft<sup>3</sup>/s, furnished by The Montana Power Company.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 13,800 ft<sup>3</sup>/s June 22, gage height, 8.76 ft; minimum daily, 600 ft<sup>3</sup>/s Dec. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2010	1970	1230	900	1790	1460	1970	3760	12000	6960	2060	1930
2	2050	1950	1200	1000	1780	1470	1940	3710	10500	6230	2150	1990
3	2110	1900	1300	1200	1700	1550	1910	3650	9350	5710	2100	1860
4	1980	1970	1500	1300	1690	1530	1890	3600	8750	5320	2060	1760
5	1960	1990	1450	1500	1640	1500	1920	3520	8800	4980	2010	1690
6	2050	1980	1400	7000	1630	1420	2060	3400	9060	4680	2030	1680
7	1870	2060	1400	5200	1620	1440	2200	3280	8690	4430	1900	1690
8	1890	2130	1500	3700	1610	1490	2240	3160	8180	4230	1850	1730
9	1950	2020	1600	3100	1470	1580	2280	3190	7610	4030	1830	1770
10	2090	1960	1700	2700	1430	1700	2330	3470	7160	3840	1770	1790
11	2120	1990	1750	2400	1660	1760	2320	3670	7080	3650	1740	1760
12	2000	2050	1700	2200	1560	1810	2280	3800	8370	3480	1680	1740
13	1970	2050	1700	2000	1650	1790	2240	4260	8720	3310	1900	1710
14	1910	2030	1700	1700	1660	1880	2200	5170	9040	3150	1760	1710
15	2000	2000	1700	1400	1650	2180	2180	7650	9410	3030	1720	1710
16	2080	1970	1680	1300	1600	2090	2370	11300	9800	2860	1670	1700
17	2050	1960	1350	1200	1550	2030	2950	12300	9990	2720	1710	1670
18	2020	1960	900	1100	1570	1980	3640	11100	9690	2590	1730	1630
19	2060	1940	800	1000	1480	1900	4550	10400	9080	2420	1710	1620
20	2000	1920	700	1000	1450	1830	6050	10600	8900	2190	1670	1650
21	1980	1910	670	1100	1500	2060	6500	11800	10300	2370	1630	1790
22	1950	1820	640	1200	1510	2190	6120	11100	13400	2300	1610	1870
23	1940	1660	620	1600	1470	2120	6060	10200	12400	2240	1580	1920
24	1940	1780	600	1700	1430	2120	6090	10200	10900	2230	1570	1910
25	1960	1880	620	1900	1450	2140	5400	9500	9670	2210	1580	1930
26	1940	1850	640	2200	1450	2160	4830	8660	9090	2130	1580	1950
27	1920	1900	700	2300	1410	2130	4690	8230	8730	2100	1500	1980
28	1910	1880	800	2340	1400	2110	4420	7860	8350	2100	1490	1980
29	1890	1790	700	2200	1450	2080	4170	7590	7850	2150	1450	1980
30	1890	1530	720	2040	---	2040	3950	8100	7460	2320	1410	1970
31	1930	---	800	1870	---	2000	---	10800	---	2200	1540	---
TOTAL	61420	57800	35770	63350	45260	57540	103750	219030	278330	104160	53990	54070
MEAN	1981	1927	1154	2044	1561	1856	3458	7065	9278	3360	1742	1802
MAX	2120	2130	1750	7000	1790	2190	6500	12300	13400	6960	2150	1990
MIN	1870	1530	600	900	1400	1420	1890	3160	7080	2100	1410	1620
AC-FT	121800	114600	70950	125700	89770	114100	205800	434400	552100	206600	107100	107200

CAL YR 1983 TOTAL 1013200 MEAN 2776 MAX 13300 MIN 600 AC-FT 2010000  
WTR YR 1984 TOTAL 1134470 MEAN 3100 MAX 13400 MIN 600 AC-FT 2250000

# PEND OREILLE RIVER BASIN

77

## 12342500 WEST FORK BITTERROOT RIVER NEAR CONNER, MT

LOCATION.--Lat 45°43'30", long 114°16'50", in SE¼NE¼NW¼ 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 mile 19.2.

DRAINAGE AREA.--317 mi<sup>2</sup>.

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 National Geodetic Vertical Datum of 1929 (U.S. Forest Service bench mark).

REMARKS.--Records excellent. Flow regulated by Painted Rocks Lake (station 12342000). Diversions for irrigation of about 200 acres above station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--43 years, 291 ft<sup>3</sup>/s, 210,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,060 ft<sup>3</sup>/s May 9, 1947, gage height, 6.18 ft; minimum, 0.2 ft<sup>3</sup>/s Nov. 25, 1952; minimum daily, 0.6 ft<sup>3</sup>/s May 3-7, 1954.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,600 ft<sup>3</sup>/s May 31, gage height, 4.84 ft; minimum daily, 90 ft<sup>3</sup>/s Apr. 4-6.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	227	128	123	118	116	111	186	114	2370	939	216	273
2	225	128	123	118	116	111	310	121	1970	843	211	273
3	224	128	123	118	116	111	219	123	1710	767	202	273
4	224	128	123	118	116	111	90	123	1550	704	193	273
5	224	128	123	118	116	111	90	123	1550	651	186	271
6	224	127	123	118	115	111	90	123	1490	607	179	271
7	222	127	123	118	115	111	92	125	1440	571	170	269
8	220	127	123	118	113	111	92	125	1340	530	163	269
9	220	126	123	118	114	111	92	125	1230	495	156	269
10	220	126	123	118	113	111	93	126	1170	463	152	269
11	220	126	123	118	113	111	94	128	1260	430	219	267
12	220	125	123	118	113	111	94	128	1340	403	336	265
13	217	125	123	118	113	111	94	130	1420	380	337	265
14	217	125	123	118	113	111	94	132	1480	358	342	265
15	217	125	122	118	113	111	95	1360	1550	337	342	263
16	217	125	121	118	113	111	96	2310	1740	318	240	261
17	217	125	121	118	113	112	98	1830	1810	301	130	261
18	215	125	120	118	113	111	101	1490	1760	287	213	261
19	213	125	120	118	113	112	103	1330	1690	282	277	261
20	213	125	120	118	113	113	104	1470	1790	274	277	238
21	213	125	120	117	113	113	106	1680	1940	271	277	200
22	213	125	120	116	113	113	107	1590	1840	262	275	200
23	211	125	120	116	113	114	109	1520	1640	259	275	200
24	210	125	120	116	113	116	110	1490	1510	269	275	200
25	210	125	120	116	113	116	111	1360	1450	266	274	200
26	210	125	120	116	113	116	112	1300	1420	246	273	200
27	209	125	120	116	112	116	113	1240	1360	251	273	200
28	167	125	120	116	111	116	113	1200	1270	244	273	200
29	128	125	120	116	111	116	114	1330	1170	261	273	200
30	128	124	120	116	---	117	116	1820	1050	266	273	200
31	128	---	118	116	---	117	---	2480	---	234	273	---
TOTAL	6423	3773	3764	3637	3292	3494	3438	28546	46310	12769	7555	7317
MEAN	207	126	121	117	114	113	115	921	1544	412	244	244
MAX	227	128	123	118	116	117	310	2480	2370	939	342	273
MIN	128	124	118	116	111	111	90	114	1050	234	130	200
AC-FT	12740	7480	7470	7210	6530	6930	6820	56620	91860	25330	14990	14510

CAL YR 1983 TOTAL 81276 MEAN 223 MAX 1920 MIN 98 AC-FT 161200  
WTR YR 1984 TOTAL 130318 MEAN 356 MAX 2480 MIN 90 AC-FT 258500

## PEND OREILLE RIVER BASIN

12344000 BITTERROOT RIVER NEAR DARBY, MT

LOCATION.--Lat 45°58'20", long 114°08'26", in SW¼SE¼NE¼ sec.36, T.3 N., R.21 W., Ravalli County, Hydrologic Unit 17010205, on left bank 45 ft downstream from bridge on U.S. Highway 93, 0.3 mi downstream from Chaffin Creek, 4.1 mi southeast of Darby, and at mile 77.2.

DRAINAGE AREA.--1,049 mi<sup>2</sup>.

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 3,943.14 ft National Geodetic Vertical Datum of 1929. Prior to Aug. 2, 1939, nonrecording gage at highway bridge 45 ft upstream at same datum.

REMARKS.--Records good except those for December to January, which are fair. Some regulation by Painted Rocks Lake (station number 12342000). Diversions for irrigation of about 5,000 acres above station. Ditch bypassing station irrigates about 500 acres below. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--47 years, 934 ft<sup>3</sup>/s, 676,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,500 ft<sup>3</sup>/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<sup>3</sup>/s Feb. 9, 1939; minimum gage height, 0.04 ft Nov. 21, 1979, result of freezeup and regulation.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,560 ft<sup>3</sup>/s May 31, gage height, 6.26 ft; minimum daily, 140 ft<sup>3</sup>/s Dec. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	445	348	220	220	327	299	409	718	5900	3170	677	742
2	445	357	220	250	321	306	580	735	5040	2970	665	604
3	440	356	270	280	324	300	570	746	4540	2860	632	538
4	440	344	280	330	318	292	396	724	4280	2620	600	511
5	456	373	258	412	311	274	420	736	4490	2550	578	495
6	445	370	293	587	312	289	479	722	4270	2440	556	515
7	440	436	297	638	321	289	461	705	4090	2290	529	539
8	446	417	321	595	315	299	479	737	3780	2050	492	524
9	511	382	323	495	312	321	480	950	3490	1860	458	596
10	515	377	340	458	318	349	469	1130	3380	1720	429	531
11	477	379	328	444	312	368	456	1180	3650	1620	444	504
12	450	400	322	421	313	373	440	1500	3910	1590	632	488
13	450	394	316	390	375	367	428	2190	4120	1540	631	474
14	469	384	317	303	388	392	428	3120	4360	1360	613	465
15	449	374	316	270	340	388	513	5430	4610	1250	606	464
16	442	368	283	230	340	397	811	6080	5060	1150	586	463
17	441	366	220	200	333	388	1360	4910	5250	1090	429	458
18	443	363	190	190	317	370	1540	4200	4900	1080	427	451
19	436	355	190	220	284	365	1630	4060	4900	1090	519	439
20	435	357	190	270	305	420	1540	4840	5360	1010	506	450
21	433	338	170	310	324	544	1300	4940	6000	907	496	538
22	433	280	160	349	312	532	1220	4410	5210	837	490	501
23	453	258	150	367	298	498	1280	4450	4440	820	487	496
24	442	360	140	355	303	521	1170	4370	4350	818	478	492
25	435	363	160	420	294	487	1060	3900	4600	819	471	478
26	430	345	180	397	294	470	972	3660	4720	788	462	485
27	421	340	170	372	283	450	875	3570	4600	834	456	490
28	404	334	160	363	296	430	806	3510	4320	792	444	474
29	361	293	160	351	297	420	777	3900	4220	819	438	463
30	355	229	170	337	---	409	728	5510	3830	808	439	460
31	351	---	190	330	---	403	---	7060	---	708	598	---
TOTAL	13593	10640	7304	11154	9187	12010	24077	94693	135670	46260	16268	15128
MEAN	438	355	236	360	317	387	803	3055	4522	1492	525	504
MAX	515	436	340	638	388	544	1630	7060	6000	3170	677	742
MIN	351	229	140	190	283	274	396	705	3380	708	427	439
AC-FT	26960	21100	14490	22120	18220	23820	47760	187800	269100	91760	32270	30010
CAL YR 1983	TOTAL	267381	MEAN	733	MAX	5720	MIN	140	AC-FT	530400		
WTR YR 1984	TOTAL	395984	MEAN	1082	MAX	7060	MIN	140	AC-FT	785400		

PEND OREILLE RIVER BASIN

79

12353000 CLARK FORK BELOW MISSOULA, MT

LOCATION.--Lat 46°52'09", long 114°07'33", in NW¼NE¼SE¼ 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 mile 349.5.

DRAINAGE AREA.--9,003 mi<sup>2</sup>.

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 National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--Water-discharge records excellent except those for December to January, which are fair. Some diurnal fluctuation at low flow caused by powerplant at Milltown 14.9 mi upstream. Diversions for irrigation of about 235,000 acres above station.

AVERAGE DISCHARGE.--55 years, 5,547 ft<sup>3</sup>/s, 4,019,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 52,800 ft<sup>3</sup>/s May 23, 1948, gage height, 12.08 ft; minimum, 388 ft<sup>3</sup>/s Jan. 18, 1933; minimum gage height, 0.30 ft about Jan. 16, 1954, Mar. 24, 1964.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 28,800 ft<sup>3</sup>/s June 1, gage height, 8.72 ft; minimum daily, 900 ft<sup>3</sup>/s Dec. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3440	3400	2130	1700	3270	2520	3450	6130	28100	16000	3720	3110
2	3560	3360	2120	1900	3190	2530	3410	5880	23800	13900	3670	3510
3	3610	3320	2560	2100	3090	2630	3370	5760	20300	12700	3620	3390
4	3500	3430	2750	2300	3040	2610	3340	5650	18600	11700	3510	3160
5	3500	3600	2620	2500	2970	2550	3300	5460	18400	11000	3420	3000
6	3620	3700	2530	3500	2900	2470	3390	5280	18800	10500	3390	2920
7	3440	3920	2520	8000	2900	2450	3610	5100	18100	9930	3250	2960
8	3380	4140	2610	7000	2880	2510	3700	4890	17000	9160	3120	3090
9	3450	3900	2980	5800	2730	2600	3780	4880	15600	8420	2990	3230
10	3730	3710	3070	4900	2590	2780	3830	5330	14500	7770	2880	3490
11	3910	3730	3180	4500	2910	2910	3800	5750	14200	7230	2780	3370
12	3900	3870	3080	4200	2790	3010	3740	6020	16400	6820	2770	3240
13	3660	3880	2980	3900	2920	3040	3670	7280	17400	6530	2960	3150
14	3680	3790	3020	3000	2980	3230	3590	9610	18800	6200	2970	3100
15	3660	3700	2990	2400	3130	3650	3570	15100	20100	5830	2920	3120
16	3770	3610	2910	2200	2890	3620	3900	21400	21500	5480	2880	3160
17	3720	3590	2410	2000	2860	3540	5040	23000	22600	5220	2870	3110
18	3620	3580	1600	1800	2780	3480	6860	20500	22100	4950	2830	3010
19	3680	3530	1400	1700	2670	3360	8290	18900	20700	4800	2770	2910
20	3610	3470	1200	1800	2590	3270	10000	19900	20300	4440	2720	2910
21	3550	3450	1100	1900	2650	3510	10500	23100	22800	4440	2670	3280
22	3520	3300	1000	2300	2690	3850	9820	21500	27700	4210	2610	3770
23	3540	3030	950	2900	2620	3850	9650	19300	25000	4040	2550	3840
24	3650	3140	900	3100	2550	3820	9720	19900	21800	3950	2550	3850
25	3680	3320	1000	3300	2560	3840	8950	18600	20700	3880	2540	3820
26	3580	3360	1100	3700	2550	3860	8200	16700	21100	3760	2530	3790
27	3510	3330	1300	4100	2490	3810	7710	15800	20800	3700	2450	3800
28	3450	3290	1400	4190	2450	3740	7230	15200	20300	3760	2390	3820
29	3420	3200	1200	4030	2500	3660	6820	15000	19100	3820	2320	3800
30	3370	2730	1300	3720	---	3590	6440	17200	18100	4060	2270	3740
31	3350	---	1500	3420	---	3510	---	24000	---	3980	2470	---
TOTAL	111060	105380	63410	103860	81140	99800	172680	408120	604700	212180	89390	100450
MEAN	3583	3513	2045	3350	2798	3219	5756	13170	20160	6845	2884	3348
MAX	3910	4140	3180	8000	3270	3860	10500	24000	28100	16000	3720	3850
MIN	3350	2730	900	1700	2450	2450	3300	4880	14200	3700	2270	2910
AC-FT	220300	209000	125800	206000	160900	198000	342500	809500	1199000	420900	177300	199200
CAL YR 1983	TOTAL	1849070	MEAN	5066	MAX	28000	MIN	900	AC-FT	3668000		
WTR YR 1984	TOTAL	2152170	MEAN	5880	MAX	28100	MIN	900	AC-FT	4269000		



## PEND OREILLE RIVER BASIN

12353000 CLARK FORK BELOW MISSOULA, MT--Continued  
(National Stream Quality Accounting Network)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1977 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	STREAM-FLOW, INSTAN- TANEOUS (CFS) (00061)	CLOUD COVER (PER- CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)
NOV 02...	1100	--	3330	99	3	262	8.0	10.0	8.5	682
DEC 20...	1430	1200	--	0	0	259	8.0	-15.0	.0	686
MAR 15...	1100	--	3620	95	3	246	8.4	7.0	5.0	681
MAY 01...	1300	--	6160	50	1	212	8.3	12.5	10.0	680
JUN 07...	1300	--	18000	85	61	137	8.2	13.5	9.0	681
SEP 18...	1330	--	3020	0	0	250	8.5	20.0	14.0	690
DATE	TUR- BID- ITY (NTU) (00076)	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- TOCOCCHI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCAR- BONATE (MG/L AS CACO3) (00902)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	
NOV 02...	.90	10.4	99	30	160	120	12	34	8.8	
DEC 20...	1.8	11.7	89	K4	21	--	--	--	5.3	
MAR 15...	4.4	10.7	94	K620	400	110	9	31	8.0	
MAY 01...	5.1	9.9	98	270	180	95	9	26	7.2	
JUN 07...	6.2	8.9	86	84	K45	65	6	18	4.9	
SEP 18...	1.6	10.8	116	K2	K3	120	15	35	8.8	
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, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	
NOV 02...	6.7	.3	1.8	109	26	2.3	.20	12	159	
DEC 20...	14	--	2.8	--	28	--	.70	17	164	
MAR 15...	6.6	.3	1.9	102	25	2.3	.20	13	152	
MAY 01...	4.9	.2	1.4	86	21	1.6	.20	12	139	
JUN 07...	3.1	.2	.90	59	12	.80	<.10	1.4	83	
SEP 18...	6.9	.3	2.3	109	22	2.3	.20	13	159	

## PEND OREILLE RIVER BASIN

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12353000 CLARK FORK BELOW MISSOULA, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	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 02...	160	.22	1430	<.10	.210	.60	.030	.040	.010
DEC 20...	--	.22	531	.21	.280	.30	.010	<.010	.010
MAR 15...	150	.21	1490	<.10	.050	.40	.020	<.010	.020
MAY 01...	130	.19	2310	<.10	.050	.40	.030	.030	.020
JUN 07...	77	.11	4030	<.10	.030	.40	.040	.040	.040
SEP 18...	160	.22	1300	<.10	.020	.40	.010	.010	.030

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 02...	1100	<10	2	94	<.5	<1	<1	<3	5	11	3
MAR 15...	1100	10	2	90	<.5	<1	<1	<3	2	15	<1
JUN 07...	1300	30	2	48	<1	<1	<1	<3	3	<3	3
SEP 18...	1330	20	3	110	<1	<1	1	<3	6	12	5

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 02...	15	7	<.1	<10	4	<1	<1	140	<6	9
MAR 15...	8	9	<.1	<10	<1	<1	<1	140	<6	12
JUN 07...	50	52	<.1	<10	4	<1	<1	--	<6	9
SEP 18...	13	4	<.1	<10	<1	<1	<1	130	<6	<3

SUSPENDED-SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	TEMPER- ATURE (DEG C) (00010)	DIS- CHARGE, IN CUBIC FEET PER SECOND (00060)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 02...	1100	8.5	--	3330	5	45	83
DEC 20...	1430	.0	1200	--	6	19	95
MAR 15...	1100	5.0	--	3620	19	186	70
MAY 01...	1300	10.0	--	6160	13	216	76
JUN 07...	1300	9.0	--	18000	37	1800	65
SEP 18...	1330	14.0	--	3020	5	41	79

## PEND OREILLE RIVER BASIN

12353000 CLARK FORK BELOW MISSOULA, MT--Continued

ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	DIS- CHARGE, IN CUBIC FEET PER SECOND (00060)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
NOV							
02...	1100	--	3330	3	262	10.0	8.5
DEC							
14...	0905	--	--	--	316	.5	1.5
20...	1430	1200	--	0	259	-15.0	.0
JAN							
25...	0920	--	3300	--	292	8.0	1.0
MAR							
15...	1100	--	3620	3	246	7.0	5.0
MAY							
01...	1300	--	6160	1	212	12.5	10.0
JUN							
07...	1300	--	18000	61	137	13.5	9.0
AUG							
29...	1435	--	2320	--	303	23.0	17.0
SEP							
18...	1330	--	3020	0	250	20.0	14.0

## PEND OREILLE RIVER BASIN

83

12353820 DRY CREEK NEAR SUPERIOR, MT

LOCATION.--Lat 47°13'17", long 114°58'19", in NW¼SE¼NE¼ sec.24, T.17 N., R.27 W., Mineral County, Hydrologic Unit 17010204, at bridge on county road 700 ft downstream from Murphy Creek, 0.5 mi upstream from mouth, and 4.3 mi northwest of Superior.

DRAINAGE AREA.--46.3 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1982 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 2,700 ft, from topographic map.

REMARKS.--Records fair except those for periods of flow below 5.0 ft<sup>3</sup>/s, which are poor. Upstream diversion may seriously affect low flow periods. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 506 ft<sup>3</sup>/s May 31, 1984, gage height, 3.86 ft; maximum gage height, 3.98 ft May 26, 1982, from outside gage; no flow on many days each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 506 ft<sup>3</sup>/s May 31, gage height, 3.86 ft; no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	248	68	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	196	61	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	167	57	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	155	51	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	152	47	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	144	43	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	135	37	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	1.0	131	32	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	2.0	120	28	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	3.2	109	25	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	2.8	107	23	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	6.9	113	21	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	5.4	128	19	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	9.3	140	16	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	80	157	14	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	68	172	11	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	55	158	9.6	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	55	138	7.9	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	72	128	6.2	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	159	125	5.1	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	145	161	3.9	.00	.00
22	.00	.00	.00	.00	.00	.00	4.0	120	135	3.0	.00	.00
23	.00	.00	.00	.00	.00	.00	1.0	132	116	2.0	.00	.00
24	.00	.00	.00	.00	.00	.00	3.0	124	112	1.0	.00	.00
25	.00	.00	.00	.00	.00	.00	2.0	110	117	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	106	117	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	119	113	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	119	104	.00	.00	.00
29	.00	.00	.00	.00	.00	.00	.00	143	98	.00	.00	.00
30	.00	.00	.00	.00	.00	.00	.00	265	82	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	384	---	.00	.00	---
TOTAL	.00	.00	.00	.00	.00	.00	10.00	2286.60	4078	591.70	.00	.00
MEAN	.000	.000	.000	.000	.000	.000	.33	73.8	136	19.1	.000	.000
MAX	.00	.00	.00	.00	.00	.00	4.0	384	248	68	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	82	.00	.00	.00
CFSM	.000	.000	.000	.000	.000	.000	.007	1.59	2.94	.41	.000	.000
IN.	.00	.00	.00	.00	.00	.00	.01	1.84	3.28	.48	.00	.00
AC-FT	.00	.00	.00	.00	.00	.00	20	4540	8090	1170	.00	.00

CAL YR 1983 TOTAL 7001.41 MEAN 19.2 MAX 291 MIN .00 CFSM .42 IN 5.63 AC-FT 13890  
WTR YR 1984 TOTAL 6966.30 MEAN 19.0 MAX 384 MIN .00 CFSM .41 IN 5.60 AC-FT 13820



## PEND OREILLE RIVER BASIN

12354500 CLARK FORK AT ST. REGIS, MT

LOCATION.--Lat 47°18'07", long 115°05'11", in NW¼SE¼SW¼ 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 mile 270.3.

DRAINAGE AREA.--10,709 mi<sup>2</sup>.

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).

GAGE.--Water-stage recorder. Datum of gage is 2,600.37 ft 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.--Records excellent. Diversions for irrigation of about 244,000 acres above station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--74 years, 7,580 ft<sup>3</sup>/s, 5,492,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 68,900 ft<sup>3</sup>/s May 24, 1948, gage height, 19.96 ft, from graph based on gage readings; minimum, 870 ft<sup>3</sup>/s Jan. 10, 1980, gage height, 3.48 ft; minimum gage height, 3.36 ft Dec. 17, 1940.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 34,900 ft<sup>3</sup>/s June 1, gage height, 14.60 ft; minimum, 971 ft<sup>3</sup>/s Dec. 22, gage height, 3.61 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	3810	3950	3190	2100	4400	3250	4520	8050	34100	20200	4630	3270		
2	4030	3980	2900	2300	4240	3290	4460	7830	32100	17600	4450	3740		
3	4090	3970	3060	2500	4130	3310	4400	7650	27000	15800	4420	4020		
4	4130	4060	3310	2700	4000	3360	4390	7470	24200	14500	4330	3900		
5	4020	4190	3380	3000	3930	3340	4400	7290	23100	13500	4280	3720		
6	4070	4360	3320	4000	3840	3280	4450	7050	23300	12800	4230	3630		
7	4140	4640	3140	6000	3780	3210	4580	6820	22900	12200	4140	3600		
8	3970	4760	3320	9180	3770	3230	4810	6650	21900	11400	3980	3620		
9	3970	4810	3370	7770	3710	3310	4910	6680	20400	10500	3850	3730		
10	4060	4600	3690	6610	3580	3460	5000	6920	18800	9710	3740	3870		
11	4270	4650	3770	5900	3500	3680	5030	7410	17900	9040	3630	4030		
12	4430	4810	3810	5490	3690	3850	4960	7920	18800	8440	3550	3910		
13	4350	4860	3720	5190	3660	4000	4900	8670	21200	8020	3520	3810		
14	4240	4780	3630	4620	3830	4100	4820	11100	22300	7680	3680	3730		
15	4170	4650	3690	3970	3890	4350	4800	15600	24200	7260	3660	3680		
16	4230	4550	3610	3690	3880	4710	5050	23000	25700	6900	3610	3700		
17	4290	4510	3490	3270	3730	4640	6090	26800	27100	6550	3620	3700		
18	4260	4490	2840	2740	3650	4590	7950	25200	27200	6210	3580	3650		
19	4200	4440	2420	2270	3550	4500	9910	22900	25600	5940	3510	3560		
20	4230	4380	2090	2110	3480	4430	11800	24100	24400	5670	3430	3500		
21	4150	4300	1600	2430	3420	4480	13200	27300	26000	5390	3390	3570		
22	4110	4220	1240	2790	3450	4790	12800	27600	30300	5310	3330	3960		
23	4120	4050	1200	3650	3450	5030	12300	24900	31800	5080	3280	4410		
24	4150	3840	1200	4170	3390	5010	12200	24100	27500	4900	3230	4400		
25	4230	3960	1300	4910	3330	4970	11900	23900	25200	4800	3210	4390		
26	4210	4070	1400	5310	3320	4990	10800	21600	25000	4720	3190	4380		
27	4130	4070	1600	5590	3290	4940	9960	20500	25100	4630	3160	4370		
28	4070	4030	1700	5680	3240	4860	9420	19900	24400	4550	3070	4370		
29	4030	3960	1500	5390	3210	4770	8910	19600	23300	4560	3020	4360		
30	4000	3750	1600	5130	---	4680	8420	22000	21800	4630	2980	4340		
31	3960	---	1800	4710	---	4590	---	29000	---	4760	3030	---		
TOTAL	128120	129690	81890	135170	106340	129000	221140	505510	742600	263250	112730	116920		
MEAN	4133	4323	2642	4360	3667	4161	7371	16310	24750	8492	3636	3897		
MAX	4430	4860	3810	9180	4400	5030	13200	29000	34100	20200	4630	4410		
MIN	3810	3750	1200	2100	3210	3210	4390	6650	17900	4550	2980	3270		
CFSM	.39	.40	.25	.41	.34	.39	.69	1.52	2.31	.79	.34	.36		
IN.	.45	.45	.28	.47	.37	.45	.77	1.76	2.58	.91	.39	.41		
AC-FT	254100	257200	162400	268100	210900	255900	438600	1003000	1473000	522200	223600	231900		
CAL YR 1983	TOTAL	2370050	MEAN	6493	MAX	36100	MIN	1200	CFSM	.61	IN	8.23	AC-FT	4701000
WTR YR 1984	TOTAL	2672360	MEAN	7302	MAX	34100	MIN	1200	CFSM	.68	IN	9.28	AC-FT	5301000

## 12355000 FLATHEAD RIVER AT FLATHEAD, BRITISH COLUMBIA

(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 mile 216.6.

DRAINAGE AREA.--427 mi<sup>2</sup>.

## 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 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.--Water-discharge records good.

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

AVERAGE DISCHARGE.--33 years (1951-84), 940 ft<sup>3</sup>/s, 29.89 in/yr, 681,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,300 ft<sup>3</sup>/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<sup>3</sup>/s on basis of slope-area measurement of peak flow; minimum daily, 62 ft<sup>3</sup>/s Jan. 2, 1977, but may have been less during periods of no winter record.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,250 ft<sup>3</sup>/s May 31, gage height, 5.28 ft; minimum daily, 134 ft<sup>3</sup>/s Dec. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	239	274	189	240	293	178	194	815	3880	1520	419	251
2	233	288	191	283	272	175	195	849	2820	1390	413	243
3	231	304	192	318	265	174	201	877	2630	1310	404	237
4	226	996	201	367	258	175	208	839	2620	1200	394	235
5	225	1030	196	491	233	176	232	820	2720	1150	385	227
6	223	802	195	533	215	175	266	811	3060	1110	391	244
7	215	749	194	509	208	172	271	808	3030	1060	396	252
8	211	618	207	456	203	173	281	845	3220	994	379	253
9	210	540	218	399	201	173	301	950	3210	950	372	283
10	208	501	219	357	198	178	294	1030	2670	908	363	374
11	209	480	221	339	194	185	298	1010	2580	875	352	340
12	207	445	224	304	191	191	285	1060	2570	833	346	319
13	206	427	224	283	194	190	282	1130	2780	790	347	311
14	203	417	217	277	203	187	303	1540	3050	755	338	303
15	202	396	208	275	201	186	360	2680	3660	714	329	293
16	202	385	191	272	191	185	545	3460	3890	677	315	275
17	203	388	171	267	180	184	999	2810	3550	649	305	259
18	211	374	158	261	173	186	1360	2400	3070	616	293	251
19	206	360	149	254	173	185	1440	2570	2780	592	298	241
20	205	345	145	265	175	189	1450	3890	2550	566	292	264
21	202	333	142	279	180	197	1460	3410	2620	549	286	315
22	216	314	144	297	187	212	1620	2650	2550	525	276	346
23	300	301	138	318	187	211	1610	2590	2120	514	270	337
24	298	301	134	346	186	211	1420	2620	2100	498	269	315
25	269	293	159	374	184	207	1260	2410	2230	478	269	301
26	253	288	180	360	184	208	1120	2240	2230	465	261	293
27	236	286	182	350	180	203	1020	2220	2180	461	254	282
28	225	280	170	328	179	200	933	2480	2030	460	250	267
29	215	265	187	353	181	201	855	3130	1880	440	251	266
30	213	203	201	367	---	199	832	4710	1740	466	251	258
31	229	---	215	350	---	198	---	5590	---	445	256	---
TOTAL	6931	12983	5762	10472	5869	5864	21895	65244	82020	23960	10024	8435
MEAN	224	433	186	338	202	189	730	2105	2734	773	323	281
MAX	300	1030	224	533	293	212	1620	5590	3890	1520	419	374
MIN	202	203	134	240	173	172	194	808	1740	440	250	227
CFSM	.53	1.01	.44	.79	.47	.44	1.71	4.93	6.40	1.81	.76	.66
IN.	.60	1.13	.50	.91	.51	.51	1.91	5.68	7.15	2.09	.87	.73
AC-FT	13750	25750	11430	20770	11640	11630	43430	129400	162700	47520	19880	16730

CAL YR 1983	TOTAL	308520	MEAN	845	MAX	7380	MIN	109	CFSM	1.98	IN	26.88	AC-FT	611900
WTR YR 1984	TOTAL	259459	MEAN	709	MAX	5590	MIN	134	CFSM	1.66	IN	22.60	AC-FT	514600

## PEND OREILLE RIVER BASIN

12355000 FLATHEAD RIVER AT FLATHEAD, BRITISH COLUMBIA--Continued  
(National Stream Quality Accounting Network)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1949-50, 1965, 1970, 1975 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: November 1974 to current year.

INSTRUMENTATION.--Temperature recorder since Oct. 1, 1975.

REMARKS.--Missing record for periods Nov. 3 to Dec. 12 and Jan. 4 to Mar. 20 due to recorder malfunction and battery failure, respectively. Probably many days of 0.0°C temperatures during those periods.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Maximum (water years 1975-80, 1982-84), 19.5°C Aug. 2, 1977; minimum, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum, 18.0°C July 25, Aug. 9; minimum, 0.0°C on many days during December and January.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	CLOUD COVER (PER- CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
DEC 13...	1200	224	100	2	251	7.8	-5.0	.0	655	.10	11.6	92
MAR 21...	1130	196	100	61	249	8.1	3.5	3.0	647	1.9	11.6	102
MAY 30...	1000	4830	95	65	156	8.0	16.0	5.5	652	50	10.8	100
SEP 06...	1100	224	100	68	264	8.4	6.0	10.0	650	.50	9.7	101
DATE	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCAR- BONATE (MG/L CACO3) (00902)	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)
DEC 13...	<1	44	140	5	42	8.9	1.0	.0	.30	137	5.8	.40
MAR 21...	<1	K19	140	0	42	9.2	1.0	.0	.30	143	6.1	.40
MAY 30...	120	120	91	12	27	5.7	.70	.0	.50	79	5.2	.50
SEP 06...	K20	30	160	22	49	9.4	.90	.0	.90	139	5.0	.20
DATE	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, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	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)
DEC 13...	<.10	4.3	139	140	.19	84	<.10	.010	.30	<.005	<.005	<.002
MAR 21...	<.10	4.3	148	150	.20	78	<.10	.030	<.20	<.005	<.005	<.001
MAY 30...	<.10	4.2	114	91	.16	1490	<.10	.010	.20	.247	.006	.004
SEP 06...	.10	4.7	136	150	.19	82	<.10	<.010	<.20	--	<.005	<.002

PEND OREILLE RIVER BASIN

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12355000 FLATHEAD RIVER AT FLATHEAD, BRITISH COLUMBIA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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)
DEC 13...	1200	<10	<1	53	<.5	<1	<1	<3	2	<3	<1
MAR 21...	1130	<10	<1	56	.6	<1	<1	<3	<1	<3	3
MAY 30...	1000	40	<1	38	<1	<1	<1	<3	2	26	<1
SEP 06...	1100	10	<1	67	<.5	<1	1	<3	<1	12	<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)
DEC 13...	8	<1	<.1	<10	5	<1	<1	57	<6	<3
MAR 21...	5	2	<.1	<10	<1	<1	<1	58	<6	18
MAY 30...	6	4	<.1	<10	<1	<1	<1	39	<6	3
SEP 06...	5	7	<.1	<10	<1	<1	<1	63	<6	60

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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



TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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

PEND OREILLE RIVER BASIN

89

12355000 FLATHEAD RIVER AT FLATHEAD, BRITISH COLUMBIA--Continued

SUSPENDED-SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	TEMPER- ATURE (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	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 13...	1200	.0	224	4	2.4	81
MAR 21...	1130	3.0	196	9	4.8	85
MAY 30...	1000	5.5	4830	--	--	65
SEP 06...	1100	10.0	224	2	1.2	91

LOCATION.--Lat 48°29'44", long 114°07'36", in NE1/4SW1/4 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 mile 162.1.

WATER-DISCHARGE RECORDS

GAGE.--Water-stage recorder. Datum of gage is 3,145.59 ft 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.

AVERAGE DISCHARGE.--53 years (1910-12, 1913-15, 1935-84), 2,979 ft<sup>3</sup>/s, 26.13 in/yr, 2,158,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 69,100 ft<sup>3</sup>/s June 9, 1964, gage height, 18.60 ft, from flood-mark, from rating curve extended above 37,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; minimum, 198 ft<sup>3</sup>/s Jan. 8, 1953, gage height, 0.86 ft, site and datum then in use.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 15,400 ft<sup>3</sup>/s May 31, gage height, 8.42 ft; minimum daily, 300 ft<sup>3</sup>/s Dec. 24.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	880	829	730	470	1090	683	942	2900	13000	6810	2150	952
2	872	889	700	500	1080	675	942	2930	9910	5870	2100	933
3	863	916	800	540	1040	668	952	3010	8520	5420	2000	898
4	854	1130	840	600	998	657	979	2880	8030	5170	1950	880
5	846	2240	810	840	952	638	1080	2810	8030	4850	1900	854
6	837	2170	780	1300	933	645	1290	2770	8490	4830	1850	880
7	829	2290	770	1600	933	645	1370	3010	8650	4730	1800	1010
8	820	2150	750	1800	924	645	1380	2870	8760	4430	1750	1040
9	812	1960	770	1600	916	660	1510	3000	9150	4080	1720	1120
10	803	1830	820	1500	907	683	1530	3190	8350	3810	1700	1230
11	795	1860	800	1400	889	722	1510	3240	7720	3610	1650	1330
12	787	1860	760	1300	889	787	1460	3500	7480	3500	1600	1310
13	778	1770	740	1200	880	820	1420	3810	7770	3430	1550	1310
14	770	1670	720	1000	872	846	1390	4410	8710	3310	1510	1280
15	762	1610	700	880	863	812	1520	6540	10100	3160	1430	1220
16	754	1540	630	900	846	795	1960	8710	11300	3030	1370	1170
17	754	1510	450	920	820	795	3030	8760	11600	2920	1320	1120
18	762	1510	320	940	754	795	4670	7740	10600	2840	1310	1070
19	770	1450	350	960	714	795	5640	7360	9580	2770	1320	1040
20	754	1400	370	980	762	795	5980	8930	8870	2700	1250	1060
21	754	1330	380	1000	795	863	5800	10000	9150	2580	1210	1260
22	754	1240	350	1040	795	988	5690	8570	9820	2490	1170	1430
23	803	1200	320	1080	778	1040	5710	7740	8460	2360	1130	1440
24	898	1180	300	1120	754	1040	5230	7770	7790	2230	1100	1360
25	898	1160	320	1160	738	1040	4650	7230	8140	2130	1060	1310
26	863	1120	370	1200	738	1030	4260	6740	8650	2090	1030	1250
27	837	1090	400	1250	722	1010	3810	6470	8710	2400	988	1190
28	820	1050	380	1300	691	979	3480	6470	8710	2350	952	1140
29	812	1020	370	1330	675	970	3210	7110	8270	2300	933	1100
30	803	889	400	1260	---	961	3030	9990	7790	2250	916	1070
31	803	---	430	1170	---	952	---	14500	---	2200	924	---
TOTAL	25147	43863	17630	34140	24748	25434	85425	184960	270110	106650	44643	34257
MEAN	811	1462	569	1101	853	820	2848	5966	9004	3440	1440	1142
MAX	898	2290	840	1800	1090	1040	5980	14500	13000	6810	2150	1440
MIN	754	829	300	470	675	638	942	2770	7480	2090	916	854
CFSM	.52	.94	.37	.71	.55	.53	1.84	3.85	5.82	2.22	.93	.74
IN.	.60	1.05	.42	.82	.59	.61	2.05	4.44	6.49	2.56	1.07	.82
AC-FT	49880	87000	34970	67720	49090	50450	169400	366900	535800	211500	88550	67950
CAL YR 1983	TOTAL	1021937	MEAN	2800	MAX	19000	MIN	300	CFSM	1.81	IN	24.56
WTR YR 1984	TOTAL	897007	MEAN	2451	MAX	14500	MIN	300	CFSM	1.58	IN	21.56
									AC-FT		2027000	1779000

PEND OREILLE RIVER BASIN

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12355500 NORTH FORK FLATHEAD RIVER NEAR COLUMBIA FALLS, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950, 1970, 1976 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: October 1975 to current year.

INSTRUMENTATION.--Temperature recorder since Oct. 1, 1975.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Maximum, 19.0°C July 22, 23, 1977; minimum, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum, 18.5°C July 26; minimum, 0.0°C on many days during December to February.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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



TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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

PEND OREILLE RIVER BASIN

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12355500 NORTH FORK FLATHEAD RIVER NEAR COLUMBIA FALLS, MT--Continued

ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
OCT 04...	0900	867	50	8.0	7.5
DEC 05...	1015	811	208	-10.0	.5
JAN 23...	0830	1070	192	-15.0	.0
MAR 08...	0930	625	202	-2.0	2.5
APR 25...	0830	4530	156	.0	3.0
JUN 01...	1500	12200	139	15.0	6.5
27...	0930	8750	131	15.0	11.0
AUG 22...	1130	1160	179	20.0	14.0

## PEND OREILLE RIVER BASIN

12358500 MIDDLE FORK FLATHEAD RIVER NEAR WEST GLACIER, MT

LOCATION.--Lat 48°29'43", long 114°00'33", in S<sup>1</sup>SW<sup>1</sup>NE<sup>1</sup> 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 mile 3.8.

DRAINAGE AREA.--1,128 mi<sup>2</sup>.

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 National Geodetic Vertical Datum of 1929. Prior to Nov. 22, 1950, nonrecording gage at present site and datum.

REMARKS.--Records good. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--45 years, 2,924 ft<sup>3</sup>/s, 35.20 in/yr, 2,118,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 140,000 ft<sup>3</sup>/s June 9, 1964, gage height, 36.46 ft, from floodmarks, from rating curve extended above 31,000 ft<sup>3</sup>/s, on basis of contracted opening measurement at gage height, 19.42 ft and flood volume-hydrographic comparison; minimum, less than 173 ft<sup>3</sup>/s Nov. 27, 1952 (stage below intake pipe).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 18,200 ft<sup>3</sup>/s May 31, gage height, 7.98 ft; minimum daily, 280 ft<sup>3</sup>/s Dec. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	658	696	677	500	1070	594	746	2600	13000	6730	1870	798
2	639	706	639	530	1050	594	746	2580	9450	5980	1770	777
3	630	716	766	560	1000	585	746	2560	8180	5860	1730	736
4	658	953	798	620	953	577	766	2500	7830	5600	1670	706
5	687	1430	777	1000	930	559	819	2440	7950	5430	1600	677
6	677	1490	756	1700	885	551	930	2320	8110	5510	1550	746
7	658	1960	736	2000	873	551	989	2280	7950	5100	1510	907
8	649	1900	716	2300	851	551	1060	2220	7830	4590	1420	942
9	658	1730	736	2140	830	551	1130	2540	7580	4210	1360	1230
10	696	1600	787	1940	819	568	1180	3300	7020	3960	1320	1620
11	726	1600	777	1820	808	612	1210	3350	6860	3840	1300	1510
12	716	1680	736	1670	798	677	1180	3530	7110	3820	1250	1340
13	706	1650	716	1520	798	696	1150	3910	7480	3750	1210	1230
14	696	1590	706	1270	798	716	1110	4910	8270	3510	1180	1130
15	687	1510	677	1140	777	696	1180	7800	9690	3280	1130	1060
16	677	1450	677	1190	756	677	1600	9420	11100	3190	1100	1010
17	667	1430	526	1220	726	667	3320	8440	11200	3120	1090	977
18	687	1390	310	1190	716	667	5150	7450	9890	3100	1090	965
19	677	1340	330	1150	687	658	5980	7450	9150	2990	1070	942
20	658	1300	350	1130	687	658	6550	11000	8890	2860	1030	953
21	649	1230	330	1130	706	687	6180	11500	10100	2690	989	1400
22	658	1150	300	1100	706	736	5630	8990	11200	2460	942	1680
23	726	1090	290	1050	687	746	5540	8210	9190	2240	919	1550
24	777	1060	280	1040	658	766	5040	8700	8530	2100	919	1400
25	787	1050	300	1210	649	777	4460	7800	9150	2090	885	1320
26	777	1010	340	1270	649	777	3990	6920	9820	2100	851	1230
27	756	989	370	1150	630	766	3560	6640	9990	2240	819	1150
28	736	953	350	1180	603	766	3230	6550	9590	2200	808	1100
29	726	919	340	1250	594	777	2970	7260	8990	2140	787	1060
30	706	808	370	1180	---	777	2760	11100	8340	2120	766	1050
31	696	---	450	1110	---	756	---	16600	---	2010	766	---
TOTAL	21501	38380	16913	39260	22694	20736	80902	192870	269440	110820	36701	33196
MEAN	694	1279	546	1266	783	669	2697	6222	8981	3575	1184	1107
MAX	787	1960	798	2300	1070	777	6550	16600	13000	6730	1870	1680
MIN	630	696	280	500	594	551	746	2220	6860	2010	766	677
CFSM	.62	1.13	.48	1.12	.69	.59	2.39	5.52	7.96	3.17	1.05	.98
IN.	.71	1.27	.56	1.29	.75	.68	2.67	6.36	8.89	3.65	1.21	1.09
AC-FT	42650	76130	33550	77870	45010	41130	160500	382600	534400	219800	72800	65840
CAL YR 1983	TOTAL	909769	MEAN	2493	MAX	16700	MIN	280	CFSM	2.21	IN	30.00
WTR YR 1984	TOTAL	883413	MEAN	2414	MAX	16600	MIN	280	CFSM	2.14	IN	29.13
									AC-FT	1805000		1752000

LOCATION.--Lat 48°20'28", long 114°00'48", in NE¼NE¼NW¼ 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 mile 5.2.

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; 3,428,000 acre-ft between elevations 3,196 ft, lowest outlet, and 3,560 ft, controlled spillway elevation. Dead storage, 40,140 acre-ft below elevation 3,196 ft. Minimum operating level, 445,900 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.

COOPERATION.--Capacity table and daily elevations furnished 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, 3,436,000 acre-ft Aug. 14, 15, elevation, 3,560.32 ft; minimum, 2,057,000 acre-ft Apr. 10, elevation, 3,492.41 ft.

Capacity table (elevation, in feet, and contents, in acre-ft)

3,480	1,859,000	3,540	2,974,000
3,500	2,186,000	3,565	3,548,000
3,520	2,560,000		

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
INSTANTANEOUS OBSERVATIONS AT 2359

		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1		3546.13	3534.74	3536.07	3522.38	3517.21	3501.08	3493.11	3501.31	3523.42	3552.91	3559.96	3553.47
2		3545.61	3534.63	3535.87	3522.21	3517.09	3500.06	3493.04	3500.64	3524.60	3553.34	3559.86	3553.17
3		3545.08	3534.49	3535.70	3521.94	3516.80	3498.93	3493.00	3500.00	3525.66	3553.84	3559.88	3553.03
4		3544.69	3534.44	3535.54	3521.83	3516.74	3497.87	3492.93	3499.64	3526.70	3554.30	3559.95	3552.49
5		3543.94	3534.50	3535.44	3521.80	3516.66	3496.86	3492.91	3499.96	3527.79	3554.86	3560.04	3551.88
6		3543.16	3534.68	3535.28	3522.02	3516.57	3496.14	3492.55	3500.24	3528.83	3555.32	3560.09	3551.22
7		3542.43	3534.84	3535.11	3522.34	3516.10	3495.82	3492.47	3500.36	3529.87	3555.73	3560.15	3550.49
8		3541.62	3534.99	3535.05	3522.64	3515.23	3495.53	3492.53	3500.69	3530.76	3556.08	3560.19	3550.32
9		3540.96	3535.11	3534.94	3522.90	3514.30	3495.37	3492.59	3500.38	3531.60	3556.44	3560.25	3550.09
10		3540.23	3535.25	3534.84	3523.14	3513.39	3495.23	3492.41	3500.49	3532.42	3556.76	3560.29	3549.87
11		3539.50	3535.49	3534.73	3523.35	3512.48	3495.10	3492.45	3500.61	3533.21	3557.04	3560.32	3549.62
12		3538.72	3535.64	3534.62	3523.54	3511.60	3495.02	3492.48	3501.10	3534.08	3557.30	3560.28	3549.34
13		3537.91	3535.84	3534.47	3523.64	3511.10	3494.92	3492.50	3501.65	3535.00	3557.58	3560.31	3549.00
14		3537.18	3536.04	3534.33	3523.64	3510.86	3494.79	3492.50	3501.91	3536.00	3557.84	3560.32	3548.66
15		3537.04	3536.15	3534.19	3523.58	3510.60	3494.66	3492.56	3502.58	3537.18	3558.06	3560.32	3548.41
16		3536.89	3536.30	3534.03	3523.28	3510.36	3494.47	3492.83	3503.84	3538.61	3558.22	3560.30	3547.87
17		3536.75	3536.38	3533.82	3522.45	3510.23	3494.32	3493.58	3504.81	3539.92	3558.41	3560.25	3547.14
18		3536.63	3536.49	3533.55	3521.77	3510.15	3494.21	3494.55	3505.60	3541.04	3558.62	3560.22	3546.58
19		3536.48	3536.57	3532.95	3521.46	3510.03	3494.12	3495.64	3506.80	3542.03	3558.80	3560.18	3546.03
20		3536.35	3536.64	3532.10	3520.84	3509.92	3493.79	3496.87	3508.52	3543.06	3558.97	3560.14	3545.98
21		3536.20	3536.67	3531.24	3520.07	3509.80	3493.72	3497.88	3509.80	3544.34	3559.11	3559.86	3545.92
22		3536.12	3536.66	3530.41	3519.22	3509.25	3493.62	3498.75	3510.80	3545.64	3559.25	3559.36	3545.85
23		3536.96	3536.67	3529.54	3518.43	3508.25	3493.52	3499.71	3512.04	3546.70	3559.40	3558.70	3545.82
24		3535.82	3536.37	3528.65	3517.60	3507.24	3493.49	3500.25	3513.10	3547.69	3559.54	3558.02	3545.72
25		3535.72	3536.65	3527.78	3517.30	3506.26	3493.48	3500.73	3513.87	3548.59	3559.66	3557.66	3545.55
26		3535.60	3536.59	3526.91	3517.29	3505.26	3493.47	3501.08	3514.80	3549.53	3559.73	3557.35	3545.48
27		3535.45	3536.55	3526.10	3517.29	3504.24	3493.42	3501.44	3515.70	3550.32	3559.74	3556.63	3545.34
28		3535.32	3536.48	3525.22	3517.33	3503.18	3493.37	3501.85	3516.56	3550.94	3559.86	3555.86	3545.19
29		3535.17	3536.40	3524.31	3517.33	3502.12	3493.30	3502.21	3517.57	3551.52	3559.97	3555.16	3545.05
30		3535.03	3536.25	3523.40	3517.29	---	3493.21	3502.00	3519.43	3552.26	3559.98	3554.43	3544.92
31		3534.86	---	3522.56	3517.27	---	3493.16	---	3521.71	---	3559.99	3553.78	---
TOTAL		9699.55	6074.50	9488.75	9147.17	1823.02	8346.05	4869.40	8706.15	6149.31	10286.65	10330.11	6449.50
MEAN		3538.70	3535.82	3531.90	3520.88	3511.14	3495.03	3495.65	3506.66	3538.31	3557.63	3559.04	3548.32
MAX		3546.13	3536.67	3536.07	3523.64	3517.21	3501.08	3502.21	3521.71	3552.26	3559.99	3560.32	3553.47
MIN		3534.86	3534.44	3522.56	3517.27	3502.12	3493.16	3492.41	3499.64	3523.42	3552.91	3553.78	3544.92
CAL YR	1983	TOTAL	1292369.97		MEAN	3540.74	MAX	3561.00	MIN	3515.46			
WTR YR	1984	TOTAL	1291370.52		MEAN	3528.33	MAX	3560.32	MIN	3492.41			

†	2,864	2,894	2,611	2,507	2,223	2,070	2,221	2,594	3,248	3,428	3,283	3,081
††	-257,000	+30,000	-283,000	-104,000	-284,000	-153,000	+151,000	+373,000	+654,000	+180,000	-145,000	-202,000

CAL YR 1983	. . . . .	††	-613,000
WTR YR 1984	. . . . .	††	-40,000



## 12362500 SOUTH FORK FLATHEAD RIVER NEAR COLUMBIA FALLS, MT

LOCATION.--Lat 48°21'24", long 114°02'12", in SW¼SW¼ sec.16, T.30 N., R.19 W., Flathead County, Hydrologic Unit 17010209, on right bank 1.7 mi downstream from Hungry Horse Dam, 3.5 mi upstream from mouth, and 6.8 mi east of Columbia Falls and at mile 152.2.

DRAINAGE AREA.--1,663 mi<sup>2</sup>.

## 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. Datum of gage is 3,040 ft National Geodetic Vertical Datum of 1929 (levels by the U.S. Bureau of Reclamation). September 1910 to September 1916, nonrecording gage, and 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.

REMARKS.--Water-discharge records excellent. Flow regulated by Hungry Horse Reservoir since Sept. 21, 1951 (see preceding page).

AVERAGE DISCHARGE.--56 years (water years, 1929-84), 3,556 ft<sup>3</sup>/s, 29.04 in/yr, 2,576,000 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<sup>3</sup>/s June 19, 1916, gage height, 16.6 ft, site and datum then in use, from rating curve extended above 20,000 ft<sup>3</sup>/s; minimum observed, 7.3 ft<sup>3</sup>/s Sept. 24, 1951, gage height, 0.52 ft, dam closure, site and datum then in use; minimum daily, 7.3 ft<sup>3</sup>/s Sept. 24, 1951.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 10,200 ft<sup>3</sup>/s Apr. 6, gage height, 10.38 ft; minimum daily, 159 ft<sup>3</sup>/s Nov. 10.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6790	2380	2810	2810	1800	9860	1690	9090	225	248	1920	4890
2	6510	2370	3010	2400	2400	9860	1690	9250	209	1910	2980	4460
3	6910	2390	2830	4050	3870	10100	1710	9460	200	1050	1040	2290
4	5280	2400	2470	2450	1800	10100	1690	5190	202	211	195	6520
5	9300	666	2420	1910	1800	9200	1700	200	208	237	463	8010
6	9270	217	2410	723	1800	7170	4950	198	209	238	452	9220
7	9270	217	2410	228	5540	3650	2530	1450	227	237	163	9210
8	9260	217	2390	220	9570	2840	1640	522	220	233	2380	3900
9	8390	339	2390	220	9560	2250	1630	6320	233	227	262	3370
10	9330	159	2400	218	9540	2250	3840	3440	241	220	455	3900
11	9320	782	2390	205	9530	2250	1620	2770	218	242	660	3820
12	9310	334	2400	207	9530	2250	1640	178	262	232	712	4080
13	9300	252	2410	896	5880	2250	1650	185	276	222	1200	4690
14	9380	527	2400	1070	3410	2660	1650	5250	1600	218	723	4720
15	2470	521	2370	1770	3270	2580	1650	6040	1680	215	831	3660
16	2380	578	2410	4790	3380	2570	836	2000	1490	994	1190	6600
17	2380	617	2660	9310	1870	2450	272	2200	1510	224	1380	9090
18	2370	621	3230	7620	1870	2160	255	2770	1500	209	1220	7200
19	2360	710	7360	3780	1950	1950	265	236	1510	209	1230	6810
20	2370	946	9420	6760	2180	3830	446	260	1490	204	1210	2480
21	2370	946	9440	9360	2180	2260	262	2270	1510	203	3360	2320
22	2370	1140	9500	9360	5520	2140	259	2210	1520	190	6440	2320
23	2370	1260	9640	9360	9690	2150	256	274	480	189	9110	1430
24	2370	1440	9640	9380	9790	1850	1210	970	259	240	9100	1790
25	2370	1550	9640	5610	9800	1670	1570	2180	1830	246	4780	2520
26	2370	1640	9670	1800	9780	1670	1740	210	2460	1120	4640	2080
27	2370	1840	9690	1800	9860	1680	979	212	3960	2030	8640	2440
28	2380	1830	9690	1800	9910	1690	206	217	4740	197	8980	2340
29	2380	1830	9690	1800	9880	1690	206	226	4740	423	8950	2340
30	2380	2110	9690	1800	---	1970	6020	791	533	1770	9230	2340
31	2380	---	9700	1800	---	1700	---	252	---	1490	9220	---
TOTAL	158060	32829	168580	105507	166960	112700	46062	76821	35742	15878	103116	130840
MEAN	5099	1094	5438	3403	5757	3635	1535	2478	1191	512	3326	4361
MAX	9380	2400	9700	9380	9910	10100	6020	9460	4740	2030	9230	9220
MIN	2360	159	2370	205	1800	1670	206	178	200	189	163	1430
CFSM	3.07	.66	3.27	2.05	3.46	2.19	.92	1.49	.72	.31	2.00	2.62
IN.	3.54	.73	3.77	2.36	3.73	2.52	1.03	1.72	.80	.36	2.31	2.93
AC-FT	313500	65120	334400	209300	331200	223500	91360	152400	70890	31490	204500	259500
MEAN †	919	1599	836	1713	821	1147	4073	8545	12180	3440	986	966
CFSM †	0.55	0.96	0.50	1.03	0.49	0.69	2.45	5.14	7.32	2.07	0.58	0.58
IN †	0.64	1.07	0.58	1.19	0.53	0.79	2.73	5.92	8.17	2.38	0.67	0.65
AC-FT †	56500	95120	51400	105300	47200	70500	242400	525400	724900	211500	59500	57500

## OBSERVED

CAL YR 1983	TOTAL	1445242	MEAN	3960	MAX	9700	MIN	135	AC-FT	2867000
WTR YR 1984	TOTAL	1153095	MEAN	3151	MAX	10100	MIN	159	AC-FT	2287000

## ADJUSTED

CAL YR 1983	TOTAL	1136170	MEAN	3113	CFSM	1.87	IN	25.41	AC-FT	2254000
WTR YR 1984	TOTAL	1132926	MEAN	3095	CFSM	1.86	IN	25.34	AC-FT	2247000

† Adjusted for change in contents in Hungry Horse Reservoir.

PEND OREILLE RIVER BASIN

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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 TEMPERATURES: October 1964 to September 1968, March 1979 to current year.

INSTRUMENTATION.--Temperature recorder since Mar. 30, 1979.

REMARKS.--Missing record Jan. 22 to Mar. 8 due to battery failure. A lower than 2.0°C minimum temperature could have occurred during that period. Prior to March 1979, thermograph records furnished by Montana Department of Fish, Wildlife, and Parks.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Maximum, 19.0°C Aug. 9-11, 1966, Aug. 2-6, 1968; minimum (water years 1965-68, 1979-81, 1983-84), 2.0°C on many days during winter periods most years.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum, 7.5°C on several days during June and July; minimum recorded, 2.0°C Jan. 6.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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

## TEMPERATURE. WATER (DEG. C). WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

TEMPERATURE. WATER (DEG. C). WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN FEBRUARY	MEAN	MAX	MIN MARCH	MEAN	MAX	MIN APRIL	MEAN	MAX	MIN MAY	MEAN
1	---	---	---	---	---	---	4.0	3.5	3.5	4.0	2.5	3.5
2	---	---	---	---	---	---	4.0	3.5	3.5	4.0	2.5	3.5
3	---	---	---	---	---	---	4.0	3.5	3.5	4.0	3.5	4.0
4	---	---	---	---	---	---	3.5	3.5	3.5	4.5	4.0	4.0
5	---	---	---	---	---	---	3.5	3.5	3.5	5.0	4.5	5.0
6	---	---	---	---	---	---	3.5	3.5	3.5	5.0	4.5	4.5
7	---	---	---	---	---	---	3.5	3.5	3.5	5.0	4.0	4.5
8	---	---	---	---	---	---	3.5	3.5	3.5	4.5	3.5	4.0
9	---	---	---	3.5	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5
10	---	---	---	3.5	3.5	3.5	3.5	3.5	3.5	4.5	3.5	4.0
11	---	---	---	3.5	3.5	3.5	3.5	3.5	3.5	4.5	3.5	4.0
12	---	---	---	3.5	3.0	3.5	3.5	3.5	3.5	5.0	4.5	4.5
13	---	---	---	3.5	3.5	3.5	3.5	3.5	3.5	5.5	4.0	4.5
14	---	---	---	3.5	3.5	3.5	4.0	3.5	3.5	4.5	4.0	4.0
15	---	---	---	3.5	3.5	3.5	4.0	3.5	3.5	4.0	3.5	4.0
16	---	---	---	3.5	2.5	3.5	5.0	3.5	4.0	4.5	3.5	4.0
17	---	---	---	3.5	3.5	3.5	4.5	4.0	4.0	4.0	3.5	4.0
18	---	---	---	3.5	2.5	3.5	4.5	4.0	4.5	4.5	4.0	4.0
19	---	---	---	3.5	3.5	3.5	4.5	4.0	4.5	5.0	4.5	4.5
20	---	---	---	3.5	3.5	3.5	4.5	4.0	4.0	5.0	4.0	4.5
21	---	---	---	3.5	3.5	3.5	5.0	4.0	4.5	4.5	4.0	4.0
22	---	---	---	3.5	3.5	3.5	5.5	4.5	4.5	5.0	3.5	4.5
23	---	---	---	3.5	3.5	3.5	4.5	4.0	4.5	4.5	4.5	4.5
24	---	---	---	3.5	3.5	3.5	5.0	4.0	4.5	5.0	4.0	4.5
25	---	---	---	3.5	3.5	3.5	4.5	3.5	4.0	5.0	4.0	4.5
26	---	---	---	4.0	3.5	3.5	4.0	3.5	4.0	5.0	4.5	5.0
27	---	---	---	3.5	3.5	3.5	4.5	3.5	4.0	5.5	4.5	5.0
28	---	---	---	3.5	3.5	3.5	4.5	4.0	4.0	6.5	4.5	5.5
29	---	---	---	3.5	3.5	3.5	5.5	4.0	4.5	6.5	4.5	5.5
30	---	---	---	4.0	3.5	3.5	4.5	3.5	4.0	6.0	4.0	5.0
31	---	---	---	4.0	3.5	3.5	---	---	---	5.0	4.0	4.5
MONTH	---	---	---	4.0	2.5	3.5	5.5	3.5	4.0	6.5	2.5	4.5
JUNE				JULY			AUGUST			SEPTEMBER		
1	6.0	4.5	5.0	6.0	5.0	5.5	5.0	4.0	4.5	4.5	4.5	4.5
2	6.0	4.5	5.0	5.5	4.0	4.5	5.0	4.0	4.5	4.5	4.5	4.5
3	6.0	4.5	5.0	5.5	4.0	5.0	6.5	4.0	4.5	4.5	4.5	4.5
4	5.5	5.0	5.0	7.0	5.5	6.0	7.0	4.5	5.5	4.5	4.5	4.5
5	6.0	5.0	5.5	7.5	5.5	6.0	6.5	4.5	5.5	4.5	4.5	4.5
6	5.5	4.5	5.0	7.0	5.5	6.0	6.5	4.5	5.5	4.5	4.0	4.5
7	6.0	5.0	5.0	7.0	5.0	6.0	7.0	5.5	6.0	4.5	4.5	4.5
8	5.5	5.0	5.0	7.0	5.0	6.0	6.0	4.0	5.0	4.5	4.5	4.5
9	5.5	5.0	5.0	7.0	5.0	6.0	7.0	5.0	5.5	4.5	4.5	4.5
10	6.0	4.5	5.0	7.5	5.0	6.0	5.5	4.5	5.0	4.5	4.5	4.5
11	6.0	5.0	5.5	7.0	5.0	6.0	5.0	4.5	4.5	4.5	4.5	4.5
12	6.5	5.0	5.5	7.0	5.5	6.0	5.0	4.5	4.5	4.5	4.5	4.5
13	6.0	4.5	5.0	7.0	5.5	6.0	5.0	4.0	4.5	4.5	4.5	4.5
14	6.5	4.0	5.0	7.0	5.5	6.0	5.0	4.5	4.5	4.5	4.5	4.5
15	6.5	4.0	5.0	7.0	5.0	6.0	5.0	4.5	4.5	4.5	4.5	4.5
16	5.0	4.0	4.5	7.0	4.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5
17	4.5	4.0	4.0	7.0	4.5	6.0	5.0	4.5	4.5	4.5	4.5	4.5
18	4.5	4.0	4.5	7.5	5.5	6.0	4.5	4.5	4.5	4.5	4.5	4.5
19	4.5	4.0	4.5	7.5	5.5	6.0	5.0	4.5	4.5	4.5	4.5	4.5
20	4.5	4.0	4.0	7.5	5.5	6.0	4.5	4.0	4.5	4.5	4.5	4.5
21	4.0	4.0	4.0	7.0	5.5	6.0	5.0	4.5	4.5	4.5	4.5	4.5
22	4.0	4.0	4.0	7.5	5.0	6.0	4.5	4.5	4.5	5.0	4.5	4.5
23	7.0	4.0	5.0	6.5	5.5	6.0	4.5	4.0	4.5	5.0	5.0	5.0
24	7.5	5.0	6.0	6.5	5.5	5.5	4.5	4.5	4.5	5.5	4.5	5.0
25	6.0	4.0	4.5	6.5	5.5	5.5	4.5	4.5	4.5	4.5	4.0	4.5
26	4.0	4.0	4.0	6.5	4.5	5.5	4.5	4.0	4.5	4.5	4.5	4.5
27	4.5	4.0	4.0	5.5	4.0	4.5	4.5	4.0	4.5	5.0	4.5	5.0
28	4.0	4.0	4.0	6.5	4.5	5.5	4.5	4.5	4.5	4.5	4.5	4.5
29	4.5	4.0	4.0	6.0	4.5	5.5	4.5	4.5	4.5	5.0	4.5	4.5
30	6.5	4.0	5.5	5.5	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5
31	---	---	---	5.0	4.5	4.5	4.5	4.5	4.5	---	---	---
MONTH YEAR	7.5 7.5	4.0 2.0	5.0 5.0	7.5	4.0	5.5	7.0	4.0	4.5	5.5	4.0	4.5

PEND OREILLE RIVER BASIN

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12362500 SOUTH FORK FLATHEAD RIVER NEAR COLUMBIA FALLS, MT--Continued

ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
OCT 03...	1215	9160	100	9.0	5.5
NOV 17...	1045	625	145	3.0	6.0
MAY 22...	1455	279	165	12.0	4.5



## PEND OREILLE RIVER BASIN

## 12363000 FLATHEAD RIVER AT COLUMBIA FALLS, MT

LOCATION.--Lat 48°21'43", long 114°11'02", in NW¼NW¼SE¼ 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 mile 143.0.  
DRAINAGE AREA.--4,464 mi<sup>2</sup>.

## 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 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.--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).

AVERAGE DISCHARGE.--56 years, 9,714 ft<sup>3</sup>/s, 29.55 in/yr, 7,038,000 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<sup>3</sup>/s June 9, 1964, gage height, 25.58 ft, from flood marks, from rating curve extended above 95,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; minimum, 798 ft<sup>3</sup>/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<sup>3</sup>/s, from rating curve extended above 95,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow in 1964.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 34,400 ft<sup>3</sup>/s May 31, gage height, 11.33 ft; minimum daily, 3,640 ft<sup>3</sup>/s Aug. 9.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8670	4120	4290	5160	4420	11900	3790	15300	28100	14900	6280	7240
2	8360	4180	4460	4050	4780	11900	3780	15000	21000	14600	7050	6720
3	8670	4240	4590	5700	6370	12000	3800	15700	17900	13100	5450	4410
4	6980	4550	4400	4210	4210	12000	3820	12000	16900	11700	4280	8240
5	11200	4700	4300	4250	4090	11200	3990	6000	16900	11300	4110	10000
6	11200	4150	4300	4150	4010	9000	7650	5820	17400	11300	4530	11300
7	11100	4640	4220	4410	7170	5940	5230	7030	17600	10800	3930	11600
8	11100	4570	4120	4930	11900	4300	4600	6040	17600	9990	5500	6530
9	10200	4350	4160	4630	11900	3880	4800	10600	17800	9180	3640	6090
10	11200	3860	4420	4240	11900	3900	7110	10300	16600	8580	3740	7160
11	11200	4490	4430	3990	11900	3980	4890	10500	15600	8230	3910	7110
12	11200	4200	4330	3790	11800	4130	4800	7600	15500	8040	3920	7230
13	11100	3900	4300	4060	8780	4210	4710	8210	16100	7900	4430	7630
14	11200	4030	4240	4090	5570	4650	4650	12800	18600	7580	3910	7560
15	4990	3920	4170	4100	5000	4520	4750	20600	22200	7180	3870	6390
16	4130	3810	4110	6620	5400	4470	4780	21200	24300	7640	4180	9020
17	4090	3830	3800	11800	3850	4390	6310	20400	25200	6750	4260	11600
18	4120	3810	4250	10100	3760	4090	10000	18200	23300	6580	4150	9710
19	4090	3750	7690	6730	3710	3810	12600	15700	21400	6450	4130	9300
20	4050	3980	10600	8790	3980	5650	13800	20000	20300	6220	4000	5490
21	4030	3840	10600	12000	4070	4290	13300	23400	21500	5940	5940	5320
22	4030	3840	10600	12100	6890	4300	12600	20400	23900	5590	9000	5890
23	4120	3880	10800	12200	11800	4380	12400	17000	19500	5260	11700	5110
24	4280	3950	10800	12200	11800	4180	12300	18300	17500	5030	11600	4840
25	4310	4070	10800	9250	11800	3960	11200	18100	19600	4870	7300	5580
26	4260	4050	11000	5010	11800	3930	10800	14800	21700	5240	7010	5060
27	4220	4230	11100	4780	11900	3900	9020	14100	23200	7080	10900	5290
28	4170	4150	11000	4810	11900	3860	7600	13900	23900	5040	11300	5050
29	4150	4060	11000	4900	11900	3840	7060	14900	22700	5130	11200	4950
30	4120	3960	11100	4760	---	4120	10700	21700	18100	6470	11400	4890
31	4100	---	11200	4570	---	3820	---	31800	---	5960	11400	---
TOTAL	214640	123110	215180	196380	228360	174500	226840	467400	601900	249630	198020	212310
MEAN	6924	4104	6941	6335	7874	5629	7561	15080	20060	8053	6388	7077
MAX	11200	4700	11200	12200	11900	12000	13800	31800	28100	14900	11700	11600
MIN	4030	3750	3800	3790	3710	3810	3780	5820	15500	4870	3640	4410
CFSM	1.55	.92	1.56	1.42	1.76	1.26	1.69	3.38	4.49	1.80	1.43	1.59
IN.	1.79	1.03	1.79	1.64	1.90	1.45	1.89	3.89	5.02	2.08	1.65	1.77
AC-FT	425700	244200	426800	389500	453000	346100	449900	927100	1194000	495100	392800	421100
MEAN †	2744	4608	2339	4643	2938	3140	10100	21140	31060	10980	4030	3682
CFSM †	0.61	1.03	0.52	1.04	0.66	0.70	2.26	4.74	6.96	2.46	0.90	0.82
IN †	0.71	1.15	0.60	1.20	0.71	0.81	2.52	5.46	7.76	2.84	1.04	0.92
AC-FT †	168700	274200	143800	285500	169000	193100	600900	1300100	1848000	675100	247800	219100

## OBSERVED

CAL YR 1983	TOTAL	3502180	MEAN	9851	MAX	36000	MIN	3470	AC-FT	6946300
WTR YR 1984	TOTAL	3108270	MEAN	8493	MAX	31800	MIN	3640	AC-FT	6165300

## ADJUSTED

CAL YR 1983	TOTAL	3192992	MEAN	8748	CFSM	1.96	IN	26.60	AC-FT	6333300
WTR YR 1984	TOTAL	3088127	MEAN	8438	CFSM	1.89	IN	25.73	AC-FT	6125300

† Adjusted for change in contents in Hungry Horse Reservoir.

PEND OREILLE RIVER BASIN

101

12363000 FLATHEAD RIVER AT COLUMBIA FALLS, MT--Continued  
(National Stream Quality Accounting Network)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1949-50, 1963-67, 1979 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: January 1949 to September 1950, August 1963 to September 1969, March 1979 to current year.

INSTRUMENTATION.--Temperature recorder since Mar. 27, 1979.

REMARKS.--Water years 1968-69 temperature records published as Flathead River near Kalispell (station 12363500) 15 mi downstream. No appreciable inflow or outflow occurs between the two points.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Maximum, 21.0°C Aug. 23, 1963, Aug. 8, 1968; minimum, 0.0°C on several days during winter periods most years.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum recorded, 18.5°C July 26, Aug. 9; minimum, 1.0°C on several days during January.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	CLOUD COVER (PER- CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	
DEC 14...	1100	4230	100	2	155	8.0	-4.0	3.5	680	.40	11.8	100	
MAR 22...	0900	4290	--	--	168	8.0	5.0	3.5	682	2.2	11.2	94	
MAY 31...	0900	31500	100	3	133	8.1	12.0	6.5	680	90	10.8	99	
SEP 05...	0830	6700	20	1	164	8.1	24.0	7.0	678	.50	10.2	95	
DATE		COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS (MG/L AS CAC03) (00900)	HARD- NESS, NONCAR- BONATE (MG/L CAC03) (00902)	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 CAC03) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
DEC 14...	<1	68	88	2	25	6.2	1.0	.0	.30	86	4.6	.50	
MAR 22...	K4	34	89	0	25	6.4	1.0	.0	.40	89	4.6	.40	
MAY 31...	K190	250	74	9	21	5.1	.80	.0	.40	65	5.7	.30	
SEP 05...	<1	K26	88	2	25	6.1	.90	.0	.50	86	3.9	.30	
DATE		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, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)
DEC 14...	<.10	4.1	111	94	.15	1270	<.10	.080	<.20	<.005	<.005	<.002	
MAR 22...	<.10	4.3	96	96	.13	1110	<.10	.080	<.20	<.005	<.005	.001	
MAY 31...	<.10	4.1	75	77	.10	6380	.20	.030	.40	.278	<.005	.002	
SEP 05...	<.10	3.9	96	92	.13	1740	<.10	.090	.20	.015	<.005	.002	

## PEND OREILLE RIVER BASIN

12363000 FLATHEAD RIVER AT COLUMBIA FALLS, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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)
DEC 14...	1100	10	<1	100	.5	<1	<1	<3	3	4	<1
MAR 22...	0900	20	<1	110	<.5	<1	<1	<3	1	6	2
MAY 31...	0900	40	<1	60	<1	<1	<1	<3	2	17	<1
SEP 05...	0830	10	<1	110	2	<1	<1	<3	1	<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)
DEC 14...	7	3	<.1	<10	4	<1	<1	42	<6	8
MAR 22...	<4	3	<.1	<10	<1	<1	<1	43	<6	17
MAY 31...	5	4	<.1	<10	<1	<1	<1	38	<6	<3
SEP 05...	<4	3	<.1	<10	2	<1	<1	42	<6	<3

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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



## PEND OREILLE RIVER BASIN

12363000 FLATHEAD RIVER AT COLUMBIA FALLS, MT--Continued

SUSPENDED SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	TEMPER- ATURE (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
DEC 14...	1100	3.5	4230	1	11	88
MAR 22...	0900	3.5	4290	6	69	65
MAY 31...	0900	6.5	31500	--	--	70
SEP 05...	0830	7.0	6700	1	18	79

ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
OCT 04...	1200	6200	--	168	11.5	7.5
DEC 06...	1035	4110	--	165	-6.0	2.5
DEC 14...	1100	4230	2	155	-4.0	3.5
MAR 09...	0915	3690	--	169	2.0	4.0
MAR 22...	0900	4290	--	168	5.0	3.5
MAY 31...	0900	31500	3	133	12.0	6.5
SEP 05...	0830	6700	1	164	24.0	7.0

## PEND OREILLE RIVER BASIN

105

12365000 STILLWATER RIVER NEAR WHITEFISH, MT

LOCATION.--Lat 48°19'08", long 114°23'11", in NE¼SW¼ 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, 10.6 mi upstream from Whitefish River, and at mile 13.6.

DRAINAGE AREA.--524 mi<sup>2</sup>.

PERIOD OF RECORD.--October and November 1930 (monthly discharge only, published in WSP 1316), December 1930 to September 1950, October 1972 to current year.

REVISED RECORDS.--WSP 1736: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,953.26 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 200 acres above station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--32 years (water years 1931-50, 1973-1984), 337 ft<sup>3</sup>/s, 8.74 in/yr, 244,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,330 ft<sup>3</sup>/s May 26, 1948, gage height, 20.90 ft, from floodmark; minimum daily, 40 ft<sup>3</sup>/s Dec. 24, 1944.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 901 ft<sup>3</sup>/s June 25, gage height, 8.15 ft; minimum daily, 62 ft<sup>3</sup>/s Dec. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	132	119	110	78	100	102	227	554	697	698	220	109
2	131	120	108	80	98	104	221	521	718	663	215	114
3	129	120	107	82	96	106	217	498	739	628	216	112
4	132	123	106	84	94	110	214	488	738	592	223	109
5	136	129	105	86	92	115	215	482	719	564	225	106
6	138	142	104	90	92	120	228	476	703	534	221	107
7	137	146	103	94	92	125	246	471	697	505	218	108
8	135	156	102	93	94	130	256	459	697	474	213	109
9	134	162	103	92	96	139	263	446	706	454	206	113
10	135	163	105	90	98	142	268	441	736	429	198	126
11	134	167	103	88	100	151	275	444	770	408	191	140
12	132	181	100	86	98	162	276	450	782	395	183	150
13	130	189	98	84	98	173	274	484	775	374	183	147
14	128	190	97	82	98	173	268	525	751	367	184	142
15	127	186	95	80	100	156	263	579	730	352	183	139
16	126	182	93	81	104	158	262	654	713	340	177	134
17	126	176	90	81	104	165	283	718	709	326	171	130
18	126	172	87	82	104	171	342	761	712	311	166	126
19	126	170	84	84	102	172	421	779	718	296	165	121
20	126	168	82	86	100	174	524	782	721	285	163	118
21	126	169	76	88	100	183	657	787	722	271	156	122
22	125	165	72	90	102	203	761	793	758	258	147	137
23	125	161	66	92	106	219	832	788	839	246	142	151
24	126	156	62	94	104	229	884	778	882	237	138	151
25	126	154	64	98	102	238	893	773	900	230	130	148
26	124	153	66	100	100	244	856	764	887	224	124	145
27	123	149	68	105	100	243	793	748	856	222	119	141
28	121	143	70	110	100	238	719	733	817	218	114	136
29	120	135	72	108	100	234	654	713	776	221	110	132
30	118	120	74	105	---	229	599	695	735	223	107	127
31	118	---	76	102	---	231	---	686	---	224	106	---
TOTAL	3972	4666	2748	2795	2874	5339	13191	19270	22703	11569	5314	3850
MEAN	128	156	88.6	90.2	99.1	172	440	622	757	373	171	128
MAX	138	190	110	110	106	244	893	793	900	698	225	151
MIN	118	119	62	78	92	102	214	441	697	218	106	106
CFSM	.24	.30	.17	.17	.19	.33	.84	1.19	1.45	.71	.33	.24
IN.	.28	.33	.20	.20	.20	.38	.94	1.37	1.61	.82	.38	.27
AC-FT	7880	9260	5450	5540	5700	10590	26160	38220	45030	22950	10540	7640
CAL YR 1983	TOTAL	132644	MEAN 363	MAX 1450	MIN 60	CFSM .69	IN 9.42	AC-FT 263100				
WTR YR 1984	TOTAL	98291	MEAN 269	MAX 900	MIN 62	CFSM .51	IN 6.98	AC-FT 195000				

## PEND OREILLE RIVER BASIN

## 12366000 WHITEFISH RIVER NEAR KALISPELL, MT

LOCATION.--Lat 48°19'13", long 114°16'39", in SW¼SE¼NW¼ 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 mile 8.3.

DRAINAGE AREA.--170 mi<sup>2</sup>.

PERIOD OF RECORD.--July to November 1928, April 1929 to September 1950, annual maximum, water year 1964, October 1972 to current year. Prior to 1964, published as Whitefish Creek near Kalispell.

GAGE.--Water-stage recorder. Datum of gage is 2,969.83 ft 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.--Records good except those for winter period, which are poor. Some regulation by Whitefish Lake. Diversion for irrigation of about 650 acres above station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--33 years (1929-50, 1972-84), 193 ft<sup>3</sup>/s, 139,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,580 ft<sup>3</sup>/s June 24, 1974, gage height, 4.91 ft; minimum, 4.5 ft<sup>3</sup>/s Oct. 18, 1934, gage height, 0.83 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 730 ft<sup>3</sup>/s June 22, gage height, 3.26 ft; minimum daily, 42 ft<sup>3</sup>/s Dec. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	80	67	74	50	67	69	125	283	535	568	151	86
2	80	67	72	52	66	71	123	280	543	543	148	82
3	80	67	70	54	64	71	123	280	539	519	145	80
4	82	69	70	56	62	71	123	277	539	495	145	78
5	84	69	69	58	62	69	128	274	543	472	140	78
6	82	69	68	60	63	69	135	274	559	449	143	78
7	80	71	69	62	63	69	138	274	563	416	143	75
8	80	71	75	61	63	71	140	271	568	397	138	73
9	80	71	75	60	64	73	143	264	605	379	133	80
10	80	69	71	59	64	80	145	261	643	354	133	88
11	80	80	67	57	65	88	148	258	634	334	130	86
12	78	86	67	55	66	97	148	261	617	317	128	84
13	75	82	65	54	68	101	148	264	601	297	126	84
14	75	80	65	53	73	111	145	280	601	280	124	84
15	75	80	65	51	73	118	145	323	609	274	122	80
16	75	80	64	52	71	118	156	368	622	258	120	80
17	73	80	60	53	71	115	195	397	639	248	118	80
18	73	82	58	54	71	113	227	408	643	236	116	78
19	75	84	56	56	71	111	261	412	643	224	114	78
20	73	84	54	57	69	113	317	427	639	209	112	80
21	73	84	52	59	69	123	327	445	651	200	109	86
22	73	82	49	60	71	145	327	449	721	192	106	93
23	71	80	45	61	71	138	340	453	721	181	103	88
24	71	82	42	62	71	133	347	461	699	175	100	86
25	69	82	43	64	71	133	340	464	686	167	97	84
26	69	80	44	66	71	135	334	464	673	159	94	84
27	69	80	45	68	71	133	323	468	660	156	91	82
28	67	80	46	71	71	133	310	464	643	151	90	80
29	67	78	47	70	69	133	300	464	622	153	88	78
30	67	75	48	69	---	130	290	472	596	159	86	78
31	65	---	49	68	---	128	---	503	---	156	86	---
TOTAL	2321	2311	1844	1832	1971	3262	6451	11243	18557	9118	3679	2451
MEAN	74.9	77.0	59.5	59.1	68.0	105	215	363	619	294	119	81.7
MAX	84	86	75	71	73	145	347	503	721	568	151	93
MIN	65	67	42	50	62	69	123	258	535	151	86	73
AC-FT	4600	4580	3660	3630	3910	6470	12800	22300	36810	18090	7300	4860
CAL YR 1983	TOTAL	71120	MEAN 195	MAX 793	MIN 40	AC-FT	141100					
WTR YR 1984	TOTAL	65040	MEAN 178	MAX 721	MIN 42	AC-FT	129000					

## PEND OREILLE RIVER BASIN

107

12369200 SWAN RIVER NEAR CONDON, MT

LOCATION.--Lat 47°25'21", long 113°40'12", NE 1/4 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, 4.0 mi downstream from Lindberg Lake, 8.1 mi southeast of Condon, and at mile 66.5.

DRAINAGE AREA.--69.1 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1972 to current year.

REVISED RECORDS.--WDR MT-80-2: Drainage area.

GAGE.--Water-stage recorder. Altitude of gage is 4,015 ft, by barometer.

REMARKS.--Records good except those for December to February, which are poor. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--12 years, 166 ft<sup>3</sup>/s, 32.62 in/yr, 120,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,540 ft<sup>3</sup>/s June 18, 1974, gage height, 4.88 ft; minimum daily, 22 ft<sup>3</sup>/s Dec. 8, 1972; minimum gage height, 1.37 ft Apr. 11, 1975.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 846 ft<sup>3</sup>/s June 22, gage height, 3.91 ft; minimum daily, 35 ft<sup>3</sup>/s Dec. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	50	47	54	40	58	42	73	145	639	605	217	80
2	49	46	53	42	55	43	70	143	537	525	214	83
3	48	46	53	44	52	43	69	145	464	496	200	87
4	48	52	53	47	52	44	70	146	432	481	192	88
5	48	61	50	49	52	43	73	138	424	473	184	87
6	46	65	51	50	50	42	82	129	424	485	177	90
7	45	77	51	50	46	40	87	122	407	493	162	86
8	43	77	49	51	46	40	95	120	380	457	154	83
9	48	74	49	51	45	42	107	136	353	409	143	88
10	55	72	52	50	44	44	110	155	324	368	138	92
11	58	87	56	50	44	47	114	163	314	342	133	90
12	58	98	54	49	44	49	111	185	332	329	133	86
13	58	98	54	47	45	52	112	222	371	325	128	83
14	59	96	53	45	46	59	106	282	397	323	124	79
15	58	92	52	43	46	63	108	418	438	315	119	75
16	57	88	50	42	46	63	135	451	514	308	113	72
17	56	88	50	41	46	63	219	395	576	300	110	69
18	58	90	49	41	44	63	308	356	585	294	108	66
19	58	92	47	40	43	64	378	352	575	291	102	63
20	57	92	43	41	42	69	505	475	556	288	98	68
21	56	86	40	43	42	77	469	524	689	282	92	119
22	55	78	38	44	43	83	410	447	836	270	88	186
23	57	73	37	47	43	84	376	413	746	252	87	209
24	57	73	35	50	43	88	339	406	634	236	83	199
25	55	74	36	54	42	86	295	374	588	222	81	182
26	54	71	37	62	42	86	253	332	615	214	78	164
27	52	70	37	70	41	82	223	337	658	220	72	152
28	50	67	37	71	41	79	199	329	707	222	67	137
29	48	63	37	68	41	77	179	342	713	228	63	124
30	47	58	37	65	---	75	159	453	691	230	63	115
31	46	---	38	62	---	74	---	693	---	222	72	---
TOTAL	1634	2251	1432	1549	1324	1906	5834	9328	15919	10505	3795	3202
MEAN	52.7	75.0	46.2	50.0	45.7	61.5	194	301	531	339	122	107
MAX	59	98	56	71	58	88	505	693	836	605	217	209
MIN	43	46	35	40	41	40	69	120	314	214	63	63
CFSM	.72	1.02	.63	.68	.62	.84	2.65	4.11	7.24	4.63	1.66	1.46
IN.	.83	1.14	.73	.79	.67	.97	2.96	4.73	8.08	5.33	1.93	1.63
AC-FT	3240	4460	2840	3070	2630	3780	11570	18500	31580	20840	7530	6350
CAL YR 1983	TOTAL	53656	MEAN 147	MAX 681	MIN 30	CFSM 2.01	IN 27.23	AC-FT	106400			
WTR YR 1984	TOTAL	58679	MEAN 160	MAX 836	MIN 35	CFSM 2.18	IN 29.78	AC-FT	116400			



## PEND OREILLE RIVER BASIN

## 12370000 SWAN RIVER NEAR BIGFORK, MT

LOCATION.--Lat 48°01'28", long 113°58'44", near center of S½SW¼ 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 south-east of Bigfork, and at mile 14.0.

DRAINAGE AREA.--671 mi<sup>2</sup>.

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 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.--Records good. Diversions for irrigation of about 360 acres above station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--62 years, 1,170 ft<sup>3</sup>/s, 23.68 in/yr, 847,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,890 ft<sup>3</sup>/s June 20, 1974, gage height, 7.34 ft; minimum observed, 193 ft<sup>3</sup>/s Jan. 26-29, 1930, gage height, 0.04 ft, site and datum then in use.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,820 ft<sup>3</sup>/s sometime between June 22-27, gage height, 5.43 ft; minimum daily, 354 ft<sup>3</sup>/s Dec. 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	504	497	578	462	679	518	935	1310	3910	4010	1170	631
2	497	504	540	483	663	525	916	1260	4260	3650	1150	647
3	483	511	518	490	647	532	888	1230	3910	3350	1100	647
4	483	540	518	511	631	540	861	1210	3520	3150	1070	639
5	483	569	547	525	623	547	861	1190	3290	2980	1050	623
6	490	600	540	569	600	540	870	1150	3170	2850	1020	615
7	483	647	554	623	584	532	898	1120	3090	2770	993	623
8	476	687	562	687	577	525	926	1080	2950	2680	954	639
9	476	703	569	746	562	532	954	1050	2850	2520	926	655
10	490	712	592	780	554	554	993	1060	2710	2380	898	663
11	497	729	600	798	540	600	1000	1100	2580	2220	870	663
12	504	807	592	798	540	655	1000	1120	2470	2090	851	647
13	497	833	600	789	540	729	984	1160	2470	2000	824	647
14	490	851	592	746	547	815	964	1210	2570	1910	824	631
15	490	861	577	671	562	964	945	1350	2760	1850	807	607
16	497	842	569	623	547	1060	935	1700	3100	1790	780	600
17	497	833	554	615	540	1120	984	2000	3580	1740	771	592
18	497	842	511	577	540	1140	1210	2110	3910	1690	746	569
19	511	842	476	547	532	1100	1520	2110	3970	1630	737	562
20	504	842	469	532	518	1080	1890	2240	3910	1570	720	562
21	497	833	455	532	532	1080	2240	2680	3950	1530	712	607
22	504	815	416	540	547	1110	2400	3020	4000	1490	695	687
23	504	771	397	562	562	1120	2370	2980	4050	1430	679	729
24	511	763	372	592	554	1120	2290	2890	4100	1380	655	737
25	511	729	354	623	547	1120	2160	2840	4150	1320	647	763
26	511	729	372	639	540	1110	1980	2660	4200	1260	631	754
27	511	712	397	655	540	1100	1820	2530	4250	1230	607	754
28	497	679	422	679	518	1070	1670	2440	4280	1220	592	737
29	497	671	416	703	511	1020	1530	2380	4300	1200	584	729
30	497	655	442	712	---	1000	1410	2460	4200	1200	577	712
31	490	---	455	703	---	974	---	3000	---	1200	584	---
TOTAL	15379	21609	15556	19512	16377	26432	40404	57640	106460	63290	25224	19671
MEAN	496	720	502	629	565	853	1347	1859	3549	2042	814	656
MAX	511	861	600	798	679	1140	2400	3020	4300	4010	1170	763
MIN	476	497	354	462	511	518	861	1050	2470	1200	577	562
CFSM	.74	1.07	.75	.94	.84	1.27	2.01	2.77	5.29	3.04	1.21	.98
IN.	.85	1.20	.86	1.08	.91	1.47	2.24	3.20	5.90	3.51	1.40	1.09
AC-FT	30500	42860	30860	38700	32480	52430	80140	114300	211200	125500	50030	39020

CAL YR 1983 TOTAL 418068 MEAN 1145 MAX 4730 MIN 354 CFSM 1.71 IN 23.18 AC-FT 829200  
WTR YR 1984 TOTAL 427554 MEAN 1168 MAX 4300 MIN 354 CFSM 1.74 IN 23.70 AC-FT 848100

PEND OREILLE RIVER BASIN

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12370900 TEEPEE CREEK NEAR POLSON, MT

LOCATION.--Lat 47°49'15", long 114°01'23", in SE¼SW¼SW¼ sec.22, T.24 N., R.19 W., Lake County, Hydrologic Unit 17010208, Flathead Indian Reservation, on left bank at upstream end of culvert crossing on State Highway 35, 100 ft upstream from mouth, 0.6 mi south of Bluebay, and 11 mi northeast of Polson.

DRAINAGE AREA.--2.18 mi<sup>2</sup>. Prior to 1974, published as 2.55 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1959 to September 1974 (annual maximums only), October 1982 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 2,910 ft, from topographic map. June 1959 to September 1974 crest-stage gage at same site at datum 2.0 ft lower.

REMARKS.--Water-discharge records good. No known regulation or diversions upstream of station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 44 ft<sup>3</sup>/s June 8, 1964, gage height, 2.15 ft, datum then in use; minimum, 0.30 ft<sup>3</sup>/s Feb. 8-10, 1983, gage height, 1.58 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 10 ft<sup>3</sup>/s May 31, gage height, 2.34 ft; minimum daily, 0.39 ft<sup>3</sup>/s Mar. 4, but may have been less during period of ice affect.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.65	.70	.65	.49	.49	.41	.49	1.5	5.3	2.6	1.4	1.0
2	.70	.70	.65	.50	.49	.41	.49	1.5	3.8	2.4	1.4	.98
3	.70	.65	.65	.58	.49	.40	.49	1.4	3.5	2.1	1.4	.92
4	.70	.75	.61	.75	.46	.39	.57	1.4	3.6	1.9	1.4	.92
5	.65	.70	.61	1.6	.46	.40	.75	1.4	3.6	1.7	1.4	.92
6	.65	.70	.61	1.4	.46	.41	.92	1.4	3.8	1.4	1.4	.92
7	.65	.65	.61	1.6	.46	.41	.80	1.4	3.6	1.3	1.4	.92
8	.65	.65	.61	1.5	.46	.41	.86	1.4	3.2	1.4	1.4	.98
9	.80	.61	.61	1.4	.46	.42	.92	1.4	2.9	1.4	1.4	.86
10	.75	.65	.65	1.2	.46	.43	.86	1.4	2.9	1.5	1.4	.86
11	.70	.75	.61	1.1	.46	.44	.80	1.4	3.1	1.4	1.4	.86
12	.70	.75	.61	1.1	.46	.46	.80	1.4	3.2	1.4	1.3	.86
13	.70	.75	.61	.92	.46	.46	.75	1.5	3.6	1.4	1.3	.86
14	.70	.75	.61	.85	.46	.57	.70	1.9	3.8	1.4	1.3	.86
15	.70	.75	.61	.75	.43	.57	.92	3.2	4.7	1.5	1.3	.80
16	.70	.75	.57	.65	.43	.53	1.6	3.8	5.3	1.5	1.2	.80
17	.70	.80	.56	.60	.43	.61	2.9	3.1	6.2	1.5	1.2	.80
18	.70	.75	.56	.55	.43	.57	3.9	2.5	6.4	1.5	1.3	.80
19	.70	.75	.56	.54	.43	.53	4.2	2.6	6.6	1.4	1.3	.70
20	.70	.75	.56	.60	.43	.53	5.5	3.9	4.9	1.4	1.3	.98
21	.70	.75	.54	.58	.43	.61	4.6	4.6	5.5	1.4	1.2	.92
22	.70	.70	.52	.56	.42	.61	4.2	3.6	8.4	1.4	1.2	1.1
23	.70	.70	.52	.54	.43	.65	3.9	3.6	7.4	1.4	1.2	.86
24	.65	.70	.54	.52	.43	.65	3.3	3.9	5.7	1.4	1.1	.86
25	.65	.70	.52	.54	.43	.57	2.6	3.5	5.1	1.4	1.0	.80
26	.65	.70	.50	.53	.43	.53	2.1	3.1	4.7	1.4	.98	.80
27	.65	.70	.50	.53	.42	.53	1.9	3.2	4.7	1.5	.98	.75
28	.65	.70	.49	.53	.41	.53	1.7	3.6	4.6	1.4	.92	.70
29	.70	.65	.48	.53	.41	.53	1.5	3.8	4.1	1.4	.80	.70
30	.70	.65	.48	.49	---	.49	1.5	6.2	3.2	1.4	.92	.70
31	.70	---	.49	.49	---	.49	---	8.9	---	1.4	1.1	---
TOTAL	21.35	21.26	17.70	24.52	12.92	15.55	56.52	87.5	137.4	47.6	38.30	25.79
MEAN	.69	.71	.57	.79	.45	.50	1.88	2.82	4.58	1.54	1.24	.86
MAX	.80	.80	.65	1.6	.49	.65	5.5	8.9	8.4	2.6	1.4	1.1
MIN	.65	.61	.48	.49	.41	.39	.49	1.4	2.9	1.3	.80	.70
CFSM	.32	.33	.26	.36	.21	.23	.86	1.29	2.10	.71	.57	.39
IN.	.36	.36	.30	.42	.22	.27	.96	1.49	2.34	.81	.65	.44
AC-FT	42	42	35	49	26	31	112	174	273	94	76	51

CAL YR 1983 TOTAL 524.56 MEAN 1.44 MAX 7.9 MIN .32 CFSM .66 IN 8.95 AC-FT 1040  
WTR YR 1984 TOTAL 506.41 MEAN 1.38 MAX 8.9 MIN .39 CFSM .63 IN 8.64 AC-FT 1000

## PEND OREILLE RIVER BASIN

12370900 TEEPEE CREEK NEAR POLSON, MT--Continued

## WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	CLOUD COVER (PER- CENT) (00032)	WEATHER CODE NUMBER (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (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)
APR 26...	1330	2.2	30	1	72	7.7	12.0	4.0	686	12.2	103
MAY 31...	2030	6.9	75	2	47	7.4	7.0	5.0	686	11.7	102
JUN 19...	1430	5.7	90	2	43	7.5	26.0	7.5	682	11.0	103
SEP 04...	1500	.57	30	1	83	7.9	20.5	10.0	684	10.3	102

DATE	HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCAR- BONATE (MG/L CACO3) (00902)	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 26...	37	0	10	2.8	1.5	.1	.50	38	3.0	.40	<.10
MAY 31...	20	0	6.0	1.3	.90	.0	.40	21	2.0	--	<.10
JUN 19...	20	1	5.9	1.3	.90	.0	.30	19	1.8	.20	<.10
SEP 04...	41	0	12	2.7	1.5	.1	.50	44	1.9	.20	<.10

DATE	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	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)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
APR 26...	11	52	.07	.31	<.10	.020	--	<.20	.010	<10	4
MAY 31...	7.4	--	--	--	<.10	.010	.79	.80	.010	<10	3
JUN 19...	7.0	29	.04	.44	<.10	<.010	--	.20	.010	<10	10
SEP 04...	9.5	55	.07	.08	<.10	.020	--	<.20	.010	<10	<3

DATE	TIME	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	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)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)
MAY 31...	2030	120	2	<2	<2	120	<10
SEP 04...	1500	50	<2	2	<2	31	<10

DATE	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	STRON- TIUM, TOTAL RECOV- ERABLE (UG/L AS SR) (01082)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)
MAY 31...	6	<20	<10	<2	20	<10
SEP 04...	1	<20	<10	<2	30	<10

PEND OREILLE RIVER BASIN

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12370900 TEEPEE CREEK NEAR POLSON, MT--Continued

SUSPENDED-SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	TEMPER- ATURE (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR 26...	1330	4.0	2.2	4	.02	80
MAY 31...	2030	5.0	6.9	6	.11	86
JUN 19...	1430	7.5	5.7	14	.22	69
SEP 04...	1500	10.0	.57	6	<.01	100

ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
NOV 04...	1000	.85	--	92	6.5	7.0
JAN 04...	1300	.84	--	97	4.5	.5
FEB 21...	0950	.41	--	102	2.0	2.0
APR 11...	1030	.88	--	95	6.0	4.0
26...	1330	2.2	1	72	12.0	4.0
MAY 21...	1330	4.6	--	56	17.0	5.0
31...	2030	6.9	2	47	7.0	5.0
JUN 19...	1430	5.7	2	43	26.0	7.5
22...	1710	9.1	--	40	15.0	6.0
AUG 24...	1130	1.1	--	84	18.0	10.5
SEP 04...	1500	.57	1	83	20.5	10.0



## PEND OREILLE RIVER BASIN

## 12371500 FLATHEAD LAKE AT SOMERS, MT

LOCATION.--Lat 48°04'22", long 114°13'30", in NE¼NE¼SE¼ sec.26, T.27 N., R.21 W., Flathead County, Hydrologic Unit 17010208, at steamboat dock at Somers.

DRAINAGE AREA.--7,086 mi<sup>2</sup>.

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, 1,802,000 acre-ft June 28, elevation, 2,893.09 ft; minimum, 667,000 acre-ft Apr. 17, elevation, 2,883.83 ft.

## Capacity table (elevation, in feet and contents, in acre-ft)

2,884	690,700	2,890	1,417,000
2,886	930,300	2,892	1,665,000
2,888	1,172,000	2,894	1,917,000

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
INSTANTANEOUS OBSERVATIONS AT 2400

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2892.33	2890.92	2888.42	2887.37	2885.44	2884.87	2883.98	2884.98	2890.72	2892.91	2892.89	2893.04
2	2892.26	2890.83	2888.36	2887.28	2885.36	2884.89	2883.92	2885.13	2890.97	2892.99	2892.90	2892.90
3	2892.23	2890.73	2888.24	2887.25	2885.29	2884.93	2883.89	2885.25	2891.13	2892.98	2892.90	2892.79
4	2892.20	2890.63	2888.15	2887.19	2885.20	2885.00	2883.87	2885.32	2891.30	2892.95	2892.93	2892.76
5	2892.17	2890.57	2888.03	2887.10	2885.09	2884.99	2883.83	2885.28	2891.44	2892.93	2892.97	2892.78
6	2892.18	2890.53	2887.96	2887.03	2885.02	2884.98	2883.91	2885.22	2891.62	2892.95	2892.93	2892.83
7	2892.18	2890.51	2887.91	2886.91	2884.93	2884.96	2883.88	2885.16	2891.79	2892.98	2892.89	2892.79
8	2892.23	2890.45	2887.85	2886.85	2884.95	2884.86	2883.90	2885.13	2891.93	2893.01	2892.89	2892.79
9	2892.23	2890.39	2887.80	2886.75	2884.99	2884.79	2883.88	2885.08	2892.00	2893.00	2892.87	2892.70
10	2892.28	2890.33	2887.72	2886.67	2885.03	2884.73	2883.95	2885.12	2891.93	2892.95	2892.86	2892.71
11	2892.28	2890.31	2887.69	2886.58	2885.05	2884.65	2883.90	2885.13	2891.93	2892.89	2892.83	2892.76
12	2892.27	2890.26	2887.60	2886.47	2885.09	2884.54	2883.90	2885.10	2891.98	2892.87	2892.81	2892.74
13	2892.29	2890.23	2887.57	2886.35	2885.10	2884.54	2883.87	2885.08	2892.03	2892.87	2892.84	2892.75
14	2892.32	2890.12	2887.53	2886.25	2885.01	2884.52	2883.86	2885.12	2892.07	2892.83	2892.79	2892.74
15	2892.25	2890.05	2887.49	2886.12	2884.90	2884.47	2883.85	2885.42	2892.08	2892.82	2892.78	2892.69
16	2892.14	2890.01	2887.34	2886.02	2884.86	2884.43	2883.83	2885.68	2892.07	2892.82	2892.79	2892.65
17	2892.07	2889.93	2887.28	2886.03	2884.79	2884.35	2883.84	2885.95	2892.09	2892.84	2892.74	2892.66
18	2891.96	2889.85	2887.24	2886.02	2884.70	2884.31	2883.95	2886.22	2892.15	2892.84	2892.76	2892.68
19	2891.87	2889.73	2887.18	2885.95	2884.62	2884.30	2884.10	2886.48	2892.28	2892.90	2892.76	2892.68
20	2891.80	2889.64	2887.23	2885.90	2884.55	2884.29	2884.30	2886.75	2892.41	2892.91	2892.74	2892.71
21	2891.75	2889.53	2887.23	2885.92	2884.54	2884.26	2884.43	2887.12	2892.52	2892.92	2892.71	2892.70
22	2891.72	2889.43	2887.26	2885.96	2884.51	2884.25	2884.56	2887.47	2892.56	2892.86	2892.81	2892.64
23	2891.62	2889.31	2887.22	2886.01	2884.52	2884.21	2884.66	2887.77	2892.56	2892.86	2892.91	2892.61
24	2891.52	2889.25	2887.25	2886.06	2884.59	2884.18	2884.74	2888.08	2892.59	2892.85	2892.96	2892.64
25	2891.42	2889.14	2887.26	2886.06	2884.65	2884.17	2884.76	2888.41	2892.75	2892.84	2892.94	2892.62
26	2891.37	2889.04	2887.34	2886.02	2884.67	2884.16	2884.83	2888.73	2892.94	2892.81	2892.91	2892.59
27	2891.32	2888.90	2887.36	2885.93	2884.72	2884.13	2884.89	2889.05	2893.06	2892.85	2892.96	2892.61
28	2891.27	2888.76	2887.36	2885.87	2884.77	2884.10	2884.87	2889.30	2893.00	2892.87	2892.95	2892.62
29	2891.16	2888.64	2887.37	2885.75	2884.81	2884.10	2884.88	2889.56	2892.95	2892.89	2892.95	2892.65
30	2891.07	2888.52	2887.42	2885.64	---	2884.05	2884.90	2889.97	2892.89	2892.89	2892.94	2892.65
31	2890.97	---	2887.46	2885.54	---	2884.03	---	2890.38	---	2892.88	2893.05	---
MAX	2892.33	2890.92	2888.42	2887.37	2885.44	2885.00	2884.90	2890.38	2893.06	2893.01	2893.05	2893.04
MIN	2890.97	2888.52	2887.18	2885.54	2884.51	2884.03	2883.83	2884.98	2890.72	2892.81	2892.71	2892.59

CAL YR 1983 MAX 2893.12 MIN 2884.12  
WTR YR 1984 MAX 2893.06 MIN 2883.83

(†) 1,537 1,235 1,107 875.0 787.4 694.3 798.2 1,464 1,777 1,776 1,797 1,747  
(††) -175,000 -302,000 -128,000 -232,000 -87,600 -93,100 +103,900 +665,800 +313,000 -1,000 +21,000 -50,000

CAL YR 1983 †† -177,000  
WTR YR 1984 †† +35,000

† 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 SW¼NE¼SE¼ 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 mile 71.5.

DRAINAGE AREA.--7,096 mi<sup>2</sup>.

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 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 National Geodetic Vertical Datum of 1929 (from river-profile survey).

REMARKS.--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 above station for irrigation of about 10,000 acres. Flathead project pumps can divert up to 12,000 acre-ft per month when required for irrigation of lands downstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--77 years, 11,690 ft<sup>3</sup>/s, 22.37 in/yr, 8,469,000 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<sup>3</sup>/s May 29, 1928, gage height, 17.2 ft, site and datum then in use; minimum probably less than 5.0 ft<sup>3</sup>/s Apr. 13, 1938; minimum daily, 32 ft<sup>3</sup>/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<sup>3</sup>/s, from lake elevation-discharge study.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 39,400 ft<sup>3</sup>/s June 29, gage height, 13.94 ft; minimum daily, 1,490 ft<sup>3</sup>/s May 28.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11100	10800	10100	11600	11900	10200	6910	10200	11200	17900	7010	10400
2	11500	10700	9240	11100	10200	9950	6110	9630	12000	14400	6990	11400
3	11500	11500	11500	9750	10500	10200	6530	10900	12400	17200	6120	11200
4	7210	10800	11700	10400	10400	9390	6510	10800	12200	16800	5170	10600
5	11600	8950	11600	9630	10900	10600	7010	11500	11800	17500	6950	9980
6	12000	8190	10000	10500	10700	10800	6790	11900	11600	12500	6700	8740
7	9970	6050	8850	11600	10900	10800	7480	11600	12400	11300	5840	10600
8	11200	7860	10100	10100	10500	10800	7350	11300	12300	11200	4630	7700
9	9800	7970	8660	11300	10800	9850	6090	11300	16700	11200	6540	8980
10	8620	9780	9880	10400	10200	10200	6360	10900	24700	14100	6190	7360
11	9620	9290	7100	10600	11000	9660	6940	11000	20300	15000	4710	6670
12	10900	7420	9870	10200	10300	9180	7000	11100	15700	11700	4660	6900
13	10200	8700	6410	10400	10700	7880	7450	11500	16100	10400	4910	7100
14	10400	9480	7780	12100	10800	8770	7070	10700	18600	10600	4760	6780
15	11000	9040	7640	11900	10700	8800	7500	7700	25100	9490	5130	10900
16	10200	8930	9400	11700	9500	9060	6510	7040	29100	9590	4130	11300
17	10600	9010	9220	11300	10300	8570	7210	6000	29300	8430	6160	11100
18	10700	9870	7670	11700	9880	7920	7240	5660	25100	8250	3660	9040
19	10000	10700	7970	11500	9590	7980	7720	5490	17800	3940	4620	8900
20	8270	10700	7850	11000	9220	6940	8050	4260	17800	5470	4560	8820
21	7720	11500	11000	11500	8880	7420	8940	5600	23400	4890	3500	5600
22	8860	11400	9750	11200	8140	7550	8500	4770	26800	8360	4440	6680
23	10100	11300	9700	10100	8130	8180	9120	3720	27300	8120	4660	6680
24	9830	10800	11000	10300	8590	7570	10000	2300	22000	7020	6980	4770
25	10500	11700	10500	11100	9850	5470	10400	1680	13800	6150	9540	4910
26	8870	12000	8490	9490	8920	8330	10900	1680	15300	6480	8740	6020
27	7150	12000	10200	9640	10100	7630	9500	1620	19500	7290	7840	4830
28	7880	11300	11100	10100	9880	7400	10200	1490	33700	6400	6460	5170
29	11400	11300	11800	12000	8750	6830	9950	1620	31900	6210	9040	3680
30	10100	12000	10300	12100	---	7740	10400	1640	28000	7030	10700	4520
31	10400	---	10400	11200	---	7490	---	6720	---	6380	8880	---
TOTAL	309200	301040	296780	337510	290230	269160	237740	223320	593900	311300	190220	237330
MEAN	9974	10030	9574	10890	10010	8683	7925	7204	19800	10040	6136	7911
MAX	12000	12000	11800	12100	11900	10800	10900	11900	33700	17900	10700	11400
MIN	7150	6050	6410	9490	8130	5470	6090	1490	11200	3940	3500	3680
CFSM	1.41	1.41	1.35	1.54	1.41	1.22	1.12	1.02	2.79	1.42	.87	1.12
IN.	1.62	1.58	1.56	1.77	1.52	1.41	1.25	1.17	3.11	1.63	1.00	1.24
AC-FT	613300	597100	588700	669500	575700	533900	471600	443000	1178000	617500	377300	470700
† -432000	-272000	-411000	-336000	-371600	-246100	+254900	+1038800	+967000	+179000	-124000	-252000	
MEAN ††	2949	5463	2890	5424	3548	4681	12210	24100	36050	12950	4119	3675
CFSM ††	0.42	0.77	0.41	0.76	0.50	0.66	1.72	3.40	5.08	1.82	0.58	0.52
IN ††	0.48	0.86	0.47	0.88	0.54	0.76	1.92	3.92	5.67	2.10	0.67	0.58
AC-FT††	181300	325100	177700	333500	204100	287800	726500	1481800	2145000	796500	253300	218700

OBSERVED												
CAL YR 1983	TOTAL	4138130	MEAN	11340	MAX	32100	MIN	3310	AC-FT	8208000	(†)	-790000
WTR YR 1984	TOTAL	3597730	MEAN	9830	MAX	33700	MIN	1490	AC-FT	7136000	(†)	-5000

ADJUSTED												
CAL YR 1983	TOTAL	3739954	MEAN	10246	CFSM	1.44	IN	19.60	AC-FT	7418000		
WTR YR 1984	TOTAL	3595312	MEAN	9823	CFSM	1.38	IN	18.84	AC-FT	7131000		

† Change in contents, in acre-ft, in Hungry Horse Reservoir and Flathead Lake.

†† Adjusted for change in contents.

## PEND OREILLE RIVER BASIN

12374250 MILL CREEK ABOVE BASSOO CREEK, NEAR NIARADA, MT

LOCATION.--Lat 47°49'49", long 114°41'45", in SE~~1~~NE~~1~~ sec.20, T.24 N., R.24 W., Sanders County, Hydrologic Unit 17010212, Flathead Indian Reservation, on right bank 0.2 mi upstream from Flathead Indian Reservation boundary and Bassoo Creek, and 4.1 mi northwest of Niarada.

DRAINAGE AREA.--19.6 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,000 ft, from topographic map.

REMARKS.--Water-discharge records good except those for December to January, which are fair. No known regulation or diversion upstream of station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42 ft<sup>3</sup>/s May 27, 1983, gage height, 2.01 ft; minimum daily, 1.5 ft<sup>3</sup>/s Dec. 23, 1983.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 27 ft<sup>3</sup>/s June 21, gage height, 1.85 ft; minimum daily, 1.5 ft<sup>3</sup>/s Dec. 23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.7	2.7	2.5	3.0	2.9	1.8	2.2	7.2	17	12	4.4	4.1
2	2.7	2.7	2.6	3.4	2.9	1.8	2.2	7.6	18	12	4.4	3.5
3	2.4	2.9	2.7	3.7	2.9	1.8	2.2	7.6	17	12	4.1	3.0
4	2.4	3.2	2.7	4.0	2.9	1.8	2.2	7.6	16	10	3.8	2.5
5	2.4	3.5	2.7	4.3	2.9	1.8	2.4	7.6	16	9.9	3.8	2.2
6	2.4	3.2	2.8	4.5	2.7	1.6	2.9	7.2	15	9.9	4.1	2.4
7	2.2	4.7	2.9	4.4	2.7	1.8	2.9	7.2	14	9.9	3.8	2.4
8	2.2	3.2	3.0	4.2	2.7	1.8	2.9	6.8	14	9.9	3.5	2.7
9	2.2	2.9	3.2	4.0	2.7	2.2	2.9	6.8	14	9.9	3.5	3.2
10	2.7	2.9	3.5	3.9	2.7	2.4	2.7	7.6	13	9.4	3.2	2.7
11	2.7	3.8	3.8	3.7	2.7	2.9	2.7	7.6	13	8.5	3.0	2.7
12	2.7	4.1	3.8	3.6	2.7	3.2	2.7	7.6	13	7.6	2.9	2.4
13	2.7	3.8	3.5	3.4	2.4	3.5	2.4	7.6	13	7.2	2.8	2.4
14	2.7	3.5	3.5	3.3	2.4	3.2	2.4	8.1	13	6.8	2.7	2.4
15	2.7	3.2	3.2	3.2	2.4	3.5	2.2	9.4	12	6.4	2.7	2.4
16	2.7	3.2	2.9	3.2	2.4	3.2	2.7	13	12	6.0	2.7	2.4
17	2.7	3.2	2.7	3.2	2.2	3.2	3.8	14	12	5.7	2.7	2.0
18	2.7	3.2	2.4	3.2	2.2	3.2	5.0	16	12	5.7	2.7	2.0
19	2.7	3.2	2.2	2.9	2.2	2.9	6.8	16	13	5.3	2.4	1.8
20	2.7	3.2	2.0	2.9	2.2	2.9	7.6	17	13	5.3	2.4	2.0
21	2.7	3.2	1.8	3.5	2.2	3.5	9.0	17	22	5.0	2.4	2.4
22	2.9	3.2	1.7	4.1	2.2	3.2	9.0	18	19	4.7	2.2	2.4
23	2.9	3.2	1.5	4.7	2.2	3.2	9.0	19	17	4.7	2.2	2.4
24	2.9	3.2	1.6	4.7	2.2	3.2	9.4	19	17	4.4	2.2	2.4
25	2.9	2.9	1.7	5.0	2.2	3.2	9.4	19	17	4.4	2.0	2.4
26	2.9	2.9	1.9	5.7	2.2	3.2	9.0	18	15	4.1	2.0	2.4
27	2.7	2.9	2.1	4.4	1.8	2.9	8.5	18	15	4.4	2.0	2.4
28	2.7	2.9	2.2	3.5	1.8	2.7	8.1	16	14	4.7	2.0	2.4
29	2.7	2.8	2.4	3.5	1.8	2.7	8.1	15	14	5.0	2.0	2.4
30	2.7	2.6	2.6	3.2	---	2.4	7.6	14	13	4.7	2.0	2.4
31	2.7	---	2.8	2.9	---	2.2	---	14	---	4.7	2.7	---
TOTAL	82.0	96.1	80.9	117.2	70.4	82.9	150.9	376.5	443	220.2	89.3	75.2
MEAN	2.65	3.20	2.61	3.78	2.43	2.67	5.03	12.1	14.8	7.10	2.88	2.51
MAX	2.9	4.7	3.8	5.7	2.9	3.5	9.4	19	22	12	4.4	4.1
MIN	2.2	2.6	1.5	2.9	1.8	1.6	2.2	6.8	12	4.1	2.0	1.8
CFSM	.14	.16	.13	.19	.12	.14	.26	.62	.76	.36	.15	.13
IN.	.16	.18	.15	.22	.13	.16	.29	.71	.84	.42	.17	.14
AC-FT	163	191	160	232	140	164	299	747	879	437	177	149

CAL YR 1983 TOTAL 2455.7 MEAN 6.73 MAX 40 MIN 1.5 CFSM .34 IN 4.66 AC-FT 4870  
WTR YR 1984 TOTAL 1884.6 MEAN 5.15 MAX 22 MIN 1.5 CFSM .26 IN 3.58 AC-FT 3740

PEND OREILLE RIVER BASIN

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12374250 MILL CREEK ABOVE BASSOO CREEK, NEAR NIARADA, MT--Continued

WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	CLOUD COVER (PER- CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (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)	
APR 19...	1200	6.9	100	2	38	7.7	10.5	6.0	673	11.2	102	
JUN 01...	1330	20	10	2	22	7.3	18.5	7.0	684	10.8	99	
18...	1200	12	0	0	26	7.4	24.0	8.5	681	10.4	100	
SEP 05...	1100	2.0	50	2	45	7.9	22.0	11.5	678	9.8	101	
DATE		HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCAR- BONATE (MG/L CACO3) (00902)	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- LITY 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 19...	11	0	3.0	.80	3.6	.5	.60	15	3.3	.70	<.10	
JUN 01...	8	0	2.5	.50	2.1	.3	.50	9.0	3.3	.30	.10	
18...	7	0	1.9	.60	2.4	.4	.50	11	2.2	.20	<.10	
SEP 05...	12	0	3.3	.90	4.1	.5	.90	23	3.3	.60	<.10	
DATE		SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L AC-FT) (70301)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	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)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
APR 19...	16	37	.05	.69	<.10	.070	.23	.30	.070	<10	42	
JUN 01...	13	28	.04	1.5	<.10	.010	.39	.40	.010	<10	49	
18...	13	27	.04	.89	<.10	.030	--	<.20	<.010	<10	35	
SEP 05...	16	43	.06	.23	<.10	.030	.57	.60	.010	<10	43	
DATE	TIME	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	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)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)					
JUN 01...	1330	150	<2	<2	<2	120	<10					
SEP 05...	1100	140	3	4	<2	66	<10					
DATE		MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	STRON- TIUM, TOTAL RECOV- ERABLE (UG/L AS SR) (01082)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)					
JUN 01...		5	<20	<10	<2	20	20					
SEP 05...		2	<20	<10	<2	30	<10					



## PEND OREILLE RIVER BASIN

12374250 MILL CREEK ABOVE BASSOO CREEK, NEAR NIARADA, MT--Continued

SUSPENDED-SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	TEMPER- ATURE (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR 19...	1200	6.0	6.9	26	.48	99
JUN 01...	1330	7.0	20	8	.43	98
18...	1200	8.5	12	4	.13	87
SEP 05...	1100	11.5	2.0	1	<.01	100

ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
NOV 09...	1200	2.9	--	43	3.5	2.0
JAN 06...	1115	4.5	--	41	3.0	.0
30...	1155	2.8	--	41	4.0	.5
FEB 23...	1500	2.4	--	41	3.0	.5
APR 19...	1200	6.9	2	38	10.5	6.0
JUN 01...	1330	20	2	22	18.5	7.0
18...	1200	12	0	26	24.0	8.5
JUL 25...	0750	4.4	--	36	17.0	12.0
SEP 05...	1100	2.0	2	45	22.0	11.5

## PEND OREILLE RIVER BASIN

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12374800 CROMWELL CREEK NEAR NIARADA, MT

LOCATION.--Lat 47°52'54", long 114°30'04", in NW¼NW¼SE¼ sec.36, T.25 N., R.23 W., Flathead County, Hydrologic Unit 17010212, on left bank 6.7 mi northeast of Niarada and 8.2 mi northwest of Elmo.

DRAINAGE AREA.--14.3 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,220 ft, from topographic map.

REMARKS.--Water-discharge records fair except those for period of no gage-height record, Dec. 2 to Mar. 14 and May 27 to June 22, which are poor, and those for July 6 to Sept. 30, which are good. No known regulation or diversion upstream from station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3.4 ft<sup>3</sup>/s July 14, 1983, gage height, 1.22 ft; maximum gage height, 1.43 ft Jan. 8, 1983 (backwater from ice); minimum discharge, 0.02 ft<sup>3</sup>/s Dec. 11, 1982, gage height, 0.65 ft (result of freezeup).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1.7 ft<sup>3</sup>/s Apr. 21, gage height, 0.98 ft; minimum daily, 0.03 ft<sup>3</sup>/s Aug. 27, 28.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.22	.27	.20	.12	.36	.30	.33	.87	.36	.22	.11	.09
2	.22	.27	.20	.14	.36	.30	.33	.87	.34	.22	.12	.08
3	.22	.27	.20	.14	.36	.30	.33	.87	.34	.22	.14	.08
4	.22	.27	.20	.16	.36	.30	.27	.87	.34	.22	.16	.07
5	.22	.27	.20	.16	.34	.30	.40	.87	.34	.22	.14	.06
6	.22	.27	.20	.18	.34	.30	.40	.76	.34	.22	.15	.05
7	.22	.33	.20	.18	.34	.32	.47	.76	.32	.20	.15	.07
8	.22	.33	.22	.18	.34	.34	.47	.71	.28	.20	.12	.07
9	.22	.27	.24	.16	.34	.36	.47	.71	.28	.20	.12	.07
10	.22	.22	.26	.16	.34	.36	.47	.71	.28	.20	.11	.07
11	.22	.27	.26	.16	.34	.42	.47	.71	.26	.19	.10	.08
12	.22	.33	.28	.16	.34	.46	.47	.66	.26	.18	.10	.08
13	.27	.33	.26	.14	.34	.55	.47	.66	.26	.15	.10	.08
14	.27	.33	.22	.14	.34	.65	.40	.66	.26	.14	.09	.08
15	.27	.27	.20	.14	.32	.76	.40	.71	.24	.14	.08	.08
16	.27	.27	.18	.14	.32	.76	.40	.71	.24	.14	.08	.08
17	.27	.27	.16	.12	.32	.66	.40	.60	.22	.12	.08	.08
18	.27	.27	.14	.12	.32	.60	.47	.54	.20	.12	.08	.07
19	.27	.27	.12	.12	.32	.47	.60	.47	.20	.12	.07	.07
20	.27	.27	.10	.14	.32	.47	1.5	.54	.24	.11	.06	.08
21	.27	.27	.10	.16	.32	.66	1.7	.54	.70	.11	.06	.11
22	.27	.27	.08	.20	.32	.66	1.5	.47	.60	.10	.06	.10
23	.27	.22	.08	.25	.32	.47	1.5	.45	.54	.09	.07	.10
24	.27	.22	.08	.30	.32	.47	1.4	.45	.47	.09	.04	.10
25	.27	.22	.08	.35	.32	.40	1.1	.43	.47	.08	.04	.10
26	.27	.22	.10	.40	.32	.40	1.1	.43	.47	.08	.04	.10
27	.27	.22	.10	.45	.30	.40	.92	.40	.40	.09	.03	.10
28	.27	.22	.10	.40	.30	.40	.92	.40	.33	.12	.03	.10
29	.27	.22	.10	.38	.30	.40	.92	.38	.27	.10	.04	.10
30	.27	.20	.12	.36	---	.40	.87	.38	.27	.18	.04	.10
31	.27	---	.12	.36	---	.40	---	.38	---	.14	.06	---
TOTAL	7.77	7.93	5.10	6.57	9.58	14.04	21.45	18.97	10.12	4.71	2.67	2.50
MEAN	.25	.26	.16	.21	.33	.45	.72	.61	.34	.15	.086	.083
MAX	.27	.33	.28	.45	.36	.76	1.7	.87	.70	.22	.16	.11
MIN	.22	.20	.08	.12	.30	.30	.27	.38	.20	.08	.03	.05
CFSM	.02	.02	.01	.02	.02	.03	.05	.04	.02	.01	.006	.006
IN.	.02	.02	.01	.02	.02	.04	.06	.05	.03	.01	.01	.01
AC-FT	15	16	10	13	19	28	43	38	20	9.3	5.3	5.0

CAL YR 1983 TOTAL 181.95 MEAN .50 MAX 2.2 MIN .07 CFSM .04 IN .47 AC-FT 361  
WTR YR 1984 TOTAL 111.41 MEAN .30 MAX 1.7 MIN .03 CFSM .02 IN .29 AC-FT 221

## PEND OREILLE RIVER BASIN

12374800 CROMWELL CREEK NEAR NIARADA, MT--Continued

## WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	CLOUD COVER (PER- CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (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)	
MAR 22...	1230	.61	100	2	246	8.1	7.0	5.0	678	12.0	106	
APR 19...	1400	.53	100	2	238	8.5	12.5	10.5	666	11.0	113	
JUN 18...	1345	.20	0	0	272	8.2	23.0	15.5	675	8.8	100	
SEP 05...	1315	.06	10	1	286	8.2	28.0	16.0	673	8.6	99	
DATE		HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCAR- BONATE (MG/L CACO3) (00902)	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)
MAR 22...	100	0	26	9.0	15	.7	2.4	125	12	2.3	.30	
APR 19...	98	0	25	8.7	15	.7	2.5	126	11	2.3	.20	
JUN 18...	100	0	26	9.3	17	.8	2.8	130	11	2.0	.30	
SEP 05...	110	0	29	9.4	16	.7	3.1	141	9.9	2.5	.20	
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, 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)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
MAR 22...	30	170	.23	.28	.10	.020	.28	.30	.080	150	13	
APR 19...	28	170	.23	.24	<.10	.080	.52	.60	.100	<10	7	
JUN 18...	33	180	.24	.10	<.10	.040	--	<.20	.130	<10	20	
SEP 05...	30	180	.25	.03	<.10	.040	.26	.30	.150	10	21	
DATE	TIME			ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	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)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)			
MAR 22...	1230			380	<2	<2	6	270	<10			
SEP 05...	1315			130	<2	<2	4	110	<10			
DATE				MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	STRON- TIUM, TOTAL RECOV- ERABLE (UG/L AS SR) (01082)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)			
MAR 22...				13	<20	<10	<2	130	27			
SEP 05...				5	<20	<10	<2	140	<10			

PEND OREILLE RIVER BASIN

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12374800 CROMWELL CREEK NEAR NIARADA, MT--Continued

SUSPENDED-SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	TEMPER- ATURE (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAR 22...	1230	5.0	.61	26	.04	82
APR 19...	1400	10.5	.53	5	.01	90
JUN 18...	1345	15.5	.20	22	.01	97
SEP 05...	1315	16.0	.06	2	<.01	86

ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
NOV 09...	1400	.23	--	265	2.0	3.0
JAN 06...	1330	.19	--	247	4.0	.0
30...	1400	.35	--	251	3.0	2.0
FEB 23...	0940	.33	--	246	.0	1.0
MAR 15...	1120	.73	--	236	6.0	3.0
22...	1230	.61	2	246	7.0	5.0
APR 19...	1400	.53	2	238	12.5	10.5
JUN 18...	1345	.20	0	272	23.0	15.5
22...	0815	.62	--	259	10.0	9.0
JUL 06...	1205	.21	--	265	18.0	16.0
AUG 23...	1200	.07	--	247	28.0	15.5
SEP 05...	1315	.06	1	286	28.0	16.0



## PEND OREILLE RIVER BASIN

12375900 SOUTH CROW CREEK NEAR RONAN, MT

LOCATION.--Lat 47°29'30", long 114°01'33", in NW¼NE¼SW¼ 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, and 4.5 mi southeast of Ronan.

DRAINAGE AREA.--7.57 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,320 ft, from topographic map.

REMARKS.--Water-discharge records good except those flows over 100 ft<sup>3</sup>/s and period of no gage-height record, July 27 to Aug. 27, which are fair. No known regulation or diversion above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 360 ft<sup>3</sup>/s June 30, 1983, gage height, 3.60 ft; minimum, 6.0 ft<sup>3</sup>/s Feb. 3-9, 1983, gage height, 1.78 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 175 ft<sup>3</sup>/s and maximums (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
June 21	1600	245	3.23	June 28	0930	*268	*3.30

Minimum discharge, 7.7 ft<sup>3</sup>/s Dec. 29, 30; Feb. 19-21; Mar. 6-9, gage height, 1.82 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.7	10	9.8	7.9	8.9	7.9	10	14	80	111	32	18
2	9.7	11	9.9	8.1	8.8	7.9	9.4	14	64	103	31	16
3	9.4	11	10	9.6	8.7	7.9	9.1	15	59	108	30	15
4	9.7	17	9.9	11	8.5	7.9	8.4	14	58	105	29	14
5	9.7	17	9.7	17	8.5	7.9	7.9	14	72	102	28	14
6	9.5	17	9.7	16	8.4	7.8	11	13	69	98	27	13
7	9.4	21	9.7	16	8.2	7.7	12	12	72	102	26	13
8	9.5	17	10	16	8.2	7.7	13	12	70	94	25	13
9	11	16	10	14	8.2	7.9	14	15	59	84	24	14
10	13	16	10	13	8.5	8.2	13	15	53	78	23	14
11	12	20	10	12	8.5	9.2	12	14	50	75	23	13
12	11	21	9.9	12	8.5	9.4	11	15	52	73	22	12
13	11	19	9.7	11	8.5	9.4	11	18	61	70	21	12
14	11	18	9.7	10	8.5	9.7	11	30	71	67	20	12
15	11	17	9.4	10	8.5	10	13	45	86	62	20	12
16	11	16	9.2	10	8.5	10	27	39	124	59	19	12
17	11	16	9.0	10	8.5	10	38	32	135	56	18	12
18	12	15	9.0	10	8.2	10	38	30	113	54	18	11
19	12	15	9.0	10	7.9	9.1	39	36	100	52	17	11
20	11	15	8.8	11	7.7	9.1	39	62	99	50	16	12
21	11	14	8.6	11	7.9	11	32	53	152	47	16	17
22	11	12	8.4	10	8.3	12	28	46	180	42	15	16
23	12	12	8.4	9.8	8.2	11	27	45	131	39	15	15
24	12	13	8.6	9.7	8.2	11	24	44	108	37	14	14
25	11	13	8.4	10	8.2	11	22	39	110	36	14	14
26	11	12	8.2	9.8	8.2	11	19	37	171	35	13	14
27	11	12	8.2	9.7	8.0	11	17	41	197	35	13	14
28	11	12	7.9	9.7	7.9	13	16	40	220	34	12	13
29	10	11	7.8	9.6	7.9	12	15	46	173	34	12	12
30	10	10	7.9	9.2	---	12	14	69	133	33	12	13
31	10	---	7.9	9.1	---	11	---	93	---	32	15	---
TOTAL	333.6	446	282.7	342.2	241.0	300.7	560.8	1012	3122	2007	620	405
MEAN	10.8	14.9	9.12	11.0	8.31	9.70	18.7	32.6	104	64.7	20.0	13.5
MAX	13	21	10	17	8.9	13	39	93	220	111	32	18
MIN	9.4	10	7.8	7.9	7.7	7.7	7.9	12	50	32	12	11
CFSM	1.43	1.97	1.21	1.45	1.10	1.28	2.47	4.31	13.7	8.55	2.64	1.78
IN.	1.64	2.19	1.39	1.68	1.18	1.48	2.76	4.97	15.34	9.86	3.05	1.99
AC-FT	662	885	561	679	478	596	1110	2010	6190	3980	1230	803

CAL YR 1983	TOTAL	9944.1	MEAN	27.2	MAX	276	MIN	6.0	CFSM	3.59	IN	48.86	AC-FT	19720
WTR YR 1984	TOTAL	9673.0	MEAN	26.4	MAX	220	MIN	7.7	CFSM	3.49	IN	47.53	AC-FT	19190

PEND OREILLE RIVER BASIN

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12375900 SOUTH CROW CREEK NEAR RONAN, MT--Continued

WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	CLOUD COVER (PER- CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (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)
APR 26...	1045	19	100	2	83	7.8	4.0	5.0	676	12.0	106
JUN 01...	0800	79	90	2	83	7.8	7.0	4.0	678	12.3	106
JUL 05...	1500	103	0	0	97	7.9	29.5	10.5	672	10.3	105
SEP 04...	1345	14	10	1	108	8.1	24.5	13.0	676	9.8	105

DATE	HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCAR- BONATE (MG/L CACO3) (00902)	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 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 26...	49	2	15	2.7	1.5	.0	.50	47	1.9	.20	<.10
JUN 01...	39	0	12	2.2	.50	.0	.40	39	2.0	--	<.10
JUL 05...	47	1	15	2.3	.50	.0	.30	46	1.4	.20	<.10
SEP 04...	55	0	17	3.0	1.0	.0	.60	57	2.1	.20	<.10

DATE	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
APR 26...	4.6	55	.07	2.8	<.10	.030	<.20	<.010	<10	4
JUN 01...	2.9	--	--	--	<.10	<.010	.30	<.010	<10	6
JUL 05...	3.1	50	.07	14	<.10	<.010	<.20	.010	<10	8
SEP 04...	5.0	63	.09	2.4	<.10	.020	<.20	<.010	<10	7

DATE	TIME	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	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)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)
JUN 01...	0800	<30	<2	<2	<2	30	<10
SEP 04...	1345	50	<2	<2	3	28	<10

DATE	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	STRON- TIUM, TOTAL RECOV- ERABLE (UG/L AS SR) (01082)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)
JUN 01...	3	<20	<10	<2	18	20
SEP 04...	1	<20	<10	<2	17	<10

## PEND OREILLE RIVER BASIN

12375900 SOUTH CROW CREEK NEAR RONAN, MT--Continued

## SUSPENDED-SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	TEMPER- ATURE (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR 26...	1045	5.0	19	2	.10	92
JUN 01...	0800	4.0	79	3	.64	94
JUL 05...	1500	10.5	103	1	.28	86
SEP 04...	1345	13.0	14	1	.04	100

## ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
OCT 27...	1500	11	--	107	12.0	7.0
DEC 06...	1330	10	--	108	1.0	1.0
JAN 17...	1330	11	--	108	-11.0	.0
MAR 14...	0930	9.3	--	101	1.0	3.0
APR 26...	1045	19	2	83	4.0	5.0
JUN 01...	0800	79	2	83	7.0	4.0
JUL 22...	1425	178	--	74	8.0	5.0
JUL 05...	1500	103	0	97	29.5	10.5
AUG 27...	1415	14	--	107	24.5	15.0
SEP 04...	1345	14	1	108	24.5	13.0

PEND OREILLE RIVER BASIN

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12377150 MISSION CREEK ABOVE RESERVOIR, NEAR ST. IGNATIUS, MT

LOCATION.--Lat 47°19'23", long 113°58'43", in NW¼SW¼NE¼ 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<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,460 ft, from topographic map.

REMARKS.--Water-discharge records good. No known regulation or diversions above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 547 ft<sup>3</sup>/s June 30, 1983, gage height, 4.19 ft; minimum discharge, 8.2 ft<sup>3</sup>/s Feb. 5-7, 1983, gage height, 0.84 ft, but may have been less during period of ice effect.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 300 ft<sup>3</sup>/s and maximums (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
June 16	2400	304	3.16	June 28	0200	401	3.56
June 21	1600	*421	*3.64	July 6	0530	304	3.16

Minimum discharge, 8.7 ft<sup>3</sup>/s Mar. 8, 9, gage height, 0.86 ft, but may have been less during period of ice effect.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	20	17	15	10	9.0	9.5	20	178	209	98	92
2	24	22	19	15	10	9.3	9.1	20	112	223	94	62
3	23	22	19	16	9.7	9.2	9.0	20	94	270	92	46
4	23	28	19	16	9.7	9.5	9.0	19	96	241	88	40
5	22	29	19	21	9.5	9.5	9.3	19	104	262	83	38
6	22	32	18	23	9.5	9.3	12	17	97	286	82	41
7	21	35	18	24	9.6	9.1	13	17	87	236	74	39
8	21	33	18	24	9.7	8.8	14	17	77	196	68	37
9	25	30	18	23	9.7	9.3	15	20	69	183	65	38
10	29	29	19	21	9.7	10	14	21	61	177	64	38
11	29	32	19	19	9.7	12	14	21	63	181	64	36
12	27	33	18	19	9.7	13	13	22	78	195	62	34
13	25	33	17	17	9.9	13	13	25	111	202	62	32
14	25	31	17	15	11	13	12	47	163	187	60	31
15	24	29	17	13	10	13	13	77	217	179	55	30
16	24	28	17	13	9.8	13	27	69	288	176	54	29
17	23	28	16	13	9.7	12	85	56	278	182	54	28
18	24	27	15	12	9.6	11	63	50	234	186	53	28
19	23	28	14	11	9.2	11	62	57	228	186	52	28
20	22	27	13	11	9.0	11	57	89	217	185	50	35
21	21	26	12	11	9.2	12	44	82	369	152	46	109
22	21	23	12	11	9.4	13	38	66	302	130	43	84
23	22	23	11	11	9.8	13	35	63	219	119	42	59
24	22	24	11	11	10	12	31	60	196	116	42	47
25	22	25	12	12	10	12	29	53	262	131	42	41
26	21	24	13	11	9.9	12	26	48	352	154	41	38
27	21	23	14	11	9.5	12	24	48	379	150	41	36
28	21	22	14	11	9.3	11	23	48	359	131	42	34
29	20	21	14	11	9.1	11	22	64	362	121	40	32
30	20	17	14	11	---	10	21	161	302	116	37	32
31	20	---	15	10	---	9.8	---	277	---	106	44	---
TOTAL	712	804	489	462	280.9	342.8	765.9	1673	5954	5568	1834	1294
MEAN	23.0	26.8	15.8	14.9	9.69	11.1	25.5	54.0	198	180	59.2	43.1
MAX	29	35	19	24	11	13	85	277	379	286	98	109
MIN	20	17	11	10	9.0	8.8	9.0	17	61	106	37	28
CFSM	1.86	2.16	1.27	1.20	.78	.90	2.06	4.36	16.0	14.5	4.77	3.48
IN.	2.14	2.41	1.47	1.39	.84	1.03	2.30	5.02	17.86	16.70	5.50	3.88
AC-FT	1410	1590	970	916	557	680	1520	3320	11810	11040	3640	2570

CAL YR 1983	TOTAL	21254.0	MEAN 58.2	MAX 469	MIN 8.2	CFSM 4.69	IN 63.76	AC-FT 42160
WTR YR 1984	TOTAL	20179.6	MEAN 55.1	MAX 379	MIN 8.8	CFSM 4.44	IN 60.53	AC-FT 40030



## PEND OREILLE RIVER BASIN

12377150 MISSION CREEK ABOVE RESERVOIR, NEAR ST. IGNATIUS, MT--Continued

## WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	CLOUD COVER (PER- CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (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)	
APR 25...	1300	28	70	1	159	8.1	4.0	3.5	667	12.2	105	
JUN 01...	1030	183	50	2	138	8.2	11.0	4.0	676	12.2	105	
JUL 05...	1330	266	0	0	114	8.1	27.0	10.0	670	10.4	105	
SEP 04...	1230	40	0	0	123	8.3	21.0	10.5	674	10.0	101	
DATE		HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCAR- BONATE (MG/L AS CACO3) (00902)	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 25...	85	0	21	8.0	.70	.0	.20	85	3.7	.20	<.10	
JUN 01...	71	4	20	5.2	.60	.0	.20	67	1.9	.30	<.10	
JUL 05...	59	2	17	4.1	.40	.0	.20	57	1.4	.20	<.10	
SEP 04...	66	0	18	5.0	.50	.0	.10	65	1.7	.20	<.10	
DATE		SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	
APR 25...	3.3	88	.12	6.7	.20	.080	<.20	<.010	<10	<3		
JUN 01...	2.6	71	.10	35	.10	<.010	<.20	.010	<10	7		
JUL 05...	2.3	60	.08	43	<.10	<.010	<.20	<.010	<10	11		
SEP 04...	2.6	67	.09	7.2	<.10	<.020	<.20	<.010	<10	4		
DATE	TIME	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	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)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)					
JUN 01...	1030	30	<2	<2	3	250	<10					
SEP 04...	1230	30	<2	<2	<2	19	<10					
DATE		MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	STRON- TIUM, TOTAL RECOV- ERABLE (UG/L AS SR) (01082)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)					
JUN 01...	5	<20	<10	<2	20	10						
SEP 04...	1	<20	<10	<2	30	<10						

PEND OREILLE RIVER BASIN

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12377150 MISSION CREEK ABOVE RESERVOIR, NEAR ST. IGNATIUS, MT--Continued

SUSPENDED-SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	TEMPER- ATURE (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR 25...	1300	3.5	28	2	.15	87
JUN 01...	1030	4.0	183	19	9.4	89
JUL 05...	1330	10.0	266	4	2.9	86
SEP 04...	1230	10.5	40	1	.11	100

ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
OCT 27...	1230	20	--	135	9.0	6.0
DEC 06...	1155	18	--	130	-1.0	.5
JAN 17...	1130	13	--	146	-12.0	.0
MAR 13...	1240	12	--	139	4.0	3.0
APR 25...	1300	28	1	159	4.0	3.5
JUN 01...	1030	183	2	138	11.0	4.0
JUN 22...	1140	299	--	120	9.0	5.0
JUL 05...	1330	266	0	114	27.0	10.0
AUG 27...	1230	40	--	125	26.0	12.5
SEP 04...	1230	40	0	123	21.0	10.5

## PEND OREILLE RIVER BASIN

12381400 SOUTH FORK JOCKO RIVER NEAR ARLEE, MT

LOCATION.--Lat 47°11'44", long 113°50'59", in NE¼NW¼ 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<sup>2</sup>.

## WATER-DISCHARGE RECORDS

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. Altitude of gage is 3,970 ft, from topographic map.

REMARKS.--Water-discharge records good except those for December to February, which are poor. No known regulation or diversion above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 587 ft<sup>3</sup>/s May 31, 1984, gage height recorded, 2.89 ft, 3.21 ft, from crest-stage gage; maximum gage height recorded, 3.27 ft Dec. 13, 1983 (backwater from ice); minimum daily discharge, 4.0 ft<sup>3</sup>/s Dec. 23, 1983.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 500 ft<sup>3</sup>/s and maximums (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Dec. 13	1130	ice jam	*a3.27	May 31	0130	*587	b3.21
May 31	0130	*587	a2.89				

a -- From recorded gage height.

b -- From crest-stage gage.

Minimum daily discharge, 4.0 ft<sup>3</sup>/s Dec. 23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	21	19	17	18	14	16	57	362	188	62	51
2	24	20	20	20	17	14	15	60	305	195	62	41
3	23	20	21	25	17	14	15	62	265	187	62	37
4	24	26	21	30	16	15	16	57	255	174	59	34
5	23	25	20	35	16	15	16	54	263	161	56	34
6	23	28	21	37	16	14	18	52	266	145	54	34
7	22	36	18	37	16	14	18	49	237	127	53	35
8	22	28	20	35	16	14	19	53	217	114	52	36
9	28	25	21	30	16	15	20	68	169	108	50	37
10	30	25	22	29	16	16	20	74	134	102	48	35
11	28	33	22	28	16	18	20	75	141	103	48	34
12	25	34	22	25	16	18	19	83	145	98	49	32
13	25	31	20	20	17	18	19	100	174	95	49	31
14	25	28	17	11	17	19	19	152	280	90	46	30
15	24	26	17	12	16	18	23	211	316	88	46	30
16	24	26	16	20	16	18	37	192	344	85	45	29
17	23	26	15	15	17	18	65	196	335	81	45	29
18	24	25	13	10	16	17	84	191	312	80	43	28
19	23	25	12	9.0	15	17	98	190	295	78	40	28
20	22	25	10	10	14	18	117	350	286	76	39	34
21	22	24	7.0	11	15	19	100	339	393	76	39	50
22	22	24	4.5	15	15	20	96	211	363	75	40	45
23	24	23	4.0	18	15	18	99	171	315	73	40	42
24	23	23	4.5	20	15	19	89	146	273	72	42	37
25	22	23	6.0	21	15	18	84	142	244	70	41	35
26	21	21	8.0	20	15	18	76	150	221	69	38	35
27	21	20	10	20	15	18	71	143	173	69	35	34
28	21	20	10	20	14	17	66	143	162	70	35	32
29	21	20	11	20	14	17	62	152	153	70	34	31
30	21	19	15	19	---	17	59	355	163	68	32	31
31	21	---	17	18	---	16	---	538	---	63	43	---
TOTAL	725	750	464.0	657.0	457	521	1476	4816	7561	3150	1427	1051
MEAN	23.4	25.0	15.0	21.2	15.8	16.8	49.2	155	252	102	46.0	35.0
MAX	30	36	22	37	18	20	117	538	393	195	62	51
MIN	21	19	4.0	9.0	14	14	15	49	134	63	32	28
CFSM	.42	.45	.27	.38	.28	.30	.88	2.77	4.50	1.82	.82	.63
IN.	.48	.50	.31	.44	.30	.35	.98	3.20	5.02	2.09	.95	.70
AC-FT	1440	1490	920	1300	906	1030	2930	9550	15000	6250	2830	2080

CAL YR 1983	TOTAL	21268.0	MEAN 58.3	MAX 473	MIN 4.0	CFSM 1.04	IN 14.13	AC-FT 42190
WTR YR 1984	TOTAL	23055.0	MEAN 63.0	MAX 538	MIN 4.0	CFSM 1.13	IN 15.31	AC-FT 45730

## PEND OREILLE RIVER BASIN

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12381400 SOUTH FORK JOCKO RIVER NEAR ARLEE, MT--Continued

## WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	CLOUD COVER (PER- CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (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)	
APR 24...	1015	88	20	1	217	8.4	4.5	3.0	652	11.8	103	
MAY 31...	1000	560	50	2	166	8.0	7.0	4.0	658	11.6	103	
JUL 05...	0900	165	0	0	224	8.3	13.0	9.0	657	10.2	103	
SEP 04...	0900	34	0	0	253	8.4	10.5	9.5	661	10.3	104	
DATE		HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCAR- BONATE (MG/L CACO3) (00902)	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 24...	120	0	36	7.6	1.1	.0	.50	124	2.6	.40	<.10	
MAY 31...	78	0	24	4.3	.70	.0	.50	78	3.3	--	<.10	
JUL 05...	120	7	38	6.7	1.2	.0	.50	116	2.2	.20	<.10	
SEP 04...	140	2	43	8.2	1.2	.0	.90	139	2.7	.20	<.10	
DATE		SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	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)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
APR 24...	6.4	130	.18	31	<.10	.050	--	<.20	.010	<10	7	
MAY 31...	5.3	--	--	--	<.10	.020	.28	.30	.030	<10	9	
JUL 05...	5.9	120	.17	55	<.10	.110	.29	.40	.010	<10	7	
SEP 04...	6.6	150	.20	13	<.10	.020	--	<.20	<.010	<10	<3	
DATE	TIME	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	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)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)					
MAY 31...	1000	620	<2	<2	4	650	<10					
SEP 04...	0900	30	<2	<2	<2	17	<10					
DATE		MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	STRON- TIUM, TOTAL RECOV- ERABLE (UG/L AS SR) (01082)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)					
MAY 31...		26	<20	<10	<2	20	20					
SEP 04...		<1	<20	<10	<2	30	<10					



## PEND OREILLE RIVER BASIN

12381400 SOUTH FORK JOCKO RIVER NEAR ARLEE, MT--Continued

SUSPENDED-SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	TEMPER- ATURE (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR 24...	1015	3.0	88	3	.71	72
MAY 31...	1000	4.0	560	48	73	93
JUL 05...	0900	9.0	165	2	.89	86
SEP 04...	0900	9.5	34	1	.09	100

ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
OCT 26...	1030	22	--	245	3.0	3.5
DEC 05...	1030	11	--	243	-6.0	.0
JAN 16...	1100	22	--	241	-8.0	.0
MAR 12...	1100	18	--	221	3.0	2.0
APR 24...	1015	88	1	217	4.5	3.0
MAY 31...	1000	560	2	166	7.0	4.0
JUL 05...	0900	165	0	224	13.0	9.0
AUG 27...	0930	35	--	250	15.0	10.0
SEP 04...	0900	34	0	253	10.5	9.5

## PEND OREILLE RIVER BASIN

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12383500 BIG KNIFE CREEK NEAR ARLEE, MT

LOCATION.--Lat 47°08'51", long 113°58'24", in NW<sup>1</sup>SW<sup>1</sup>NW<sup>1</sup> 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<sup>2</sup>.

## WATER-DISCHARGE RECORDS

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. Altitude of gage is 3,720 ft, from topographic map.

REMARKS.--Water-discharge records good. No known regulation or diversion above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 78 ft<sup>3</sup>/s June 30, 1916, gage height, 3.65 ft, site and datum then in use; minimum discharge, 4.3 ft<sup>3</sup>/s Apr. 17, 1911, and part or all of each day Feb. 11-13, 1984.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 56 ft<sup>3</sup>/s June 21, gage height, 1.67 ft; minimum, 4.3 ft<sup>3</sup>/s Feb. 11-13, gage height, 1.02 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	8.8	7.4	5.4	4.8	4.8	5.4	8.8	36	42	20	15
2	10	8.8	7.0	5.4	4.8	4.8	5.4	8.7	30	40	20	14
3	10	8.8	7.0	5.5	4.8	4.8	5.4	8.5	26	40	20	14
4	10	9.6	7.0	5.7	4.6	4.8	5.4	8.5	26	40	19	13
5	10	9.2	6.9	6.8	4.5	4.8	5.4	8.4	26	39	19	13
6	10	9.2	6.9	7.3	4.5	4.8	5.5	8.4	30	38	19	13
7	10	9.6	6.9	7.2	4.5	4.8	5.6	8.1	31	37	19	13
8	10	9.2	6.9	6.9	4.5	4.8	5.7	8.0	28	34	19	13
9	10	8.8	6.9	6.7	4.5	4.8	5.4	8.0	26	33	19	13
10	10	8.8	6.9	6.6	4.5	4.8	5.4	8.5	26	32	18	13
11	10	9.6	6.9	6.6	4.3	5.1	5.5	8.8	26	31	18	13
12	9.6	9.2	6.9	6.6	4.3	5.1	5.4	8.8	26	30	18	12
13	9.6	9.2	6.9	6.3	4.4	5.1	5.4	9.7	26	29	17	12
14	9.6	8.8	6.9	6.6	4.8	5.4	5.4	14	30	27	17	12
15	9.6	8.8	6.9	6.6	4.8	5.5	5.5	22	35	27	16	12
16	9.6	8.4	7.3	6.6	4.8	5.4	5.9	22	39	27	16	11
17	9.6	8.4	7.0	6.2	4.8	5.5	7.2	19	42	26	16	11
18	9.6	8.4	6.8	5.8	4.5	5.4	9.8	18	40	26	16	11
19	9.2	8.4	6.6	5.4	4.5	5.4	11	19	39	26	16	11
20	9.2	8.0	6.4	5.0	4.5	5.4	14	28	38	26	15	11
21	9.2	8.0	6.4	4.8	4.6	5.5	12	29	50	26	15	12
22	9.2	8.0	6.2	4.8	4.8	5.6	12	27	53	25	15	12
23	9.2	8.0	6.2	4.8	4.8	5.6	11	25	43	24	15	12
24	9.2	8.0	6.0	4.8	4.8	5.6	11	24	40	23	15	11
25	9.2	8.0	5.7	4.8	4.8	5.6	10	23	41	23	15	11
26	8.8	7.6	5.5	4.8	4.8	5.6	9.6	22	47	23	15	11
27	8.8	7.6	5.4	4.8	4.8	5.6	9.7	21	50	23	15	11
28	8.8	7.6	5.4	4.8	4.8	5.5	9.6	22	53	22	15	10
29	8.8	7.6	5.4	4.8	4.8	5.4	9.2	23	53	22	15	10
30	9.2	7.6	5.4	4.8	---	5.4	8.8	33	50	22	14	10
31	8.8	---	5.4	4.8	---	5.4	---	43	---	21	15	---
TOTAL	294.8	256.0	201.4	178.0	134.7	162.1	232.6	545.2	1106	904	521	360
MEAN	9.51	8.53	6.50	5.74	4.64	5.23	7.75	17.6	36.9	29.2	16.8	12.0
MAX	10	9.6	7.4	7.3	4.8	5.6	14	43	53	42	20	15
MIN	8.8	7.6	5.4	4.8	4.3	4.8	5.4	8.0	26	21	14	10
CFSM	1.38	1.24	.95	.83	.67	.76	1.13	2.56	5.36	4.24	2.44	1.74
IN.	1.59	1.38	1.09	.96	.73	.88	1.26	2.95	5.98	4.89	2.82	1.95
AC-FT	585	508	399	353	267	322	461	1080	2190	1790	1030	714
CAL YR 1983	TOTAL	4439.1	MEAN 12.2	MAX 40	MIN 4.5	CFSM 1.77	IN 24.00	AC-FT 8800				
WTR YR 1984	TOTAL	4895.8	MEAN 13.4	MAX 53	MIN 4.3	CFSM 1.95	IN 26.47	AC-FT 9710				

## PEND OREILLE RIVER BASIN

12383500 BIG KNIFE CREEK NEAR ARLEE, MT--Continued

## WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	CLOUD COVER (PER- CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (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)	
APR 24...	1215	10	15	1	202	8.3	11.5	7.0	658	11.4	109	
MAY 31...	1300	43	80	2	149	8.2	10.0	5.0	665	11.6	104	
JUL 05...	1030	39	0	0	168	8.2	21.5	8.0	662	10.8	105	
SEP 04...	1030	13	0	0	209	8.3	19.0	7.5	666	10.8	103	
DATE		HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCAR- BONATE (MG/L CACO3) (00902)	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 24...	110	0	32	7.8	1.1	.0	.50	116	2.8	.50	<.10	
MAY 31...	85	0	26	4.9	.70	.0	.50	85	2.1	--	<.10	
JUL 05...	98	6	30	5.6	.90	.0	.30	92	2.1	.20	<.10	
SEP 04...	120	7	35	7.2	1.0	.0	.40	110	2.4	.40	<.10	
DATE		SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	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)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
APR 24...	5.8	120	.16	3.2	.40	.080	.32	.40	.010	<10	<3	
MAY 31...	4.7	--	--	--	<.10	.020	.58	.60	.010	<10	<3	
JUL 05...	5.2	99	.14	10	<.10	<.010	--	<.20	<.010	<10	4	
SEP 04...	5.8	120	.16	4.1	<.10	.010	--	<.20	<.010	<10	9	
DATE	TIME	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	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)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)					
MAY 31...	1300	370	<2	<2	3	370	<10					
SEP 04...	1030	50	<2	<2	4	47	<10					
DATE		MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	STRON- TIUM, TOTAL RECOV- ERABLE (UG/L AS SR) (01082)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)					
MAY 31...		12	<20	<10	<2	20	30					
SEP 04...		300	<20	<10	<2	20	<10					

12383500 BIG KNIFE CREEK NEAR ARLEE, MT--Continued

## SUSPENDED-SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	TEMPER- ATURE (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR 24...	1215	7.0	10	8	.22	66
MAY 31...	1300	5.0	43	38	4.4	79
JUL 05...	1030	8.0	39	3	.32	82
SEP 04...	1030	7.5	13	2	.07	69

## ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
OCT 26...	1300	8.7	--	203	6.0	5.0
DEC 05...	1210	7.1	--	197	-2.0	1.0
JAN 16...	1300	6.7	--	196	-6.0	.0
MAR 12...	1300	5.1	--	190	4.0	4.0
APR 24...	1215	10	1	202	11.5	7.0
MAY 31...	1300	43	2	149	10.0	5.0
JUN 27...	0830	57	--	159	9.0	5.0
JUL 05...	1030	39	0	168	21.5	8.0
AUG 27...	1020	14	--	205	22.0	9.0
SEP 04...	1030	13	0	209	19.0	7.5



## PEND OREILLE RIVER BASIN

12387450 VALLEY CREEK NEAR ARLEE, MT

LOCATION.--Lat 47°10'11", long 114°13'52", in NE&SE&SE& 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<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1982 to current season (seasonal records only).

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

REMARKS.--Seasonal water-discharge records good except those for Mar. 1 to Apr. 24, which are fair. No known regulation or diversion above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 68 ft<sup>3</sup>/s May 26, 1983, gage height, 2.97 ft; minimum daily, 6.0 ft<sup>3</sup>/s on many days in March 1984.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 48 ft<sup>3</sup>/s May 31, gage height, 2.77 ft; minimum daily, 6.0 ft<sup>3</sup>/s on many days in March.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.6	8.2				6.0	6.6	13	40	20	11	10
2	8.6	8.2				6.0	6.6	13	36	19	11	9.7
3	8.6	8.2				6.0	6.6	13	33	18	11	9.5
4	8.6	8.4				6.0	6.6	12	32	17	11	9.5
5	8.6	8.4				6.0	7.0	12	32	16	11	9.3
6	8.6	8.8				6.0	7.0	12	31	16	11	9.5
7	8.4	9.1				6.0	7.0	12	31	15	11	9.0
8	8.4	8.4				6.0	7.4	12	30	15	10	9.3
9	8.9	8.4				6.0	7.4	12	29	14	10	9.1
10	8.8	8.4				6.0	7.4	13	28	14	10	9.1
11	8.6	9.5				6.0	7.4	13	27	14	10	9.1
12	8.6	8.9				6.0	7.4	13	28	13	10	8.9
13	8.6	8.6				6.0	7.4	15	31	13	10	8.9
14	8.4	8.4				6.0	7.4	20	31	13	10	8.8
15	8.4	8.2				6.4	7.4	31	33	13	10	8.8
16	8.4	8.2				6.4	7.4	33	36	12	10	8.6
17	8.2	8.4				6.4	9.0	31	34	12	10	8.6
18	8.4	8.4				6.4	13	29	32	12	10	8.4
19	8.2	8.2				6.4	17	30	31	12	10	8.6
20	8.2	8.2				6.4	20	36	31	12	10	9.1
21	8.0	8.0				7.0	22	36	38	12	9.7	9.7
22	8.0	8.0				7.0	20	33	34	12	9.7	9.5
23	8.0	8.0				7.0	19	32	31	12	9.7	9.3
24	8.0	8.0				7.0	18	31	30	12	9.7	9.1
25	8.0	8.0				7.0	17	30	28	12	9.7	9.1
26	8.0	7.9				7.0	17	28	27	11	9.7	9.1
27	8.2	7.9				6.6	15	28	26	12	9.7	9.1
28	8.2	7.9				6.6	15	28	24	11	9.5	8.9
29	8.2	7.9				6.6	14	30	23	12	9.3	8.9
30	8.2	7.9				6.6	13	41	22	12	9.5	8.8
31	8.2	---				6.6	---	45	---	11	11	---
TOTAL	259.1	249.0				197.4	343.0	737	919	419	314.2	273.3
MEAN	8.36	8.30				6.37	11.4	23.8	30.6	13.5	10.1	9.11
MAX	8.9	9.5				7.0	22	45	40	20	11	10
MIN	8.0	7.9				6.0	6.6	12	22	11	9.3	8.4
CFSM	.55	.54				.42	.75	1.56	2.00	.88	.66	.60
IN.	.63	.61				.48	.83	1.79	2.23	1.02	.76	.66
AC-FT	514	494				392	680	1460	1820	831	623	542

## PEND OREILLE RIVER BASIN

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12387450 VALLEY CREEK NEAR ARLEE, MT--Continued

## WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	CLOUD COVER (PER- CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (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)	
APR 25...	0915	18	10	1	108	7.9	4.5	2.5	666	12.2	102	
MAY 31...	1500	44	50	2	60	7.8	15.0	5.0	672	11.6	103	
JUN 19...	0930	32	0	0	85	7.9	18.0	6.5	670	10.9	101	
SEP 07...	1445	9.4	80	1	168	8.1	16.0	8.0	668	10.6	102	
DATE		HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCAR- BONATE (MG/L CACO3) (00902)	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 25...	57	0	16	4.2	1.8	.1	.70	60	.6	.20	.10	
MAY 31...	26	0	7.4	1.9	1.1	.0	.40	27	3.1	--	<.10	
JUN 19...	42	0	12	2.9	1.5	.1	.50	41	2.5	.20	<.10	
SEP 07...	90	3	26	6.0	1.9	.0	1.0	87	3.0	.20	<.10	
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, 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)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
APR 25...	11	71	.10	3.4	<.10	.120	--	<.20	<.010	20	14	
MAY 31...	1.8	--	--	--	<.10	.020	.38	.40	.010	<10	7	
JUN 19...	8.6	53	.07	4.6	<.10	.040	.16	.20	.020	<10	11	
SEP 07...	11	100	.14	2.6	<.10	<.010	--	<.20	.050	20	<3	
DATE	TIME	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	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)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)					
MAY 31...	1500	90	<2	<2	3	80	<10					
SEP 07...	1445	60	<2	2	3	30	<10					
DATE		MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	STRON- TIUM, TOTAL RECOV- ERABLE (UG/L AS SR) (01082)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)					
MAY 31...		4	<20	<10	<2	11	10					
SEP 07...		<1	<20	<10	<2	26	<10					

## PEND OREILLE RIVER BASIN

12387450 VALLEY CREEK NEAR ARLEE, MT--Continued

SUSPENDED-SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	TEMPER- ATURE (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR 25...	0915	2.5	18	10	.49	78
MAY 31...	1500	5.0	44	17	2.0	78
JUN 19...	0930	6.5	32	3	.26	94
SEP 07...	1445	8.0	9.4	<1	.03	100

ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
OCT 26...	1510	7.9	--	174	8.0	5.5
DEC 05...	1325	7.9	--	170	1.0	.5
MAR 13...	1020	6.1	--	173	1.5	2.5
APR 25...	0915	18	1	108	4.5	2.5
MAY 31...	1500	44	2	60	15.0	5.0
JUN 19...	0930	32	0	85	18.0	6.5
JUL 25...	1350	12	--	152	29.5	10.5
SEP 07...	1445	9.4	1	168	16.0	8.0

PEND OREILLE RIVER BASIN

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12388400 REVAIS CREEK BELOW WEST FORK, NEAR DIXON, MT

LOCATION.--Lat 47°16'00", long 114°24'21", in SE¼NE¼NW¼ 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, and 7.3 mi southwest of Dixon, MT.

DRAINAGE AREA.--26.3 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,420 ft, from topographic map.

REMARKS.--Water-discharge records good. No known regulation or diversion above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 198 ft<sup>3</sup>/s May 30, 1984, gage height, 3.77 ft; maximum gage height, 4.43 ft Dec. 20, 1984 (backwater from ice); minimum daily discharge, 5.0 ft<sup>3</sup>/s Dec. 24, 1983.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 198 ft<sup>3</sup>/s May 30, gage height, 3.77 ft; maximum gage height, 4.43 ft Dec. 20 (backwater from ice); minimum daily discharge, 5.0 ft<sup>3</sup>/s Dec. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.6	7.0	6.4	6.2	6.6	5.6	5.8	15	107	43	9.4	8.0
2	7.6	7.0	6.6	6.2	6.6	5.6	5.8	15	82	40	9.4	7.8
3	7.6	7.0	6.8	6.3	6.6	5.6	5.8	14	70	38	9.4	7.4
4	7.5	7.7	6.8	6.8	6.4	5.6	5.8	14	66	36	9.1	7.2
5	7.6	7.5	6.8	8.4	6.4	5.6	5.8	13	67	32	9.1	7.0
6	7.5	8.1	6.8	8.6	6.4	5.5	6.2	12	67	30	9.1	7.0
7	7.4	8.6	6.6	8.6	6.4	5.4	6.2	12	65	29	9.1	7.0
8	7.4	7.8	7.0	8.6	6.4	5.4	6.5	11	63	29	8.9	7.0
9	7.7	7.6	7.4	8.3	6.4	5.6	6.9	12	62	26	8.9	7.0
10	7.7	7.8	7.4	7.8	6.4	5.8	6.8	13	59	24	8.5	7.0
11	7.5	9.6	7.4	7.8	6.4	5.9	6.8	14	57	23	8.2	7.0
12	7.4	8.9	7.3	7.6	6.4	5.8	6.6	16	57	22	9.0	7.0
13	7.4	8.6	7.2	7.5	6.4	5.8	6.6	21	60	20	9.0	6.8
14	7.4	8.6	7.2	6.8	6.3	5.9	6.6	42	67	17	8.2	6.8
15	7.4	8.4	7.0	6.6	6.2	6.2	6.7	91	70	17	8.2	6.8
16	7.4	8.2	6.8	6.4	6.2	6.2	8.7	74	77	16	8.0	6.8
17	7.4	8.2	6.6	5.8	6.2	6.2	15	57	73	16	8.0	6.8
18	7.5	8.2	6.4	5.8	6.2	6.2	24	54	67	15	8.0	6.6
19	7.4	7.9	6.2	5.6	5.9	6.0	28	55	65	13	8.0	6.6
20	7.4	7.8	5.9	6.0	5.8	6.1	37	97	65	13	7.8	6.7
21	7.4	7.8	5.6	6.3	5.8	6.5	34	98	82	12	7.8	7.0
22	7.4	7.6	5.4	6.6	5.8	6.4	32	72	83	12	7.8	7.4
23	7.4	7.6	5.2	6.6	5.8	6.4	30	69	68	12	7.8	7.9
24	7.4	7.6	5.0	6.6	5.8	6.4	27	65	65	12	7.5	7.6
25	7.4	7.6	5.4	7.7	5.8	6.4	26	57	65	12	7.2	7.5
26	7.4	7.6	5.8	7.3	5.8	6.4	22	56	63	12	7.2	7.4
27	7.2	7.6	6.0	7.2	5.7	6.3	21	56	57	11	7.0	7.4
28	7.0	7.4	5.8	7.2	5.6	6.2	20	56	54	11	7.0	7.2
29	7.0	6.8	6.2	7.2	5.6	6.2	17	66	51	11	7.0	7.0
30	7.0	6.2	6.2	6.9	---	6.0	15	140	45	9.8	7.0	7.0
31	7.0	---	6.2	6.6	---	5.8	---	169	---	9.7	7.6	---
TOTAL	229.4	234.3	199.4	217.9	178.3	185.0	451.6	1556	1999	623.5	254.2	213.7
MEAN	7.40	7.81	6.43	7.03	6.15	5.97	15.1	50.2	66.6	20.1	8.20	7.12
MAX	7.7	9.6	7.4	8.6	6.6	6.5	37	169	107	43	9.4	8.0
MIN	7.0	6.2	5.0	5.6	5.6	5.4	5.8	11	45	9.7	7.0	6.6
CFSM	.28	.30	.24	.27	.23	.23	.57	1.91	2.53	.76	.31	.27
IN.	.32	.33	.28	.31	.25	.26	.64	2.20	2.83	.88	.36	.30
AC-FT	455	465	396	432	354	367	896	3090	3970	1240	504	424

CAL YR 1983 TOTAL 7062.2 MEAN 19.3 MAX 174 MIN 5.0 CFSM .73 IN 9.99 AC-FT 14010  
WTR YR 1984 TOTAL 6342.3 MEAN 17.3 MAX 169 MIN 5.0 CFSM .66 IN 8.97 AC-FT 12580



## PEND OREILLE RIVER BASIN

12388400 REVAIS CREEK BELOW WEST FORK, NEAR DIXON, MT--Continued

## WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	CLOUD COVER (PER- CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (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)	
APR 23...	0915	31	95	1	16	6.9	5.0	4.5	670	11.4	100	
MAY 31...	1700	150	30	2	12	7.0	10.0	5.0	674	11.4	101	
JUN 19...	1130	62	75	2	13	7.1	23.5	7.5	672	11.0	104	
SEP 07...	1100	7.0	80	1	23	7.3	12.0	9.0	668	10.4	103	
DATE		HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCAR- BONATE (MG/L CACO3) (00902)	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 23...	6	0	1.8	.46	1.8	.3	.40	8.0	3.6	.40	<.10	
MAY 31...	3	0	.90	.20	1.0	.3	.20	3.0	6.9	.30	<.10	
JUN 19...	4	0	1.0	.30	1.2	.3	.40	5.0	1.6	.20	<.10	
SEP 07...	6	0	1.7	.50	2.3	.4	.60	10	1.9	.20	<.10	
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, 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)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
APR 23...	11	24	.03	2.0	<.10	.070	.13	.20	.020	<10	44	
MAY 31...	7.5	19	.03	7.6	<.10	.010	.19	.20	.010	<10	23	
JUN 19...	8.3	16	.02	2.7	<.10	.040	--	<.20	.010	<10	16	
SEP 07...	13	26	.04	.50	<.10	.020	--	<.20	.050	20	12	
DATE	TIME	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	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)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)					
MAY 31...	1700	90	<2	<2	<2	60	<10					
SEP 07...	1100	50	<2	<2	<2	63	<10					
DATE		MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	STRON- TIUM, TOTAL RECOV- ERABLE (UG/L AS SR) (01082)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)					
MAY 31...	3	<20	<10	<2	10	10						
SEP 07...	1	20	<10	<2	20	<10						

PEND OREILLE RIVER BASIN

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12388400 REVAIS CREEK BELOW WEST FORK, NEAR DIXON, MT--Continued

SUSPENDED-SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	TEMPER- ATURE (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR 23...	0915	4.5	31	5	.42	72
MAY 31...	1700	5.0	150	9	3.6	96
JUN 19...	1130	7.5	62	1	.17	78
SEP 07...	1100	9.0	7.0	1	.02	100

ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
OCT 27...	0940	7.3	--	27	7.0	4.5
DEC 06...	1010	6.8	--	25	-2.0	.0
JAN 17...	0940	5.9	--	28	-18.0	.0
MAR 07...	1315	5.5	--	24	7.0	1.5
APR 23...	0915	31	1	16	5.0	4.5
MAY 31...	1700	150	2	12	10.0	5.0
JUN 07...	1040	60	--	16	10.0	5.0
JUN 19...	1130	62	2	13	23.5	7.5
JUL 25...	1110	12	--	19	21.0	11.0
SEP 07...	1100	7.0	1	23	12.0	9.0

## PEND OREILLE RIVER BASIN

12388650 CAMAS CREEK NEAR HOT SPRINGS, MT

LOCATION.--Lat 47°29'19", long 114°41'42", in NE¼SW¼SE¼ sec.18, T.20 N., R.24 W., Sanders County, Hydrologic Unit 17010212, Flathead Indian Reservation, on left bank 200 ft upstream from bridge, 4.6 mi northwest of former community of Camas Prairie, 7.7 mi southwest of Hot Springs, and 10.0 mi northwest of Perma.

DRAINAGE AREA.--4.46 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 3,120 ft, from topographic map.

REMARKS.--Water-discharge records fair except those for winter period, which are poor. No known regulation or diversion upstream of station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5.6 ft<sup>3</sup>/s Apr. 21, 1984, gage height, 0.97 ft; maximum gage height, 1.04 ft Jan. 17, 1983 (backwater from ice); minimum discharge, 0.18 ft<sup>3</sup>/s Aug. 27, 28, 1984, gage height, 0.42 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5.6 ft<sup>3</sup>/s Apr. 21, gage height, 0.97 ft; minimum, 0.18 ft<sup>3</sup>/s Aug. 27, 28, gage height, 0.42 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.39	.57	.50	.70	.96	.66	.85	2.4	1.2	.61	.28	.34
2	.39	.57	.54	.76	.95	.70	.85	2.2	1.1	.57	.28	.28
3	.36	.57	.58	.84	.95	.75	.80	2.1	1.1	.47	.28	.26
4	.39	.75	.60	.90	.95	.70	.80	2.0	1.1	.43	.31	.26
5	.47	.70	.60	1.0	.95	.66	.75	1.9	1.1	.39	.31	.24
6	.47	.85	.60	.95	.90	.66	.80	1.9	1.1	.39	.34	.31
7	.47	1.1	.62	.90	.90	.70	.85	1.8	1.1	.36	.34	.31
8	.47	.75	.65	.87	.90	.75	.85	1.7	1.1	.36	.31	.31
9	.52	.66	.68	.84	.90	.75	.90	1.7	.95	.36	.29	.31
10	.57	.66	.72	.82	.90	.75	.90	1.7	.95	.34	.28	.28
11	.57	.85	.78	.81	.90	.75	.90	1.8	.95	.34	.27	.28
12	.52	.85	.82	.80	.90	.90	.90	1.8	.90	.31	.26	.28
13	.52	.85	.76	.79	.85	1.1	.90	1.7	.90	.28	.26	.26
14	.52	.80	.70	.76	.80	1.1	.90	1.8	.90	.28	.25	.24
15	.52	.75	.64	.75	.80	1.1	.90	2.1	.85	.26	.25	.24
16	.52	.70	.58	.74	.80	1.0	1.0	2.2	.80	.24	.25	.24
17	.52	.70	.52	.73	.75	.90	1.3	2.2	.66	.24	.25	.24
18	.61	.70	.48	.72	.75	.95	1.8	2.1	.61	.24	.25	.22
19	.61	.70	.44	.70	.75	.90	2.8	2.0	.57	.22	.23	.22
20	.61	.70	.40	.74	.75	.90	4.7	2.8	.61	.22	.23	.24
21	.61	.70	.36	.85	.75	.95	5.4	2.1	1.9	.22	.22	.31
22	.61	.66	.33	1.0	.75	1.1	5.4	2.0	1.3	.22	.22	.31
23	.61	.66	.30	1.2	.75	1.1	5.1	2.1	1.1	.22	.22	.34
24	.61	.66	.33	1.4	.75	1.1	4.7	1.9	.95	.22	.22	.34
25	.61	.66	.37	1.7	.75	.95	4.5	1.9	.85	.20	.22	.31
26	.61	.66	.41	1.9	.75	.95	3.9	1.8	.75	.20	.20	.31
27	.52	.66	.45	1.7	.70	.95	3.4	1.8	.70	.28	.18	.31
28	.61	.66	.49	1.4	.70	.95	3.1	1.7	.66	.31	.18	.31
29	.52	.60	.54	1.2	.70	.95	2.8	1.4	.61	.26	.20	.31
30	.52	.54	.58	1.1	---	.90	2.5	1.3	.61	.66	.20	.31
31	.52	---	.64	.98	---	.85	---	1.3	---	.34	.28	---
TOTAL	16.37	21.24	17.01	30.55	23.91	27.43	65.25	59.2	27.98	10.04	7.86	8.52
MEAN	.53	.71	.55	.99	.82	.88	2.18	1.91	.93	.32	.25	.28
MAX	.61	1.1	.82	1.9	.96	1.1	5.4	2.8	1.9	.66	.34	.34
MIN	.36	.54	.30	.70	.70	.66	.75	1.3	.57	.20	.18	.22
CFSM	.12	.16	.12	.22	.18	.20	.49	.43	.21	.07	.06	.06
IN.	.14	.18	.14	.25	.20	.23	.54	.49	.23	.08	.07	.07
AC-FT	32	42	34	61	47	54	129	117	55	20	16	17
CAL YR 1983	TOTAL 364.50	MEAN 1.00	MAX 4.7	MIN .22	CFSM .22	IN 3.04	AC-FT 723					
WTR YR 1984	TOTAL 315.36	MEAN .86	MAX 5.4	MIN .18	CFSM .19	IN 2.63	AC-FT 626					

## PEND OREILLE RIVER BASIN

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12388650 CAMAS CREEK NEAR HOT SPRINGS, MT--Continued

## WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	CLOUD COVER (PER- CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (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)
MAR 22...	0845	1.1	--	1	94	7.9	8.0	3.5	680	12.2	103
APR 19...	0900	2.4	75	1	75	7.7	13.0	8.0	672	10.8	104
JUN 18...	0900	.61	0	1	95	8.0	15.5	10.0	679	10.0	100
SEP 05...	0930	.24	90	2	150	8.1	16.5	12.0	677	9.2	96
DATE	HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCAR- BONATE (MG/L CACO3) (00902)	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)
MAR 22...	41	0	10	3.8	5.4	.4	.80	50	8.7	1.0	<.10
APR 19...	33	0	8.2	3.0	5.0	.4	1.0	38	8.8	1.0	<.10
JUN 18...	38	0	9.2	3.7	5.4	.4	.40	46	5.8	.40	<.10
SEP 05...	61	0	15	5.7	7.3	.4	1.2	72	7.6	.90	<.10
DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	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)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
MAR 22...	18	78	.11	.23	--	.090	.31	.40	.020	<10	110
APR 19...	18	68	.09	.44	<.10	.080	.32	.40	.030	<10	190
JUN 18...	17	70	.09	.11	<.10	.030	.47	.50	.010	<10	59
SEP 05...	22	100	.14	.07	<.10	.030	.37	.40	.030	<10	37
DATE	TIME	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	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)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)				
APR 19...	0900	570	<2	<2	5	510	<10				
SEP 05...	0930	130	<2	<2	2	11	<10				
DATE	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	STRON- TIUM, TOTAL RECOV- ERABLE (UG/L AS SR) (01082)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)					
APR 19...	19	<20	<10	<2	64	11					
SEP 05...	11	<20	<10	<2	120	<10					



## PEND OREILLE RIVER BASIN

12388650 CAMAS CREEK NEAR HOT SPRINGS, MT--Continued

## SUSPENDED-SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	TEMPER- ATURE (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAR 22...	0845	3.5	1.1	10	.03	66
APR 19...	0900	8.0	2.4	15	.10	98
JUN 18...	0900	10.0	.61	4	.01	93
SEP 05...	0930	12.0	.24	2	<.01	100

## ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
NOV 09...	1000	.68	--	126	4.0	2.0
JAN 09...	1220	.84	--	95	5.0	.0
30...	0925	1.1	--	92	.0	.0
FEB 23...	1330	.77	--	110	6.0	2.0
MAR 14...	1330	1.1	--	93	10.0	5.0
22...	0845	1.1	1	94	8.0	3.5
APR 19...	0900	2.4	1	75	13.0	8.0
JUN 18...	0900	.61	1	95	15.5	10.0
22...	1130	1.3	--	87	18.0	10.0
AUG 23...	1000	.22	--	147	21.0	14.0
SEP 05...	0930	.24	2	150	16.5	12.0

## PEND ORILLE RIVER BASIN

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12388700 FLATHEAD RIVER AT PERMA, MT

LOCATION.--Lat 47°22'03", long 114°35'03", in SE~~NE~~NE~~NE~~ 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 mile 10.9.

DRAINAGE AREA.--8,795 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1983 to September 1984.

GAGE.--Water-stage recorder. Datum of gage is 2,469.31 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Water-discharge records good. 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 above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,900 ft<sup>3</sup>/s June 29, 1984, gage height, 17.83 ft; maximum gage height, 18.02 ft Jan. 21, 22, 1984 (backwater from ice); minimum daily discharge, 2,670 ft<sup>3</sup>/s May 29, 1984.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 37,900 ft<sup>3</sup>/s June 29, gage height, 17.83; maximum gage height, 18.02 ft Jan. 21, 22 (backwater from ice); minimum daily discharge, 2,670 ft<sup>3</sup>/s May 29.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11500	11600	12000	14000	11600	10100	8020	11200	10300	27600	7190	10400
2	11700	11000	10800	15000	11800	10900	6950	9890	13900	15600	7900	11900
3	12100	11700	10200	14000	10800	11000	6610	11300	13900	18000	7950	12100
4	12200	12000	11700	13500	10800	10400	6770	11900	13900	18700	7300	11700
5	8040	10900	12400	14000	11200	10000	7590	11300	13700	18700	6330	10600
6	12500	8220	11100	14500	11100	10800	7510	12400	13200	16500	7500	9960
7	12100	9150	9740	15000	11300	11500	8090	12200	13500	13000	7530	11000
8	10700	6890	11000	13000	11100	11100	7920	12100	14100	12700	6770	11100
9	10900	9590	9560	11800	11100	11000	7880	11800	13800	12400	5540	8050
10	9610	8880	10100	11200	11200	10900	6950	11600	22700	12500	7370	10000
11	9970	10400	9870	11400	10800	10400	7340	11700	23300	15900	6870	7980
12	11200	9310	8800	11000	11000	10300	7700	11600	18800	14900	5560	7570
13	10900	8170	9140	10900	10900	9250	7770	11600	17300	11600	5700	7740
14	11000	9970	6940	11800	11500	9190	7900	11800	17900	11400	5840	8160
15	11800	10300	9150	12000	11300	9400	7830	10400	23100	10800	5630	9130
16	10500	9910	8510	12000	11300	9390	7790	8890	28200	10600	5990	11700
17	11600	9020	10600	11900	10200	9150	7700	8790	30500	9420	4950	12300
18	11600	10200	8400	12000	9690	8940	8200	6970	30700	10100	6900	10300
19	10600	11300	8000	12000	10100	8580	8010	6220	23000	8120	4830	11000
20	9940	11400	7500	11500	10100	8430	9440	6980	18800	4940	5250	8770
21	8860	11700	7200	11800	9450	7810	10600	6610	22000	6290	5320	9450
22	9590	11800	8000	13500	9380	8090	10000	7040	28700	6050	4310	7430
23	9110	12200	9000	12500	8990	8410	10500	6490	30100	9590	5370	7360
24	11100	11300	10000	12000	8850	8570	10100	4810	29500	8020	5560	7520
25	11000	11700	10500	11500	9940	9280	11400	3590	20800	7830	8390	5980
26	11300	12300	11500	10600	9890	5800	11300	2930	14600	7200	9600	5580
27	7560	12900	12000	10900	10300	8210	11600	2890	20800	7300	9390	6560
28	8270	12100	13000	10300	10300	8110	9950	2790	25500	8040	8360	5800
29	10300	12200	14000	11600	9820	8060	11200	2670	36400	7470	7830	6140
30	10700	11600	14500	12400	---	8360	10800	2980	31100	7160	10700	4500
31	10900	---	14000	12400	---	8450	---	3890	---	7980	10500	---
TOTAL	329150	319710	319210	382000	305810	289880	261420	257330	634100	356410	214230	267780
MEAN	10620	10660	10300	12320	10550	9351	8714	8301	21140	11500	6911	8926
MAX	12500	12900	14500	15000	11800	11500	11600	12400	36400	27600	10700	12300
MIN	7560	6890	6940	10300	8850	5800	6610	2670	10300	4940	4310	4500
CFSM	1.21	1.21	1.17	1.40	1.20	1.06	.99	.94	2.40	1.31	.79	1.02
IN.	1.39	1.35	1.35	1.62	1.29	1.23	1.11	1.09	2.68	1.51	.91	1.13
AC-FT	652900	634100	633200	757700	606600	575000	518500	510400	1258000	706900	424900	531100

WTR YR 1984 TOTAL 3937030 MEAN 10760 MAX 36400 MIN 2670 CFSM 1.22 IN 16.65 AC-FT 7809000

## PEND OREILLE RIVER BASIN

12388700 FLATHEAD RIVER AT PERMA, MT--Continued

## WATER QUALITY RECORDS

PERIOD OF RECORD---Water years 1971-1973, April to September 1984.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	CLOUD COVER (PER- CENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (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)	
APR 23...	1230	12200	95	1	176	8.2	11.0	10.5	694	10.4	102	
JUN 18...	1400	30800	5	1	164	8.3	25.0	15.0	692	9.8	107	
JUL 17...	1000	10600	0	0	167	8.3	27.0	20.0	694	8.4	102	
SEP 05...	0830	11900	100	2	157	8.3	18.0	17.5	691	8.6	99	
DATE		HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCAR- BONATE (MG/L CACO3) (00902)	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 23...	93	0	26	6.8	2.9	.1	.70	96	5.1	.80	<.10	
JUN 18...	88	3	25	6.2	1.5	.0	.50	85	4.5	.60	<.10	
JUL 17...	91	7	26	6.3	1.8	.0	.50	84	4.9	.80	<.10	
SEP 05...	88	0	25	6.2	1.5	.0	.60	90	3.7	.40	<.10	
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, 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)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
APR 23...	4.8	100	.14	3450	<.10	.090	.11	.20	.030	<10	9	
JUN 18...	4.3	94	.13	7780	<.10	.030	--	<.20	.010	<10	5	
JUL 17...	4.3	95	.13	2720	<.10	.020	--	<.20	.010	<10	5	
SEP 05...	1.2	93	.13	2970	<.10	.030	--	<.20	.010	<10	5	
DATE	TIME	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	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)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)					
JUN 18...	1400	230	<2	<2	5	240	<10					
SEP 05...	0830	<30	<2	<2	9	89	<10					
DATE		MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	STRON- TIUM, TOTAL RECOV- ERABLE (UG/L AS SR) (01082)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)					
JUN 18...	13	<20	<10	<2	40	20						
SEP 05...	7	<20	<10	<2	40	<10						

PEND OREILLE RIVER BASIN

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12388700 FLATHEAD RIVER AT PERMA, MT--Continued

SUSPENDED-SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	TEMPER- ATURE (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	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 23...	1230	10.5	12200	34	1120	87
JUN 18...	1400	15.0	30800	22	1830	83
JUL 17...	1000	20.0	10600	3	86	88
SEP 05...	0830	17.5	11900	4	129	71

ADDITIONAL WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	WEATHER (WMO CODE NUMBER) (00041)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
NOV 16...	1330	9600	--	172	7.0	7.0
MAR 26...	1020	3390	--	178	2.0	4.0
APR 23...	1230	12200	1	176	11.0	10.5
JUN 18...	1400	30800	1	164	25.0	15.0
JUN 28...	1100	22600	--	164	23.0	17.0
JUL 17...	1000	10600	0	167	27.0	20.0
SEP 05...	0830	11900	2	157	18.0	17.5



## PEND OREILLE RIVER BASIN

## 12389000 CLARK FORK NEAR PLAINS, MT

LOCATION.--Lat 47°25'47", long 114°51'18", in E<sup>1</sup>SW<sup>4</sup> 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 mile 239.0.

DRAINAGE AREA.--19,958 mi<sup>2</sup>.

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 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.--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 above station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--74 years, 19,980 ft<sup>3</sup>/s, 14,480,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 134,000 ft<sup>3</sup>/s June 5, 1948, gage height, 19.17 ft; minimum, 3,200 ft<sup>3</sup>/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, 61,300 ft<sup>3</sup>/s June 23, gage height, 12.21 ft; minimum, 6,870 ft<sup>3</sup>/s Aug. 23, gage height, 3.73 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15300	15000	15500	16100	15900	12700	12300	19300	39900	49100	12000	12800
2	15600	15100	13500	17700	16200	13800	11400	18200	44400	35400	11800	15000
3	16000	15200	12800	16600	14800	14200	11000	18500	40200	33300	11900	15900
4	16300	15900	14900	15900	14700	13800	11000	19300	37500	33600	11100	15600
5	11800	15300	15800	17400	14900	13000	11200	18800	36000	32400	10500	14600
6	16200	13000	14900	18500	15000	14200	11600	19400	35500	30600	11300	13700
7	16300	13100	13300	21700	15000	14400	11800	19300	35500	25900	11300	13100
8	14600	11400	13300	22200	14800	14300	12400	19000	35400	24200	10700	14500
9	15200	13000	13400	19700	14700	14400	12500	18400	34100	23200	9330	12000
10	13900	13200	13000	18400	14700	14100	11600	18500	39900	22300	10300	13000
11	13500	14600	13700	17100	14000	14100	11800	18800	42100	24700	10100	11900
12	14800	14200	12000	16500	15000	14000	12200	19400	37900	24200	9220	11200
13	15500	12600	13400	16100	14400	13200	12200	20000	37700	20300	8820	11200
14	14800	14000	10600	16100	14900	12700	12400	22000	39200	19000	9070	11300
15	15600	14700	11900	16000	15000	13700	12200	24800	44900	18600	8820	11500
16	14900	14100	11700	15600	15200	13600	12400	29300	52200	17100	9210	14900
17	15500	13600	13600	15500	13700	13800	12600	34000	56300	16700	8390	15800
18	15700	14000	12100	16000	13600	13500	15000	31700	57000	15400	9880	14500
19	14900	15200	11400	15000	13800	12800	17100	29300	49500	14900	8030	13700
20	14300	15800	9330	13400	13400	12700	20200	29500	42900	11000	8450	12600
21	13000	15700	8760	14300	12800	11900	23100	31600	45700	11100	8380	12600
22	12600	16100	10600	16200	12600	12400	23000	33800	55600	10700	7510	10500
23	13300	16200	10200	16300	12200	12900	22700	30700	60600	13400	8080	11600
24	14500	15500	11000	16000	11800	13300	22100	28300	57000	13700	8340	11600
25	15000	15300	12600	15600	12600	13600	23200	27300	46600	12200	10500	9980
26	15200	16300	13600	16300	13200	11100	22500	24600	39000	11500	12600	9770
27	12700	16800	13100	15700	13100	13100	21900	23200	43600	11600	12100	10600
28	11700	16300	14700	15600	13400	12600	19600	22500	47300	12400	11300	9770
29	12800	16100	15800	16700	13200	12500	20100	21900	59400	11500	9980	10000
30	15000	15600	16800	17500	---	12200	19300	23400	53500	11500	12700	8750
31	14500	---	15200	17400	---	12800	---	29400	---	11900	13700	---
TOTAL	451000	442900	402490	519100	408600	411400	472400	744200	1346400	623400	315410	373970
MEAN	14550	14760	12980	16750	14090	13270	15750	24010	44880	20110	10170	12470
MAX	16300	16800	16800	22200	16200	14400	23200	34000	60600	49100	13700	15900
MIN	11700	11400	8760	13400	11800	11100	11000	18200	34100	10700	7510	8750
AC-FT	894600	878500	798300	1030000	810500	816000	937000	1476000	2671000	1237000	625600	741800
CAL YR 1983	TOTAL	6724270	MEAN	18420	MAX	68200	MIN	7770	AC-FT	13340000		
WTR YR 1984	TOTAL	6511270	MEAN	17790	MAX	60600	MIN	7510	AC-FT	12920000		

## PEND OREILLE RIVER BASIN

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## 12389500 THOMPSON RIVER NEAR THOMPSON FALLS, MT

LOCATION.--Lat 47°35'31", long 115°13'43", in NW¼ sec.7, T.21 N., R.28 W., Sanders County, Hydrologic Unit 17010213, Lolo National Forest, on right bank 1.3 mi upstream from mouth and 5.5 mi east of Thompson Falls.

DRAINAGE AREA.--642 mi<sup>2</sup>.

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 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.--Records good. Minor diversions above station for irrigation, acreage unknown. Diversion from headwaters of Alder Creek in SW¼ sec.16, T.23 N., R.25 W., to supplement water supply for storage in Upper Dry Fork Reservoir in Little Bitterroot River basin. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--28 years, 468 ft<sup>3</sup>/s, 9.90 in/yr, 339,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,080 ft<sup>3</sup>/s June 9, 1964, gage height, 8.53 ft; minimum, 60 ft<sup>3</sup>/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<sup>3</sup>/s, by slope-area measurement of peak flow at site 0.2 mi downstream.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,230 ft<sup>3</sup>/s May 31, gage height, 4.06 ft; minimum daily, 70 ft<sup>3</sup>/s Dec. 23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	159	148	92	134	166	148	197	344	1090	542	217	177
2	159	152	118	131	159	155	193	344	899	504	213	162
3	155	152	131	138	159	152	189	354	788	485	209	155
4	159	170	131	148	152	148	189	344	728	455	221	152
5	155	170	128	189	148	148	201	339	721	432	221	148
6	155	177	128	205	145	148	226	323	713	414	213	162
7	155	201	125	239	155	148	226	313	699	398	201	159
8	155	185	134	247	148	152	226	304	670	387	197	159
9	159	174	138	230	148	155	230	323	656	370	193	159
10	162	170	145	205	148	166	226	339	635	354	185	152
11	159	193	145	185	148	177	226	344	601	339	185	148
12	155	201	145	174	148	197	221	344	587	318	181	148
13	159	193	145	166	155	209	217	365	608	313	181	148
14	155	181	145	115	159	217	209	461	642	304	177	145
15	152	177	145	115	152	230	217	656	692	294	174	145
16	152	174	138	115	152	221	275	721	758	280	177	141
17	152	170	95	113	148	217	398	663	758	275	177	141
18	155	170	94	110	141	209	449	601	713	266	174	138
19	155	166	90	108	141	205	497	594	670	261	174	134
20	152	166	86	110	152	209	601	796	635	256	170	141
21	152	166	80	120	152	230	635	899	796	252	166	148
22	152	155	75	135	152	239	594	835	1030	247	162	148
23	155	152	70	150	148	234	587	811	924	243	162	152
24	152	159	72	162	148	230	548	804	843	239	162	145
25	148	162	75	217	145	226	504	758	788	234	159	141
26	145	159	80	213	141	226	461	706	750	230	155	141
27	145	155	85	193	141	217	426	684	713	247	152	141
28	145	152	90	193	145	213	398	670	677	234	145	141
29	145	138	95	193	145	209	376	699	628	230	148	138
30	148	92	100	181	---	205	360	924	587	230	152	138
31	148	---	115	170	---	201	---	1200	---	226	166	---
TOTAL	4754	4980	3435	5104	4341	6041	10302	17862	21999	9859	5569	4447
MEAN	153	166	111	165	150	195	343	576	733	318	180	148
MAX	162	201	145	247	166	239	635	1200	1090	542	221	177
MIN	145	92	70	108	141	148	189	304	587	226	145	134
CFSM	.24	.26	.17	.26	.23	.30	.53	.90	1.14	.50	.28	.23
IN.	.28	.29	.20	.30	.25	.35	.60	1.03	1.27	.57	.32	.26
AC-FT	9430	9880	6810	10120	8610	11980	20430	35430	43640	19560	11050	8820
CAL YR 1983	TOTAL	133978	MEAN 367	MAX 1820	MIN 70	CFSM .57	IN 7.76	AC-FT 265700				
WTR YR 1984	TOTAL	98693	MEAN 270	MAX 1200	MIN 70	CFSM .42	IN 5.72	AC-FT 195800				

## PEND OREILLE RIVER BASIN

12390700 PROSPECT CREEK AT THOMPSON FALLS, MT

LOCATION.--Lat 47°35'10", long 115°21'15", in lot 12, SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$  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<sup>2</sup>.

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

GAGE.--Water-stage recorder. Datum of gage is 2,382.40 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. No known regulation or diversions above station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--28 years, 254 ft<sup>3</sup>/s, 18.95 in/yr, 184,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,490 ft<sup>3</sup>/s Jan. 16, 1974, gage height, 9.86 ft; minimum, 26 ft<sup>3</sup>/s Nov. 30, 1979, gage height, 0.19 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,140 ft<sup>3</sup>/s May 31, gage height, 4.67 ft; minimum daily, 44 ft<sup>3</sup>/s Dec. 23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	54	47	55	75	162	99	173	254	857	291	93	72
2	54	48	56	80	151	102	168	269	714	262	91	68
3	53	47	58	85	142	100	163	275	632	243	89	67
4	54	53	58	95	135	98	160	271	586	229	89	66
5	56	48	60	110	130	96	163	267	572	216	90	65
6	56	51	63	125	125	94	172	258	565	203	87	69
7	56	51	64	145	130	94	177	250	555	194	84	66
8	55	47	67	160	125	94	182	248	545	182	81	66
9	57	46	67	140	122	97	183	273	536	172	80	64
10	56	47	69	125	119	100	185	295	504	163	80	64
11	54	52	67	112	118	105	183	307	485	156	79	63
12	54	50	67	128	117	115	183	309	482	148	78	64
13	53	49	67	123	121	125	183	328	526	140	77	62
14	53	49	67	115	121	129	177	434	572	136	76	61
15	52	49	66	105	115	148	182	576	614	130	75	60
16	52	50	64	104	114	183	231	562	639	128	75	59
17	53	51	62	102	113	190	379	494	603	123	75	58
18	52	52	63	98	110	187	415	449	559	118	74	58
19	51	54	61	92	109	183	420	449	519	114	73	58
20	51	55	55	92	108	183	449	698	488	114	72	59
21	51	54	51	94	109	197	434	835	536	110	72	57
22	52	53	45	94	108	212	420	721	519	109	71	57
23	51	53	44	97	105	220	432	698	458	105	70	56
24	50	54	45	99	104	226	415	710	429	104	69	54
25	49	54	47	165	103	220	385	668	420	102	69	54
26	49	54	49	214	100	220	353	621	415	103	68	53
27	47	55	52	212	99	207	326	653	393	104	68	53
28	47	55	54	205	98	197	307	664	369	100	69	52
29	47	55	56	194	98	190	284	725	351	99	68	51
30	47	55	60	180	---	183	267	955	326	97	69	51
31	47	---	65	170	---	178	---	1080	---	93	76	---
TOTAL	1613	1538	1824	3935	3411	4772	8151	15596	15769	4588	2387	1807
MEAN	52.0	51.3	58.8	127	118	154	272	503	526	148	77.0	60.2
MAX	57	55	69	214	162	226	449	1080	857	291	93	72
MIN	47	46	44	75	98	94	160	248	326	93	68	51
CFSM	.29	.28	.32	.70	.65	.85	1.50	2.76	2.89	.81	.42	.33
IN.	.33	.31	.37	.80	.70	.98	1.67	3.19	3.22	.94	.49	.37
AC-FT	3200	3050	3620	7810	6770	9470	16170	30930	31280	9100	4730	3580
CAL YR 1983	TOTAL	76331	MEAN 209	MAX 1240	MIN 44	CFSM 1.15	IN 15.60	AC-FT 151400				
WTR YR 1984	TOTAL	65391	MEAN 179	MAX 1080	MIN 44	CFSM .98	IN 13.37	AC-FT 129700				

## PEND OREILLE RIVER BASIN

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12391400 CLARK FORK BELOW NOXON RAPIDS DAM, NEAR NOXON, MT

LOCATION.--Lat 47°57'40", long 115°43'58", in SW¼ 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 mile 169.7.

DRAINAGE AREA.--21,833 mi<sup>2</sup>.

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 above station. Some sub-surface flow is 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 supervision of the Geological Survey, in connection with a Federal Power Commission project.

AVERAGE DISCHARGE.--24 years, 21,220 ft<sup>3</sup>/s, 15,370,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 124,900 ft<sup>3</sup>/s June 12, 1964; minimum daily, 80 ft<sup>3</sup>/s Oct. 16, 1960, Aug. 26, 1962, Aug. 18, 25, 31, Sept. 1, 1963, Sept. 11, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 62,400 ft<sup>3</sup>/s June 23; minimum daily, 3,370 ft<sup>3</sup>/s Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12700	15000	15500	14500	17900	21100	9980	17000	37100	51700	7140	11000
2	10300	17700	13300	14600	18800	17700	13900	19600	41900	44400	17500	7640
3	17800	12700	11900	17100	11300	14200	10900	16300	43900	38700	11300	14700
4	11900	13300	13200	12500	15700	21200	12400	23000	42300	30300	9280	16400
5	18100	15900	14300	15600	12000	16700	13200	24300	38000	32800	9550	18400
6	13200	15700	12000	17000	16700	18400	15500	23000	36800	37600	9560	16900
7	17300	13200	19700	20900	14500	13200	7630	22800	38800	31500	14400	13400
8	16500	13300	13100	23000	17500	10700	10800	17600	37300	24700	9410	12000
9	12800	11700	13400	20200	17600	10300	16500	20700	30600	25400	11700	11300
10	13500	14700	17900	19900	13500	20400	15400	19100	36600	21500	12200	13900
11	14600	11500	13400	18500	18600	21200	13400	23700	38600	24500	10300	12500
12	12300	17500	19200	18200	13300	16500	13500	21100	44000	20600	5790	11400
13	17800	13000	8950	15300	10900	14500	10600	20400	39600	21600	5430	12200
14	14300	13800	10700	18300	20800	14900	14200	23400	41800	19200	8650	8900
15	15500	14300	13800	15800	11700	12000	9930	23900	43000	20600	10600	8880
16	17100	14600	13000	15300	15400	7760	10500	36200	46300	16500	10400	8750
17	12800	13300	5810	16900	16700	5420	11700	40800	56700	14500	14700	18800
18	10400	13100	9160	10200	12500	11100	13900	39800	59700	18600	4830	14600
19	15400	15400	9370	14500	14800	11000	27800	40300	54700	14100	6910	20400
20	13000	14800	11500	15300	10300	7910	26300	38200	46000	14400	9140	10300
21	15900	15900	10000	8650	19900	11600	22100	38100	45600	9080	10400	8870
22	9950	18600	8170	15700	18300	10700	17600	35200	55800	9660	4960	6590
23	17800	14800	7670	17300	10900	9980	25400	34200	62400	13800	8420	13200
24	13900	14200	8200	13800	9370	9450	21400	35000	61200	13600	13100	14600
25	11100	13300	4770	20300	4710	13600	28200	32100	51500	15100	10600	15400
26	15700	19700	9130	18600	9820	16000	23100	25500	43700	16000	6480	14600
27	14300	18400	12400	15600	13200	15300	29900	18600	42500	11200	10200	12800
28	14400	13700	11800	16500	18900	16100	21300	21200	47100	9250	11700	12800
29	12700	16000	13800	19400	16500	14000	13100	21900	61300	7220	11600	3520
30	10600	14500	13600	14600	---	7110	23000	22000	56200	11000	11300	3370
31	13400	---	14700	17200	---	8030	---	32600	---	15800	19100	---
TOTAL	437050	443600	373430	511250	422100	418060	503140	827600	1381000	654910	316650	368120
MEAN	14100	14790	12050	16490	14560	13490	16770	26700	46030	21130	10210	12270
MAX	18100	19700	19700	23000	20800	21200	29900	40800	62400	51700	19100	20400
MIN	9950	11500	4770	8650	4710	5420	7630	16300	30600	7220	4830	3370
AC-FT	866900	879900	740700	1014000	837200	829200	998000	1642000	2739000	1299000	628100	730200
CAL YR 1983	TOTAL	6975700	MEAN	19110	MAX	73100	MIN	2310	AC-FT	13840000		
WTR YR 1984	TOTAL	6656910	MEAN	18190	MAX	62400	MIN	3370	AC-FT	13200000		



## PEND OREILLE RIVER BASIN

12392000 CLARK FORK AT WHITEHORSE RAPIDS, NEAR CABINET, ID

LOCATION.--Lat 48°05'18", long 116°04'16", in SW¼NW¼ 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<sup>2</sup>, based on revised area of 22,067 mi<sup>2</sup> for site 0.4 mi upstream.

PERIOD OF RECORD.--September 1928 to current year. Prior to October 1952, published as "near Heron, MT."

REVISED RECORDS.--WSP 1182: 1936. WSP 1736: 1931, 1936(m), 1937.

GAGE.--Water-stage recorder. Datum of gage is 2,060.00 ft National Geodetic Vertical Datum of 1929, levels by Washington Water Power Co. See WSP 1934 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 fair. Flow regulated by Hungry Horse Reservoir and Flathead Lake. Extreme diurnal fluctuation caused by powerplant at Cabinet Gorge Dam. Diversions above station for irrigation of about 354,000 acres. Discharge measurements indicate about 800 ft<sup>3</sup>/s ground-water inflow between Cabinet Gorge Dam and Whitehorse Rapids. Records given herein represent flow at Whitehorse Rapids, computed by adding 600 ft<sup>3</sup>/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<sup>3</sup>/s should be deducted from discharges published herein.

AVERAGE DISCHARGE.--56 years, 22,410 ft<sup>3</sup>/s, 16,240,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 153,000 ft<sup>3</sup>/s May 29 to June 1, 1948; maximum gage height, 50.97 ft May 31, 1948, site and datum then in use; minimum discharge observed, 270 ft<sup>3</sup>/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<sup>3</sup>/s Sept. 2, 1962.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1894 reached a discharge of 195,000 ft<sup>3</sup>/s from floodmark, elevation, 2,137.1 ft, at site about 4 mi upstream and 0.1 mi below "near Heron" site.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 77,900 ft<sup>3</sup>/s June 25, gage height, 21.47 ft; minimum recorded, 1,140 ft<sup>3</sup>/s Sept. 12, gage height, 4.33 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14000	16300	16200	15500	20500	21500	10000	23600	43000	56000	9090	13000
2	11900	18600	16600	18300	21900	19000	15200	19500	47200	48800	18800	8120
3	17700	13400	12900	17900	12900	16700	11800	20300	49500	44200	12700	16400
4	15400	15200	13500	14200	16300	20700	13700	23900	47100	33300	10800	18100
5	18400	17500	15100	16500	15600	19900	15700	26400	45100	35300	10000	19500
6	15600	18100	13400	19900	17900	20600	17000	26800	41400	43800	11600	18300
7	17900	15300	20300	21800	17100	15100	10300	26100	43500	34500	14700	15400
8	18500	14600	15200	26300	18400	15100	12200	24900	41600	29400	12000	13500
9	13500	13400	14900	23500	20200	12000	17800	22100	35600	29600	13000	13600
10	15100	15600	19900	22200	14800	20200	18500	22300	40700	27400	13700	14900
11	16300	14500	15600	20800	21300	20700	15000	24200	43700	25900	12100	17100
12	16100	18100	21900	21800	14600	22000	14700	24700	49900	23800	7750	9990
13	17000	15500	9160	17100	12400	20300	12600	24300	44300	25300	7330	15600
14	15500	17000	11400	20200	22500	18000	15800	26300	47600	24800	9130	8810
15	16400	17100	15300	17900	13200	14800	11700	27300	48900	23400	12200	9510
16	19200	14400	14800	17900	17800	10400	13600	40200	52700	20200	11000	9610
17	17000	13800	7180	18800	18200	7490	13200	45900	62000	17100	16700	20700
18	9590	14200	9970	12300	14500	7210	18900	44900	64000	19800	7410	16600
19	17500	17700	10100	15200	16500	13700	29800	44800	61200	18700	7120	22700
20	14400	15900	12100	16500	13000	9900	31500	44100	52500	18100	10300	11600
21	18100	17700	11900	10800	21200	12700	25600	44400	51800	10300	11200	9840
22	10900	20200	9200	17800	19600	12900	22000	39700	60800	12800	7190	7780
23	18700	16700	8770	19700	13100	12100	25900	40000	67400	13900	8150	13900
24	17300	17000	9240	16400	11600	11000	25500	40700	66400	15700	13600	16700
25	10500	13200	5530	20900	4650	13300	32400	37600	58000	16900	12300	16200
26	17500	20500	9760	21400	11500	17500	27000	30900	50900	17500	7600	16900
27	15800	20500	13400	17300	15900	18300	34000	24000	47100	12200	10300	14200
28	16400	15500	13600	18200	23200	17700	26800	24100	52300	10600	12600	15200
29	14200	17000	15900	21400	18200	17300	19200	25600	65400	8770	14300	8360
30	11300	16800	14600	17100	---	8950	23800	26800	61700	14400	11700	8270
31	14800	---	16600	19000	---	9980	---	37000	---	19400	19900	---
TOTAL	482490	491300	414010	574600	478550	477030	581200	953400	1543300	751870	356270	420390
MEAN	15560	16380	13360	18540	16500	15390	19370	30750	51440	24250	11490	14010
MAX	19200	20500	21900	26300	23200	22000	34000	45900	67400	56000	19900	22700
MIN	9590	13200	5530	10800	4650	7210	10000	19500	35600	8770	7120	7780
AC-FT	957000	974500	821200	1140000	949200	946200	1153000	1891000	3061000	1491000	706700	833800
CAL YR 1983	TOTAL	7882300	MEAN	21600	MAX	80000	MIN	4170	AC-FT	15630000		
WTR YR 1984	TOTAL	7524410	MEAN	20560	MAX	67400	MIN	4650	AC-FT	14920000		

## Smaller reservoirs in Pend Oreille River basin in Montana

- 12325000 GEORGETOWN LAKE.--Lat 46°12'55", long 113°16'40", in SW¼ sec.6, T.5 N., R.13 W., Granite County, Hydrologic Unit 17010202, at dam on Flint Creek, 2 mi west of Southern Cross, 8 mi south of Philipsburg, and at mile 38.8. DRAINAGE AREA, 50.1 mi<sup>2</sup>. 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, 30,950 acre-ft Aug. 4, elevation, 6,429.47 ft; minimum observed, 27,000 acre-ft Mar. 9-16, elevation, 6,428.14 ft.
- 12332500 EAST FORK ROCK CREEK RESERVOIR.--Lat 46°07'54", long 113°22'48", in NE¼ sec.6, T.4 N., R.14 W., Granite County, Hydrologic Unit 17010202, at dam on East Fork Rock Creek, 14 mi southwest of Philipsburg, and at mile 9.7. DRAINAGE AREA, 30.3 mi<sup>2</sup>. 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, 16,230 acre-ft June 15, elevation, 6,056.0 ft; minimum observed, 8,810 acre-ft Oct. 1, 4, elevation, 6,034.71 ft.
- 12336500 NEVADA LAKE.--Lat 46°48'06", long 112°48'42", in NE¼ 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<sup>2</sup>. 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.
- EXTREMES FOR CURRENT YEAR: Maximum contents observed, 12,720 acre-ft May 15, 30, June 15, elevation, 4,616.89 ft; minimum contents, 3,080 acre-ft Dec. 15, elevation, 4,583.42 ft.
- 12342000 PAINTED ROCKS LAKE.--Lat 45°43'06", long 114°16'45", in NE¼SE¼ 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 mile 19.8. DRAINAGE AREA, 317 mi<sup>2</sup>. 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 prior to December 1958; most monthly readings made by Geological Survey personnel thereafter. REVISED RECORDS, WSP 1316: Drainage area.
- EXTREMES OF PERIOD OF RECORD: Maximum contents observed, 33,930 acre-ft June 18, 1974, 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.
- EXTREMES FOR CURRENT YEAR: Maximum contents observed, 32,960 acre-ft May 15, elevation, 4,727.3 ft; minimum observed, 7,240 acre-ft Mar. 2, elevation, 4,669.5 ft.
- 12344500 LAKE COMO.--Lat 46°03'40", long 114°14'00", in NE¼NW¼ 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 mile 3.6. DRAINAGE AREA, 54.6 mi<sup>2</sup>. PERIOD OF RECORD, October 1939 to current year. April to August 1948 scattered daily gage height and contents, published in WSP 1080. Prior to October 1967, published as Como Lake. Nonrecording gage read at or near end of month in winter and more often during irrigation season but only monthend figures supplied. Datum of gage is at 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, 35,120 acre-ft June 30, elevation, 4,242.7 ft; minimum observed, 7,450 acre-ft Sept. 30 (interpolated).

## Smaller reservoirs in Pend Oreille River basin in Montana--Continued

CAMAS RESERVOIRS.--A group of four reservoirs in the Little Bitterroot River basin operated for irrigation and recreation. Nonrecording gages are set to approximate 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 SE½SE½SW¼ 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 mile 70.3. DRAINAGE AREA, 31.8 mi<sup>2</sup>. 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, 20,000 acre-ft Oct. 31, elevation, 3,904.78 ft; minimum observed, 12,300 acre-ft Sept. 30, elevation, 3,902.58 ft.

12372500 HUBBART RESERVOIR.--Lat 47°55'43", long 114°43'53", in SE½NE¼ 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 mile 55.8. DRAINAGE AREA, 114 mi<sup>2</sup>. PERIOD OF RECORD, December 1939, April 1940, September 1940 to current year.

Reservoir is formed by concrete variable-radius dam; storage began in 1924. Usable capacity, 12,120 acre-ft between elevation 3,140.0 ft and 3,210.0 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.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 10,750 acre-ft May 31, elevation, 3,215.9 ft; minimum observed, 3,560 acre-ft Sept. 30, elevation, 3,193.9 ft.

12375000 UPPER DRY FORK RESERVOIR.--Lat 47°44'55", long 114°40'53", in SE½SE½SW¼ 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<sup>2</sup>. 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 SW¼ 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, 2929.5 ft; no storage at times in 1940, 1942, 1943.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 2,170 acre-ft June 30, elevation, 2,926.2 ft; minimum observed, 312 acre-ft Sept. 30, elevation, 2,913.5 ft.

12375500 DRY FORK RESERVOIR.--Lat 47°42'00", long 114°40'02", in SW¼NW¼NW¼ sec.3, T.22 N., R.24 W., Sanders County, Hydrologic Unit 17010202, at dam on Dry Fork Creek, 1 mi west of Lonepine. DRAINAGE AREA, 17.8 mi<sup>2</sup>. 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 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, 2,170 acre-ft June 30, elevation, 2,855.7 ft; minimum observed, 312 acre-ft Sept. 30, elevation, 2,835.6 ft.

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 SW¼NW¼NE¼ 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, 721 acre-ft June 30, elevation, 3,087.6 ft; minimum observed, 131 acre-ft Aug. 31, Sept. 30, elevation, 3,070.0 ft.

12376700 LOWER CROW RESERVOIR.--Lat 47°30'09", long 114°13'35", in SW¼SE½SE¼ sec.11, T.20 N., R.21 W., at outlet works on Crow Creek, 5.2 mi northwest of Charlo, at 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, 6,120 acre-ft Mar. 31, elevation, 2,862.0 ft; minimum observed, 1,600 acre-ft Sept. 30, elevation 2,835.0 ft.

12377200 MISSION RESERVOIR.--Lat 47°18'54", long 114°01'15", in NW¼SW¼SE¼ sec.15, T.18 N., R.19 W., at outlet works on Mission Creek, 4 mi east of St. Ignatius and at mile 16.7; storage began in 1935. Usable capacity, 7,250 acre-ft between elevation 3,340.7 ft and 3,406.0 ft.

EXTREMES FOR 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, 8,250 acre-ft June 30, elevation, 3,409.4 ft; minimum observed, 1,950 acre-ft Aug. 31, elevation, 3,384.6 ft.



## Smaller reservoirs in Pend Oreille River Basin in Montana--Continued

## MISSION VALLEY RESERVOIRS--Continued

12377300 ST. MARYS LAKE.--Lat 47°15'58", long 113°56'08", in SW¼NE¼NE¼ 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, 22,630 acre-ft June 30, elevation, 4,022.6 ft; minimum observed, 228 acre-ft Sept. 30, elevation, 3,913.0 ft.

12377900 PABLO RESERVOIR.--Lat 47°38'25", long 114°08'33", in SW¼SW¼NE¼ 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 supplied by Flathead pumping plant; storage began in 1914. Usable capacity, 27,100 acre-ft between elevation 3,179 ft, gate sill, and 3,210.2 ft. No dead storage.

EXTREMES FOR 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, 26,930 acre-ft June 30, elevation, 3,210.2 ft; minimum observed, 12,130 acre-ft Sept. 30, elevation, 3,201.1 ft.

12378200 McDONALD RESERVOIR.--Lat 47°25'31", long 113°59'27", in SE¼NE¼NE¼ sec.10, T.19 N., R.19 W., at outlet works on Post Creek, 9 mi east of Charlo, and at 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, 8,250 acre-ft June 30, elevation, 3,598.1 ft; minimum observed, 285 acre-ft Oct. 31, elevation, 3,548.0 ft.

12379700 KICKING HORSE RESERVOIR.--Lat 47°27'25", long 114°04'35", in SE¼NE¼NE¼ 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 3,042.0 ft and 3,061.94 ft. Dead storage, 70 acre-ft below elevation 3,042.0 ft.

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, 9,700 acre-ft June 30, elevation, 3,063.6 ft; minimum observed, 1,650 acre-ft Oct. 31, elevation, 3,050.4 ft.

12380000 NINEPIPE RESERVOIR.--Lat 47°27'20", long 114°08'08", in NE¼NW¼NW¼ 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.

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, 15,100 acre-ft June 30, elevation, 3,010.1 ft; minimum observed, 1,900 acre-ft Sept. 30, elevation, 2,997.9 ft.

12380500 LOWER JOCKO LAKE.--Lat 47°12'10", long 113°45'35", in NW¼SW¼NW¼ 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 mile 39.3. DRAINAGE AREA, 7.39 mi<sup>2</sup>. 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 SW¼ 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, 5,050 acre-ft June 30, elevation, 4,328.0 ft; no storage most of year.

12390000 THOMPSON FALLS RESERVOIR.--Lat 47°35'42", long 115°21'36", in NE¼ sec.7, T.21 N., R.29 W., Sanders County, Hydrologic Unit 17010213, at dam on Clark Fork at Thompson Falls, at mile 208.0. DRAINAGE AREA, 20,968 mi<sup>2</sup>. 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 contents observed, 16,060 acre-ft Nov. 30, 1949, elevation, 2,396.7 ft; no storage July 31, 1958.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 15,750 acre-ft Oct. 31, July 31, elevation, 2,396.5 ft; minimum observed, 13,250 acre-ft Sept. 30, elevation, 2,394.8 ft.



## PEND OREILLE RIVER BASIN

## Smaller reservoirs in Pend Oreille River basin in Montana--Continued

12391300 NOXON RAPIDS RESERVOIR.--Lat 47°57'38", long 115°44'00", in NE¼SW¼ 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 mile 169.7. DRAINAGE AREA, 21,833 mi<sup>2</sup>. 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 and 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, 333,000 acre-ft June 18, elevation, 2,330.80 ft; minimum, 249,300 acre-ft May 21, elevation, 2,319.48 ft.

## Monthend contents, in acre-ft, water year October 1983 to September 1984

Date	Georgetown Lake	East Fork Rock Creek Reservoir	Nevada Lake	Painted Rocks Lake	Lake Como	Camas Reservoir	Mission Valley Reservoirs
Sept. 30	30,890	b 8,810	b 9,340	a21,410	8,900	28,040	49,190
Oct. 31	29,670	a 9,850	b 6,560	a14,690	11,950	28,130	48,430
Nov. 30	28,220	a11,030	b 3,860	a14,060	16,070	27,390	51,060
Dec. 31	27,710	a12,260	a 3,310	c10,900	a18,920	28,080	52,540
Jan. 31	27,470	a12,940	b 6,900	b 8,670	a21,730	29,030	55,940
Feb. 29	27,110	a11,860	b 6,290	a 7,330	a24,020	29,450	55,420
Mar. 31	27,230	a10,700	b 8,130	a 9,300	21,150	30,170	58,030
Apr. 30	27,770	a14,760	a10,810	a19,950	24,440	32,420	67,340
May 31	29,260	a15,960	a12,720	a32,760	32,960	32,210	81,060
June 30	30,860	a14,830	a11,750	33,180	35,120	30,530	97,090
July 31	30,690	a11,930	b10,180	b31,780	27,940	24,580	67,190
Aug. 31	30,150	b 8,940	b 7,310	a25,590	9,860	19,140	38,120
Sept. 30	29,140	a 8,130	b 3,500	a17,300	a 7,450	16,810	22,080

Date	Lower Jocko Lake	Thompson Falls Reservoir	Noxon Rapids Reservoir
Sept. 30	942	15,440	308,600
Oct. 31	0	15,750	323,000
Nov. 30	0	15,440	319,700
Dec. 31	0	14,680	318,900
Jan. 31	0	14,820	322,800
Feb. 29	0	15,440	308,800
Mar. 31	0	15,280	322,300
Apr. 30	0	14,540	313,900
May 31	3,050	14,970	291,100
June 30	5,050	14,970	331,300
July 31	4,320	15,750	316,700
Aug. 31	681	15,280	308,300
Sept. 30	0	13,250	312,700

a Interpolated.

b Figure of contents for first day of following month.

c Estimate.

As the number of streams on which streamflow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than stream-gaging stations. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or floodflow analyses, depending on the type of data collected. In addition, discharge measurements are made at other sites not included in the partial-record program. These measurements are generally made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Records collected at partial-record stations are presented in a table of annual maximum stage and discharge at crest-stage stations. Discharge measurements made at miscellaneous sites for both low flow and high flow are given in a second table.

## Crest-stage partial-record stations

The following table contains annual maximum discharge for crest-stage stations. A crest-stage gage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain, but it is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained, but is not published herein. The years given in the period of record represent water years for which the annual maximum has been determined.

## Annual maximum discharge at crest-stage partial-record stations

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Annual maximum Gage height (ft)	Discharge (ft <sup>3</sup> /s)
KOOTENAI RIVER BASIN							
12300400	Cayuse Creek near Trego	Lat 48°36'33", long 115°01'42", in SW¼SW¼NE¼ sec.24, T.33 N., R.27 W., Lincoln County, Hydrologic Unit 17010101, at culvert in Forest Service road, 9.8 mi southwest of Trego.	5.29	1972-82 1984	6-28-84	0.75	34
12300800	Deep Creek near Fortine	Lat 48°45'41", long 114°52'32", in SW¼ sec.30, T.35 N., R.25 W., Lincoln County, Hydrologic Unit 17010101, at culvert in county road, 1.2 mi east of Fortine.	18.9	1959-84	6-26-84	2.38	110
12301993	Wolf Creek tributary near Libby	Lat 48°23'52", long 114°55'05", in NW¼NE¼NE¼ sec.4, T.30 N., R.26 W., Lincoln County, Hydrologic Unit 17010102, on right bank 9 ft from Burlington Northern Railroad culvert, 0.3 mi upstream from mouth, 28.8 mi east of Libby.	2.76	1974-84	5-21-84	.46	10
12301997	Richards Creek near Libby	Lat 48°15'31", long 115°11'57", in SE¼NW¼SE¼ sec.20, T.29 N., R.28 W., Lincoln County, Hydrologic Unit 17010102, at bridge on county road, 0.1 mi upstream from mouth, 18.5 mi southeast of Libby.	9.50	1973-84	5-21-84	.39	4
12302400	Shaughnessy Creek near Libby	Lat 48°18'11", long 115°35'37", in W¼ sec.5, T.29 N., R.31 W., Lincoln County, Hydrologic Unit 17010101, at culvert in county road, 6.5 mi southwest of Libby.	1.16	1959-84	4-16-84	(a)	b 2
12303400	Ross Creek near Troy	Lat 48°12'26", long 115°52'08", in SE¼NE¼ sec.8, T.28 N., R.33 W., Lincoln County, Hydrologic Unit 17010101, at bridge on Forest Service road, 11.3 mi north of Heron, 17.5 mi south of Troy at site of former water-quality station.	23.8	1972-84	5-31-84	4.35	670

See footnotes at end of table.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations--Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Annual Gage height (ft)	maximum Dis- charge (ft <sup>3</sup> /s)
KOOTENAI RIVER BASIN--Continued							
12303440	Camp Creek near Troy	Lat 48°18'46", long 115°50'35", in SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.32, T.30 N., R.33 W., Lincoln County, Hydro- logic Unit 17010101, at bridge on Forest Service road, 0.8 mi east of Highway 202, 12.6 mi south of Troy.	11.3	1972-84	5-31-84	1.77	250
12304060	Blacktail Creek near Yaak	Lat 48°57'03", long 115°32'27", in SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.20, T.37 N., R.30 W., Lincoln County, Hydro- logic Unit 17010103, at bridge on Forest Service road, 200 ft upstream from mouth, 10.3 mi northeast of Yaak.	8.66	1964 1972-82 1984	5-20-84	1.24	74
12304120	Zulu Creek near Yaak	Lat 48°43'49", long 115°38'30", in NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.8, T.34 N., R.31 W., Lincoln County, Hydro- logic Unit 17010103, at culvert in South Fork Yaak River road, 8.5 mi south of Yaak.	5.27	1972-82 1984	5-20-84	1.49	75
12304300	Cyclone Creek near Yaak	Lat 48°45'01", long 115°54'06", SE $\frac{1}{4}$ sec.32, T.35 N., R.33 W., Lincoln County, Hydrologic Unit 17010103 at bridge, 0.2 mi upstream from mouth, 10.5 mi southwest of Yaak.	5.71	1960-84	5-20-84	.78	82
PEND OREILLE RIVER BASIN							
12323220	Basin Creek near Butte	Lat 45°55'09", long 112°30'26", in NW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.17, T.2 N., R.7 W., Silver Bow County, Hydrologic Unit 17010201, on left bank, at bridge on county road, 0.3 mi downstream of Little Basin Creek, and 4.7 mi south of Butte.	37.6	1984	6-12-84	2.47	41
12323300	Smith Gulch near Silver Bow	Lat 45°57'26", long 112°39'45", in N $\frac{1}{2}$ sec.1, T.2 N., R.9 W., Silver Bow County, Hydrologic Unit 17010201, at culvert in Interstate Highway 15 and U.S. Highway 91, 4 mi south of Silver Bow.	4.36	1959-84	4-20-84	3.38	20
12324250	Cottonwood Creek at Deer Lodge	Lat 46°23'59", long 112°43'02", in NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.33, T.8 N., R.9 W., Powell County, Hydrologic Unit 17010201, at culverts in county road and U.S. Highway 10 in Deer Lodge.	45.4	1975-84	5-16-84	3.13	570
12324700	Clark Fork tributary near Drummond	Lat 46°36'58", long 113°02'08", in SW $\frac{1}{4}$ sec.18, T.10 N., R.11 W., Powell County, Hydrologic Unit 17010201, 0.5 mi upstream from Interstate Highway 90 and U.S. Highway 10, 6.5 mi east of Drummond.	4.61	1958-84	1-05-84	2.78	213
12331700	Edwards Gulch at Drummond	Lat 46°40'16", long 113°08'39", in NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.31, T.11 N., R.12 W., Granite County, Hydrologic Unit 17010201, at culvert on down- stream side of Interstate Highway 90 and U.S. Highway 10 at Drummond.	4.69	1960-62 1974-84	1-05-84 c	3.73	b 30

## Annual maximum discharge at crest-stage partial-record stations--Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Annual maximum Gage height (ft)	Dis-charge (ft <sup>3</sup> /s)
PEND OREILLE RIVER BASIN--Continued							
12338550	Dunham Creek near Ovando	Lat 47°07'24", long 113°09'50", in SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.19, T.16 N., R.12 W., Powell County, Hydrologic Unit 17010203, at bridge on Forest Service road 1 mi west of Monture Creek, 2.2 mi north of Forest Service boundary, and 7.3 mi north of Ovando.	31.7	1977-84	5-31-84	1.54	470
12338600	Monture Creek at Forest Service boundary, near Ovando	Lat 47°05'37", long 113°09'10", in SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.32, T.16 N., R.12 W., Powell County, Hydrologic Unit 17010203, 800 ft upstream from Forest Service boundary, 5.2 mi north of Ovando.	105	1964 1974-84	5-31-84	--	810
12339300	Deer Creek near Seeley Lake	Lat 47°12'37", long 113°32'27", in SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.20, T.17 N., R.15 W., Missoula County, Hydrologic Unit 17010203, at bridge on county road, 3.5 mi northwest of Seeley Lake.	19.8	1974-84	4-21-84	2.29	250
12339900	West Twin Creek near Bonner	Lat 46°54'44", long 113°42'50", in SW $\frac{1}{4}$ sec.2, T.13 N., R.17 W., Missoula County, Hydrologic Unit 17010203, at bridge on State Highway 200, 8 mi east of Bonner.	7.33	1959-84	5-30-84	1.03	74
12342950	Trapper Creek near Conner	Lat 45°53'43", long 114°10'51", in SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.27, T.2 N., R.21 W., Ravalli County, Hydrologic Unit 17010205, at bridge on State Highway 473, 0.6 mi southwest of Trapper Creek Job Corps Center, 3.0 mi southwest of junction of State Highway 473 and turnoff to Conner, and 4.5 mi southwest of Conner.	28.5	1974-84	5-16-84	2.08	470
12345850	Sleeping Child Creek near Hamilton	Lat 46°07'58", long 114°03'26", in SE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.2, T.4 N., R.20 W., Ravalli County, Hydrologic Unit 17010205, Bitterroot National Forest, on right bank 5.8 mi upstream from mouth, and 10.8 mi southeast of Hamilton.	65.2	1958-59 †1973-77 1978-84	5-31-84	4.14	500
12353400	Negro Gulch near Alberton	Lat 47°01'24", long 114°31'24", in NW $\frac{1}{4}$ sec.33, T.15 N., R.23 W., Mineral County, Hydrologic Unit 17010204, at culvert on county road 300 ft upstream of U.S. Highway 90 and 2.6 mi west of Alberton.	8.02	1959-73 1984	5-21-84	.57	25
12355350	Big Creek at Big Creek ranger station, near Columbia Falls	Lat 48°36'07", long 114°09'55", in SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.22, T.33 N., R.20 W., Flathead County, Hydrologic Unit 17010206, Flathead National Forest, on right bank at Big Creek Ranger Station, 300 ft upstream from North Fork road bridge, 0.4 mi upstream from mouth, 16.0 mi north of Columbia Falls.	82.1	1964 1973-84	5-31-84	4.51	900

See footnotes at end of table.



## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

## Annual maximum discharge at crest-stage partial-record stations--Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Annual gage height (ft)	maximum Dis-charge (ft <sup>3</sup> /s)
PEND OREILLE RIVER BASIN--Continued							
12356500	Bear Creek near Essex	Lat 48°16'56", long 113°25'23", in SE¼NW¼NE¼ sec.16, T.29 N., R.14 W., Flathead County, Hydrologic Unit 17010207, on left bank, 1.1 mi upstream from U.S. Highway 2 bridge crossing Bear Creek, 8.5 mi northeast of Essex at site of former gaging station.	20.4	†1946-52 1964 1975-84	5-20-84	3.68	245
12369250	Holland Creek near Condon	Lat 47°26'20", long 113°40'11", in NE¼NW¼ sec.5, T.19 N., R.16 W., Missoula County, Hydrologic Unit 17010211, at bridge on State Highway 209, at junction with road to Holland Lake, 6.8 mi south of Condon.	22.3	1974-84	5-30-84	2.34	260
12369650	North Fork Lost Creek near Swan Lake	Lat 47°53'06", long 113°47'53", in NE¼NW¼SE¼ sec.31, T.25 N., R.17 W., Lake County, Hydrologic Unit 17010211, Flathead National Forest, at U.S. Forest Service bridge on North Fork Lost Creek road 1.5 mi upstream of Lost Creek and 4 mi southwest of Swan Lake.	13.0	1982-84	6-17-82 5-27-83 5-31-84	3.70 3.77 4.18	220 225 310
12370500	Dayton Creek near Proctor	Lat 47°54'59", long 114°20'14", in NW¼ sec.20, T.25 N., R.21 W., Lake County, Hydrologic Unit 17010208, at culvert in county road, 2.5 mi northwest of Proctor.	18.5	1959-84	4-01-84	(a)	b 5
12391100	White Pine Creek near Trout Creek	Lat 47°44'19", long 115°40'27", in SW¼SW¼NW¼ sec.23, T.23 N., R.32 W., Sanders County, Hydrologic Unit 17010213, Kaniksu National Forest, on right downstream wingwall on bridge, 7.5 mi southwest of Trout Creek.	8.75	1974-84	5-21-84	3.96	200
12391200	Canyon Creek near Trout Creek	Lat 47°51'16", long 115°29'57", in SW¼NW¼ sec.7, T.24 N., R.30 W., Sanders County, Hydrologic Unit 17010213, at bridge on U.S. Forest Service road, 2.9 mi upstream from junction of road at mouth of Vermillion River, 4.6 mi northeast of Trout Creek.	8.64	1972 1974-84	5-21-84	2.07	106
12391430	Skeleton Creek near Noxon	Lat 47°57'47", long 115°53'18", in SW¼SW¼ sec.32, T.26 N., R.33 W., Sanders County, Hydrologic Unit 17010213, at culvert in U.S. Forest Service road, 0.4 mi upstream from West Fork Pilgrim Creek, 5.7 mi southwest of Noxon.	2.10	1973-82 1984	5-21-84	1.33	20
12391525	Snake Creek near Noxon	Lat 48°07'24", long 115°45'10", in SW¼SW¼ sec.5, T.27 N., R.32 W., Sanders County, Hydrologic Unit 17010213, at culvert in U.S. Forest Service road, 9.0 mi north of Noxon.	3.11	1972-82 1984	5-21-84	1.84	28

- † Operated as a continuous-record station.  
a Peak discharge did not reach bottom of gage.  
b Estimate.  
c Backwater.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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## Measurements at miscellaneous sites

Measurements of streamflow at points other than gaging stations are given in the following table.

Discharge measurements made at miscellaneous sites during water year 1984

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Date	Discharge (ft <sup>3</sup> /s)
Kootenai River Basin						
China Creek 4827101154453	Kootenai River	Lat 48°27'10", long 115°44'53", in NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.13, T.31 N., R.33 W., Lincoln County, Hydrologic Unit 17010101, at mouth 400 ft upstream of Kootenai National Forest boundary, approximately 2.2 miles north of Cabinet Mountains Wilderness Area, 6.1 mi west of Libby, and 7.2 mi east of Troy.			2-16-76	a1.5
					3-23-78	a6.0
					4-25-78	a6.0
					5-17-78	a25
					6-21-78	a3.0
					7-31-78	a2.0
					8-21-78	a2.0
9-19-78	a2.0					
Pend Oreille River Basin						
Dunham Creek 12338550	Monture Creek	Lat 47°07'24", long 113°09'50", in SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.19, T.16 N., R.12 W., Powell County, Hydrologic Unit 17010203, at bridge on forest road 1 mi west of Monture Creek, 2.2 mi north of Lolo National Forest bound- ary, and 7.3 mi north of Ovando.			5-23-77	38.8
					4-11-78	91.2
					5-26-78	181
					6-09-78	394
					6-16-78	184
					5-23-79	370
					5-12-80	150
					5-04-81	206
					5-18-82	429
					6-22-82	406
					8-04-82	13.6
					5-24-83	234
					5-16-84	313
Clark Fork 12391400	Columbia River	Lat 47°57'40", long 115°43'58", in SW $\frac{1}{4}$ sec.33, T.26 N., R.32 W., Sanders County, Hydrologic Unit 17010213, 0.3 mi downstream of Noxon Rapids Dam, 1 mi upstream from Rock Creek, 3 mi southeast of Noxon, and at mile 169.7.	1956; 1958; b 1960- 1971; 1974; 1976-78 1981	10-07-82 11-09-83	17,400	
					18,600	

a--Estimate of flow.

b--Operated as continuous station.

ADDITIONAL TEMPERATURE MEASUREMENTS AND FIELD DETERMINATIONS  
WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
KOOTENAI RIVER BASIN											
12303000 KOOTENAI RIVER AT LIBBY, MT											
OCT 04...	1435	19000	202	18.0	13.0	AUG 16...	1615	13400	223	35.0	14.0
MAR 07...	0850	4580	229	-1.0	3.0						
12303100 FLOWER CREEK NEAR LIBBY, MT											
OCT 05...	0750	7.0	77	2.0	5.5	MAY 30...	0840	156	24	14.5	5.0
NOV 16...	0820	19	38	2.0	3.0	JUN 28...	0800	97	26	13.0	8.5
JAN 05...	0950	28	45	2.5	.0	AUG 16...	1510	6.7	65	33.0	12.5
APR 18...	1200	42	48	12.0	4.0						
12303500 LAKE CREEK AT TROY, MT											
OCT 04...	1235	164	97	18.0	9.0	MAY 30...	1120	1260	45	18.5	9.5
NOV 15...	1600	292	71	4.5	6.5	JUN 27...	1235	902	49	27.0	14.0
MAR 06...	1435	209	86	6.0	5.0	AUG 17...	1005	148	87	20.5	15.0
PEND OREILLE RIVER BASIN											
12323170 SILVER BOW CREEK ABOVE BLACKTAIL CREEK, AT BUTTE, MT											
OCT 13...	1340	.13	447	10.0	7.0	APR 30...	1240	.37	399	5.0	2.0
NOV 14...	1300	.06	430	4.0	2.0	MAY 10...	1615	.75	248	1.5	5.0
21...	1530	.06	453	-2.5	.5						
12323200 BLACKTAIL CREEK NEAR BUTTE, MT											
OCT 12...	1340	2.7	188	10.0	6.0	MAY 10...	1300	13	122	12.5	2.0
NOV 14...	0915	2.7	180	5.0	.5	16...	1050	29	107	2.0	3.0
JAN 05...	0945	1.8	192	4.0	.0	31...	0900	14	143	7.0	8.0
FEB 08...	1000	1.7	210	-10.0	.0	JUN 12...	1010	21	140	10.0	4.0
MAR 15...	1100	2.5	196	.0	.5	JUL 23...	1040	2.7	193	15.0	10.5
APR 30...	1100	7.3	173	1.0	.5	SEP 04...	1020	1.8	204	10.0	7.0
12323250 SILVER BOW CREEK BELOW BLACKTAIL CREEK, AT BUTTE, MT											
OCT 12...	1340	27	431	14.0	12.0	MAY 16...	1415	91	555	1.5	7.0
NOV 14...	1130	27	414	6.0	6.0	31...	1025	38	332	12.0	9.0
FEB 07...	1630	23	446	-1.0	3.0	JUN 12...	1145	73	274	15.0	9.5
MAR 15...	0840	23	409	.0	4.0	JUL 23...	1130	24	439	15.0	14.5
APR 30...	1400	30	404	5.0	8.5	SEP 04...	1200	26	449	12.0	15.0

ADDITIONAL TEMPERATURE MEASUREMENTS AND FIELD DETERMINATIONS

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WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
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PEND OREILLE RIVER BASIN--Continued

12323770 WARM SPRINGS CREEK AT WARM SPRINGS, MT

NOV						MAY					
15...	1145	82	332	7.0	3.0	15...	0945	165	248	11.0	7.0
DEC						17...	1600	165	262	17.5	9.5
29...	0930	11	812	-20.0	.0	JUN					
JAN						01...	1425	218	204	16.5	8.0
06...	1350	78	367	14.0	6.0	23...	1345	349	203	23.5	9.5
FEB						JUL					
09...	1300	58	379	7.0	1.5	13...	1030	123	269	10.5	20.0
APR						AUG					
05...	1630	45	479	14.0	10.0	21...	1340	16	711	22.5	15.0
						22...	1700	14	710	26.0	19.0

12324200 CLARK FORK AT DEER LODGE, MT

OCT						APR					
05...	1045	358	520	10.0	7.5	05...	1445	287	585	12.0	10.0
NOV						MAY					
15...	1430	382	519	8.0	3.0	15...	1200	641	392	11.0	13.0
DEC						JUN					
29...	1315	176	603	.0	.0	23...	1115	1470	298	15.0	10.5
JAN						JUL					
06...	1150	551	538	13.0	1.5	13...	1200	303	389	20.0	16.0
FEB						AUG					
15...	1320	262	540	4.0	1.0	21...	1020	159	1020	17.0	14.0

12324590 LITTLE BLACKFOOT RIVER NEAR GARRISON, MT

OCT						MAY					
06...	0850	103	286	1.5	6.5	15...	1530	1240	154	20.5	10.5
NOV						17...	0820	1200	151	3.0	3.5
16...	0930	93	287	6.0	3.0	JUN					
JAN						04...	1600	485	195	12.0	10.0
06...	1015	452	172	5.0	1.5	JUL					
FEB						11...	1010	102	270	19.0	13.0
09...	1600	71	275	6.5	2.5	AUG					
APR						23...	1030	49	285	20.5	14.5
05...	1015	121	278	12.0	6.0						

12324680 CLARK FORK AT GOLD CREEK, MT

OCT						APR					
05...	1510	568	459	14.0	10.0	05...	1230	493	487	18.5	8.5
NOV						MAY					
15...	1645	578	479	7.0	3.0	15...	1730	2320	250	9.0	11.0
DEC						17...	1025	2610	234	10.5	6.0
29...	1600	345	533	-15.0	.0	JUL					
JAN						11...	1445	565	382	30.0	19.5
06...	1655	1680	352	8.0	1.5	AUG					
FEB						02...	1445	349	453	28.0	21.5
15...	1545	452	480	5.0	2.5	23...	1245	287	494	25.0	20.0

12325500 FLINT CREEK NEAR SOUTHERN CROSS, MT

OCT						APR					
04...	1810	29	155	8.5	9.5	03...	1030	26	260	7.0	4.5
NOV						MAY					
15...	0815	86	171	-2.0	4.0	16...	1745	60	231	6.0	4.0
JAN						JUL					
04...	1610	27	221	3.0	3.5	12...	1815	106	1820	24.5	16.5
FEB						AUG					
08...	1630	--	242	1.5	3.5	22...	0920	50	188	17.0	17.5



ADDITIONAL TEMPERATURE MEASUREMENTS AND FIELD DETERMINATIONS  
WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
PEND OREILLE RIVER BASIN--Continued											
12329500 FLINT CREEK AT MAXVILLE, MT											
OCT						MAY					
04...	1300	99	275	11.5	8.5	16...	1615	387	151	9.0	6.5
NOV						17...	1245	313	153	15.0	5.5
14...	1400	139	242	6.0	3.5	JUN					
JAN						23...	1530	405	189	19.5	12.0
04...	1425	144	242	11.0	.5	JUL					
FEB						12...	1215	166	296	21.5	15.0
08...	1445	68	288	1.5	2.0	AUG					
APR						22...	1120	168	283	22.0	12.5
03...	1715	69	282	10.0	8.0						
12330000 BOULDER CREEK AT MAXVILLE, MT											
OCT						APR					
04...	1105	35	175	9.5	6.0	03...	1545	24	196	11.5	6.0
NOV						MAY					
14...	1145	34	174	6.5	3.0	16...	1245	337	100	10.0	3.5
JAN						JUL					
04...	1200	28	186	12.0	2.5	12...	1000	88	143	20.5	8.5
FEB						AUG					
08...	1305	24	199	3.5	1.0	22...	1330	23	199	23.5	11.0
12332000 MIDDLE FORK ROCK CREEK NEAR PHILIPSBURG, MT											
OCT						MAY					
04...	1610	54	127	8.0	8.5	17...	1050	562	71	10.0	2.5
NOV						31...	1430	846	77	9.5	5.5
14...	1615	55	128	1.0	2.0	JUL					
JAN						12...	1540	188	115	25.5	15.0
05...	1100	54	122	6.0	.5	AUG					
FEB						21...	1710	66	129	25.0	16.0
09...	1000	23	157	3.5	1.0						
APR											
03...	1315	31	135	12.5	5.0						
12335500 NEVADA CREEK ABOVE RESERVOIR, NEAR FINN, MT											
NOV						APR					
01...	1035	21	278	8.0	4.5	16...	1000	29	261	18.5	6.0
DEC						23...	0905	88	253	12.0	5.0
12...	0900	17	277	1.0	.0	JUN					
JAN						05...	0930	162	245	13.0	9.0
05...	1220	700	119	6.0	.5	14...	1530	101	251	25.0	18.0
06...	1000	158	162	10.5	.5	JUL					
11...	1300	24	246	2.0	.0	16...	1000	27	245	18.5	12.5
MAR						AUG					
12...	0815	27	268	.0	1.0	27...	0945	10	288	22.0	12.0
12339450 CLEARWATER RIVER NEAR CLEARWATER, MT											
DEC						APR					
12...	1625	83	153	2.5	.5	23...	1130	1340	126	14.0	8.0
JAN						JUL					
25...	1510	107	158	4.0	.5	16...	1210	194	127	25.0	22.0
MAR						AUG					
12...	1455	86	145	5.5	4.0	27...	1115	66	148	23.0	19.0
12340500 CLARK FORK ABOVE MISSOULA, MT											
NOV						APR					
02...	1305	1880	343	10.5	8.0	26...	1600	4610	218	7.0	5.5
FEB						JUN					
02...	0915	1830	345	1.5	1.0	07...	1230	8870	185	13.0	9.5
MAR						AUG					
14...	0930	--	330	1.0	5.0	29...	1000	1460	331	15.0	15.0

ADDITIONAL TEMPERATURE MEASUREMENTS AND FIELD DETERMINATIONS

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WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
PEND OREILLE RIVER BASIN--Continued											
12342500 WEST FORK BITTERROOT RIVER NEAR CONNER, MT											
DEC 13...	1145	116	74	2.5	2.5	JUN 06...	1250	1490	48	10.0	7.0
JAN 24...	0957	120	86	3.5	1.5	AUG 28...	1245	278	62	18.0	10.0
12344000 BITTERROOT RIVER NEAR DARBY, MT											
NOV 03...	1335	340	81	14.5	9.0	MAY 17...	0830	5110	52	8.5	4.0
DEC 13...	1500	326	99	3.5	2.5	JUN 06...	0905	4170	67	15.0	7.0
JAN 24...	1420	347	80	7.0	1.0	JUL 17...	1015	1100	51	25.0	12.5
MAR 13...	1130	359	100	9.5	2.5	AUG 28...	0930	449	71	18.0	12.0
APR 25...	0815	1070	68	3.0	2.5						
12353820 DRY CREEK NEAR SUPERIOR, MT											
MAY 25...	0830	112	158	--	3.0	JUN 19...	1300	129	141	21.0	9.0
12354500 CLARK FORK AT ST. REGIS, MT											
OCT 04...	1145	4110	269	15.0	9.0	APR 23...	1120	12100	177	3.0	9.0
JAN 10...	1320	6660	222	1.0	1.0	MAY 23...	1300	24900	136	11.0	7.0
MAR 06...	1230	3270	250	4.0	4.0	AUG 27...	1245	3130	258	26.0	16.0
12358500 MIDDLE FORK FLATHEAD RIVER NEAR WEST GLACIER, MT											
OCT 03...	1100	637	176	9.0	8.0	APR 25...	1230	4380	162	7.0	4.0
NOV 23...	1200	1080	168	-2.0	3.5	MAY 21...	1435	11300	149	4.0	5.0
JAN 04...	1340	618	187	2.0	1.5	JUN 27...	1230	10100	120	15.0	9.0
09...	1415	2160	165	3.0	2.0	AUG 24...	1030	918	182	20.0	14.0
23...	1230	1070	168	2.0	1.0						
MAR 08...	1215	549	183	3.0	4.0						
12365000 STILLWATER RIVER NEAR WHITEFISH, MT											
OCT 03...	0900	129	240	6.5	9.0	MAY 17...	1130	743	195	12.5	8.5
NOV 15...	1130	186	234	4.0	5.0	JUN 27...	0830	854	185	18.5	17.5
JAN 03...	1000	82	255	2.0	.0	AUG 10...	0930	195	232	18.0	21.0
FEB 16...	0920	104	248	-1.0	.0	29...	1010	111	237	14.5	15.5
APR 02...	1330	221	238	9.0	5.0						
12366000 WHITEFISH RIVER NEAR KALISPELL, MT											
OCT 03...	1330	82	177	9.5	11.0	APR 02...	1515	125	195	10.0	6.0
NOV 15...	0900	77	184	4.0	5.5	MAY 16...	1410	373	173	11.0	9.0
JAN 03...	1315	53	190	2.0	.0	JUN 27...	1200	654	159	26.0	16.0
FEB 16...	1200	74	190	4.0	1.0	AUG 10...	1230	133	163	31.0	22.0

ADDITIONAL TEMPERATURE MEASUREMENTS AND FIELD DETERMINATIONS  
 WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
PEND OREILLE RIVER BASIN--Continued											
12369200 SWAN RIVER NEAR CONDON, MT											
OCT 04...	1550	48	58	12.0	11.5	APR 24...	0820	342	45	3.5	3.5
DEC 12...	1345	53	56	2.0	.5	JUN 05...	1310	413	46	17.0	10.5
JAN 23...	1315	46	53	4.0	.0	JUL 16...	1440	306	36	27.0	19.0
MAR 12...	1155	49	66	5.5	2.0	AUG 27...	1415	67	42	24.0	20.0
12370000 SWAN RIVER NEAR BIGFORK, MT											
OCT 06...	1100	502	165	13.0	9.5	MAY 21...	1200	2740	195	11.0	10.5
JAN 04...	1500	502	161	9.0	1.5	JUN 28...	0845	4420	153	18.0	12.0
APR 11...	1145	998	191	6.5	7.0	AUG 24...	0900	678	158	16.0	18.0
12372000 FLATHEAD RIVER NEAR POLSON, MT											
NOV 16...	1130	3560	175	7.5	7.0	JUN 28...	1250	39800	167	24.0	17.0
MAR 25...	1150	1960	162	4.0	4.5						
12389000 CLARK FORK NEAR PLAINS, MT											
OCT 04...	1630	16900	187	15.0	11.0	MAY 23...	1515	31800	148	13.0	10.0
JAN 10...	1645	18500	185	1.0	1.0	JUN 28...	1405	47300	153	28.0	17.0
MAR 26...	1615	8530	188	10.5	7.0	AUG 28...	1145	13000	188	18.0	16.0
12389500 THOMPSON RIVER NEAR THOMPSON FALLS, MT											
OCT 05...	0845	158	172	2.0	7.0	APR 23...	1530	597	111	7.0	8.0
NOV 17...	1030	169	167	4.5	5.0	MAY 24...	1100	780	88	9.0	7.0
JAN 11...	1030	192	147	.5	2.0	AUG 27...	1745	154	157	26.0	15.0
MAR 06...	1645	143	170	10.0	5.0						
12390700 PROSPECT CREEK AT THOMPSON FALLS, MT											
OCT 05...	1000	57	80	5.0	7.0	APR 24...	0700	408	49	-2.0	5.0
NOV 17...	0930	52	71	4.5	5.5	MAY 24...	1010	725	43	7.0	6.0
JAN 11...	0945	111	55	.5	3.5	JUN 26...	1630	412	34	32.0	13.0
MAR 07...	0900	92	52	-2.0	4.0	AUG 28...	0900	68	78	13.0	10.0

## GROUND-WATER LEVELS

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## DEER LODGE COUNTY

460632112493502. Local number, 04N10W10DC02.  
 LOCATION.--Lat 46°06'32", long 112°49'35", Hydrologic Unit 17010201. Owner: Village of Opportunity.  
 AQUIFER.--Alluvium of Quaternary Age.  
 WELL CHARACTERISTICS.--Driven fire protection water-table well, diameter 4 in., depth 20.0 ft, steel casing.  
 DATUM.--Land-surface datum is 4,979 ft National Geodetic Vertical Datum of 1929. Measuring point: Bottom of 6 in. outlet pipe, 1.3 ft above land-surface datum.  
 PERIOD OF RECORD.--July 1960 to current year.  
 EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.05 ft below land-surface datum June 4, 1980; lowest, 5.22 ft below land-surface datum Mar. 13, 1972.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL
Oct. 12	4.26

## DEER LODGE COUNTY

461420112504501. Local number, 06N10W27CCCC01.  
 LOCATION.--Lat 46°14'20", long 112°50'45", Hydrologic Unit 17010201. Owner: Mount Haggin Land and Livestock Company.  
 AQUIFER.--Deposits of Tertiary Age.  
 WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in., depth 88.8 ft, steel casing.  
 DATUM.--Land-surface datum is 5,006 ft National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.50 ft above land-surface datum.  
 PERIOD OF RECORD.--June 1960 to current year.  
 EXTREMES FOR PERIOD OF RECORD.--Highest water level, 30.00 ft below land-surface datum Sept. 18, 1980; lowest, 66.17 ft below land-surface datum June 9, 1969.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL
Oct. 12	46.37	Aug. 30	43.84

## DEER LODGE COUNTY

461515112441201. Local number, 06N09W21CDBC01.  
 LOCATION.--Lat 46°15'15", long 112°44'12", Hydrologic Unit 17010201. Owner: W. Beck.  
 AQUIFER.--Deposits of Tertiary Age.  
 WELL CHARACTERISTICS.--Drilled domestic and stock artesian well, diameter 6 in., depth 150 ft, steel casing.  
 DATUM.--Land-surface datum is 4,786 ft National Geodetic Vertical Datum of 1929. Measuring point: Top of well cap, 0.50 ft above land-surface datum.  
 PERIOD OF RECORD.--September 1960 to current year.  
 EXTREMES FOR PERIOD OF RECORD.--Highest water level, 88.97 ft below land-surface datum Aug. 20, 1968; lowest, 100.30 ft below land-surface datum Nov. 17, 1983.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL
Oct. 12	90.76

## FLATHEAD COUNTY

481407114205601. Local number, 29N22W36BCBD01.  
 LOCATION.--Lat 48°14'07", long 114°20'56", Hydrologic Unit 17010210. Owner: State of Montana.  
 AQUIFER.--Glacial deposits of Quaternary Age.  
 WELL CHARACTERISTICS.--Drilled unused artesian test well, diameter 4 in., depth 452.0 ft, steel casing.  
 DATUM.--Land-surface datum is 3,050 ft National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.0 ft above land-surface datum.  
 PERIOD OF RECORD.--September 1976 to current year.  
 EXTREMES FOR PERIOD OF RECORD.--Highest water level, 126.63 ft below land-surface datum Apr. 27, 1977; lowest, 153.09 ft below land-surface datum June 25, 1977.  
 REMARKS.--Effected by irrigation pumpage.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL
Oct. 31	130.72



## GROUND-WATER LEVELS

## FLATHEAD COUNTY

481458114111701. Local number, 29N20W29BD01.

LOCATION.--Lat 48°14'58", long 114°11'17", Hydrologic Unit 17010208. Owner: John Byrne.

AQUIFER.--Glacial deposits of Quaternary Age.

WELL CHARACTERISTIC.--Drilled unused artesian well, diameter 5 in., depth 151 ft, steel casing.

DATUM.--Land-surface datum is 2,980.5 ft National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 2.5 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 19.88 ft below land-surface datum Aug. 18, 1969; lowest, 39.24 ft below land-surface datum June 11, 1975.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DISCONTINUED

## FLATHEAD COUNTY

481519114182501. Local number, 29N21W20CCCC01.

LOCATION.--Lat 48°15'19", long 114°18'25", Hydrologic Unit 17010210. Owner: Lutheran Cemetery Association.

AQUIFER.--Glacial deposits of Quaternary Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 6 in., depth 278 ft, steel casing.

DATUM.--Land-surface datum is 3,027 ft National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 5.0 ft below land-surface datum.

REMARKS.--Used in irrigation season only.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 100.00 ft below land-surface datum July 1, 1964; lowest, 108.13 ft below land-surface datum Sept. 22, 1977.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL
Oct. 31	105.73

## FLATHEAD COUNTY

481653114114901. Local number, 29N20W18AAD01.

LOCATION.--Lat 48°16'53", long 114°11'49", Hydrologic Unit 17010208. Owner: William Anderson.

AQUIFER.--Eolian deposits of Quaternary Age.

WELL CHARACTERISTICS.--Dug unused water-table well, diameter 56 in., depth 20.0 ft, concrete casing.

DATUM.--Land-surface datum is 3,050 ft National Geodetic Vertical Datum of 1929. Measuring point: Top of 3/4 in. pipe, 0.7 ft below land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 14.73 ft below land-surface datum June 11, 1970; lowest, 19.36 ft below land-surface datum Feb. 15, 1978.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DISCONTINUED

## MISSOULA COUNTY

465312114052001. Local number, 13N20W14ACCA01.

LOCATION.--Lat 46°53'20", long 114°05'20", Hydrologic Unit 17010204. Owner: Bonneville Power Administration.

AQUIFER.--Terrace deposits of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 6 in., depth 35.5 ft, cased with pipe.

DATUM.--Land-surface datum is 3,145 ft National Geodetic Vertical Datum of 1929. Measuring point: top of casing 1.30 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level 8.08 ft below land-surface datum June 1974; lowest, 21.14 ft below land-surface datum May 1961.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DISCONTINUED

## GROUND-WATER LEVELS

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## POWELL COUNTY

463540112320301. Local number, 10N07W30BBC01.  
 LOCATION.--Lat 46°35'40", long 112°32'03", Hydrologic Unit 17010201. Owner: Powell County School District.  
 AQUIFER.--Sands and gravels of Tertiary Age.  
 WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in., depth 69.6 ft steel casing.  
 DATUM.--Land-surface datum is 4,825 ft National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.5 ft above land-surface datum.  
 PERIOD OF RECORD.--June 1961 to March 1963, September 1967 to current year.  
 EXTREMES FOR PERIOD OF RECORD.--Highest water level, 28.77 ft below land-surface datum May 21, 1979; lowest, 34.37 ft below land-surface datum Aug. 20, 1968.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL
Oct. 12	32.73

## RAVALLI COUNTY

461518114090802. Local number, 06N20W19CCCC02.  
 LOCATION.--Lat 46°15'18", long 114°09'08", Hydrologic Unit 17010205. Owner: Bonneville Power Administration.  
 AQUIFER.--Flood plain Alluvium of Quaternary Age.  
 WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 6 in., depth 40 ft, cased with pipe.  
 DATUM.--Land-surface datum is 3,557 ft National Geodetic Vertical Datum of 1929. Measuring point: Top of recorder shelf 3.0 ft above land-surface datum.  
 REMARKS.--Water-stage recorder installed September 1970.  
 PERIOD OF RECORD.--September 1970 to current year.  
 EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.06 ft below land-surface datum June 25, 1971; lowest, 18.36 ft below land-surface datum Apr. 7, 1981.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL
Nov. 3	11.27	July 7	6.48
Feb. 8	15.45	17	6.75
Mar. 21	16.49	Aug. 28	6.97
May 4	17.81		
June 6	7.92		

## RAVALLI COUNTY

462631114084603. Local number, 08N20W19BAAD03.  
 LOCATION.--Lat 46°26'31", long 114°08'46", Hydrologic Unit 17010205. Owner: U.S. Geological Survey.  
 AQUIFER.--Sands and gravels of Tertiary Age.  
 WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 6 in., depth 52 ft, cased with pipe.  
 DATUM.--Land-surface datum is 3,393 ft National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.5 ft above land-surface datum.  
 PERIOD OF RECORD.--July 1957 to current year.  
 EXTREMES FOR PERIOD OF RECORD.--Highest water level, 12.39 ft below land-surface datum Sept. 2, 1961; lowest, 19.76 ft below land-surface datum Mar. 29, 1973.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL
Oct. 12	15.09

## RAVALLI COUNTY

46278114014101. Local number 08N19W07CBB01.  
 LOCATION.--Lat 46°27'50", long 114°01'45", Hydrologic Unit 17010205. Owner: W. Wax.  
 AQUIFER.--Sediments of Tertiary Age.  
 WELL CHARACTERISTICS.--Dug domestic and stock water-table well, diameter 48 in., depth 116.5 ft, cased with concrete  
 DATUM.--Land-surface datum is 3,893 ft National Geodetic Vertical Datum of 1929. Measuring points: Hole in top of cover, 1.4 ft above land-surface datum.  
 PERIOD OF RECORD.--April 1956 to March 1964, November 1978 to current year.  
 EXTREMES FOR PERIOD OF RECORD.--Highest water level 79.25 ft below land-surface datum October 1983; lowest 102.16 ft below land-surface datum August 1962.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL
Oct. 11	80.79

## GROUND-WATER LEVELS

## RAVALLI COUNTY

463130114064402. Local number, 09N20W21ADB02.

LOCATION.--Lat 46°31'30", long 114°06'44", Hydrologic Unit 17010205. Owner: D. Shea.

AQUIFER.--Alluvium underlying river terraces.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 4 in., depth 40 ft, cased with pipe. This well replaces 463140114064001 (09N20W21AD1).

DATUM.--Land-surface datum is 3,308 ft National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.5 ft above land-surface datum.

PERIOD OF RECORD.--September 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 16.87 ft below land-surface datum June 26, 1978; lowest, 34.01 ft below land-surface datum Mar. 28, 1977.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DISCONTINUED

## RAVALLI COUNTY

463750114033001. Local number, 10N20W13BBA.

LOCATION.--Lat 46°37'50", long 114°03'30", Hydrologic Unit 17010205. Owner: Bonneville Power Administration.

AQUIFER.--Alluvium of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 6 in., depth 50.5 ft, cased with pipe.

DATUM.--Land-surface datum is 3,200 ft National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.5 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 2.48 ft below land-surface datum June 15, 1959; lowest, 7.55 ft below land-surface datum Apr. 15, 1975.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DISCONTINUED

## SANDERS COUNTY

474251114385201. Local number, 23N24W34ADA01.

LOCATION.--Lat 47°42'51", long 114°38'52", Hydrologic Unit 17010212. Owner: U.S. Bureau of Indian Affairs.

AQUIFER.--Glacial lake deposits of Quaternary age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 18 in., depth 377 ft, perforated with 480 perforations.

DATUM.--Land-surface datum is 2,878.6 ft National Geodetic Vertical Datum of 1929. Measuring point: Top of casings 1.0 ft above land-surface datum.

REMARKS.--Water-stage recorder installed January 1971. Submersible pump installed for stock purposes.

PERIOD OF RECORD.--March 1943 to June 1943, October 1970 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 102.72 ft below land-surface datum Apr. 10, 1981; lowest, 116.40 ft below land-surface datum Aug. 30, 1977.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL
Oct. 20	105.23	Apr. 19	107.98
Nov. 17	107.12	Sept. 28	112.83
Jan. 6	106.13		

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## 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). This report contains both the inch-pound and SI unit equivalents in the station manuscript descriptions.

Multiply inch-pound units	By	To obtain SI units
<i>Length</i>		
inches (in)	$2.54 \times 10^1$	millimeters (mm)
	$2.54 \times 10^{-2}$	meters (m)
feet (ft)	$3.048 \times 10^{-1}$	meters (m)
miles (mi)	$1.609 \times 10^0$	kilometers (km)
<i>Area</i>		
acres	$4.047 \times 10^3$	square meters (m <sup>2</sup> )
	$4.047 \times 10^{-1}$	square hectometers (hm <sup>2</sup> )
	$4.047 \times 10^{-3}$	square kilometers (km <sup>2</sup> )
square miles (mi <sup>2</sup> )	$2.590 \times 10^0$	square kilometers (km <sup>2</sup> )
<i>Volume</i>		
gallons (gal)	$3.785 \times 10^0$	liters (L)
	$3.785 \times 10^0$	cubic decimeters (dm <sup>3</sup> )
	$3.785 \times 10^{-3}$	cubic meters (m <sup>3</sup> )
million gallons	$3.785 \times 10^3$	cubic meters (m <sup>3</sup> )
	$3.785 \times 10^{-3}$	cubic hectometers (hm <sup>3</sup> )
cubic feet (ft <sup>3</sup> )	$2.832 \times 10^1$	cubic decimeters (dm <sup>3</sup> )
	$2.832 \times 10^{-2}$	cubic meters (m <sup>3</sup> )
cfs-days	$2.447 \times 10^3$	cubic meters (m <sup>3</sup> )
	$2.447 \times 10^{-3}$	cubic hectometers (hm <sup>3</sup> )
acre-feet (acre-ft)	$1.233 \times 10^3$	cubic meters (m <sup>3</sup> )
	$1.233 \times 10^{-3}$	cubic hectometers (hm <sup>3</sup> )
	$1.233 \times 10^{-6}$	cubic kilometers (km <sup>3</sup> )
<i>Flow</i>		
cubic feet per second (ft <sup>3</sup> /s)	$2.832 \times 10^1$	liters per second (L/s)
	$2.832 \times 10^1$	cubic decimeters per second (dm <sup>3</sup> /s)
	$2.832 \times 10^{-2}$	cubic meters per second (m <sup>3</sup> /s)
gallons per minute (gal/min)	$6.309 \times 10^{-2}$	liters per second (L/s)
	$6.309 \times 10^{-2}$	cubic decimeters per second (dm <sup>3</sup> /s)
	$6.309 \times 10^{-5}$	cubic meters per second (m <sup>3</sup> /s)
million gallons per day	$4.381 \times 10^1$	cubic decimeters per second (dm <sup>3</sup> /s)
	$4.381 \times 10^{-2}$	cubic meters per second (m <sup>3</sup> /s)
<i>Mass</i>		
tons (short)	$9.072 \times 10^{-1}$	megagrams (Mg) or metric tons



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