00)
a3
ONTANA
1987
1

Water Resources Data Montana Water Year 1987

Volume 1. Hudson Bay Basin Missouri River Basin

U.S. GEOLOGICAL SURVEY RESTON, VA.
OCT 31 1988
LIBRARY



U.S. GEOLOGICAL SURVEY WATER DATA REPORT MT-87-1
Prepared in cooperation with the State of Montana
and with other agencies

CALENDAR FOR WATER YEAR 1987

1986

OCTOBER

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

NOVEMBER

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

DECEMBER

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

1987

JANUARY

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

FEBRUARY

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

MARCH

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

APRIL

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

MAY

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

JUNE

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

JULY

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

AUGUST

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

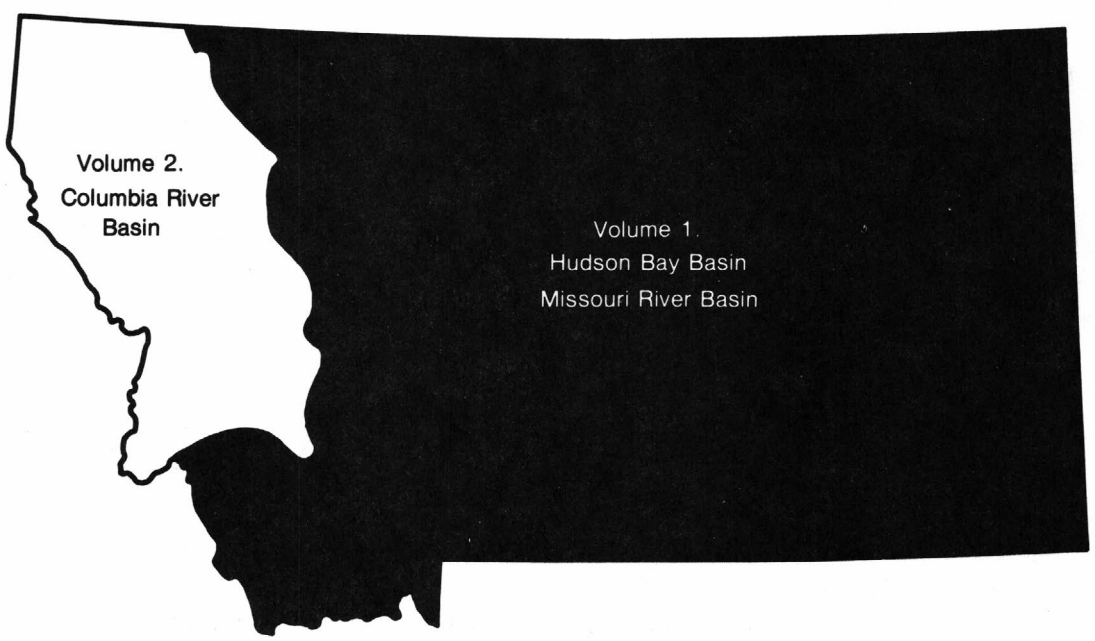
SEPTEMBER

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

Water Resources Data
Montana
Water Year 1987

Volume 1. Hudson Bay Basin
Missouri River Basin

by R.R. Shields, J.R. Knapton, M.K. White, T.M. Brosten, and J.H. Lambing



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT MT-87-1
Prepared in cooperation with the State of Montana
and with other agencies

DEPARTMENT OF THE INTERIOR

DONALD PAUL HODEL, Secretary

U.S. 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

1988

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:

Donald A. Bischoff, Hydrologic Technician
Bruce M. Bochy, Hydrologic Technician
Tom Brooks, Hydrologist
C. Lee Chambers, Hydrologic Technician
Cynthia J. Diamond, Technical Publications Editor
Jay H. Diamond, Supervisory Hydrologic Technician
James E. Elliott, Hydrologic Technician
James L. Fisher, Hydrologic Technician
Thomas I. Follinglo, Hydrologic Technician
John J. French, Hydrologic Technician
David B. Hanson, Hydrologist
Millard M. Hiner, Supervisory Hydrologic Technician
James A. Hull, Hydrologic Technician
Kurt C. Jenewein, Cartographic Technician
Michael R. Johnson, Hydrologic Technician
Philip L. Karper, Hydrologic Technician
Stephen V. Lynn, Hydrologic Technician
Lawrence A. Merritt, Hydrologist
Karen S. Midtlyng, Editorial Assistant
Norman A. Midtlyng, Hydrologic Technician
Evonne S. Mitton, Computer Assistant
Consuelo E. Mougeot, Clerk Typist
Robert J. Omang, Hydrologist
Charles Parrett, Hydrologist
Marian D. Piatte, Hydrologic Technician
Virginia Redstone, Hydrologic Technician
Thomas E. Reed, Hydrologic Technician
Andrew A. Skerda, Hydrologic Technician
Kenneth L. Tangen, Supervisory Hydrologic Technician

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

Hydrologic data for Montana are in two volumes as follows:

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

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. USGS/WRD/HD-88/276	2.	3. Recipient's Accession No.

4. Title and Subtitle
Water Resources Data, Montana, Water Year 1987
Volume 1. Hudson Bay and Missouri River Basins

5. Report Date

6. August 1988

7. Author(s)
U.S. Geological Survey

8. Performing Organization Rept. No.
USGS-WDR-MT-87-1

9. Performing Organization Name and Address
U.S. Geological Survey, Water Resources Division
301 South Park Avenue, Drawer 10076
Federal Office Building, Room 428
Helena, MT 59626

10. Project/Task/Work Unit No.

11. Contract(C) or Grant(G) No.
(C)
(G)

12. Sponsoring Organization Name and Address
U.S. Geological Survey, Water Resources Division
301 South Park Avenue, Drawer 10076
Federal Office Building, Room 428
Helena, MT 59626

13. Type of Report & Period Covered
Annual - Oct. 1, 1986 to Sept. 30, 1987

14.

15. Supplementary Notes
Prepared in cooperation with the State of Montana and with other agencies.

16. Abstract (Limit: 200 words)

Water resources data for the 1987 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 in wells. Volume 1 of this report contains discharge records for 186 gaging stations; stage/contents for 6 lakes and reservoirs; water quality for 53 stations; water levels for 250 observation wells. Also included are 131 crest-stage partial-record stations and 33 smaller reservoirs. Additional water data were collected at various sites, not part of the systematic data collection programs, and are published as miscellaneous measurements. These data represent that part of the National Water Data System operated by the U.S. Geological Survey and cooperating State and Federal agencies in Montana. Specific conductance determinations are also published for discharge measurements made during the year.

17. Document Analysis a. Descriptors
*Montana, *Hydrologic data, *Surface water, *Ground water, *Water quality, Flow rate, Gaging stations, Lakes, Reservoirs, Chemical analyses, Sediments, Water temperatures, Sampling sites, Water levels, Water analyses.

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement: No restriction on distribution. This report may be purchased from: National Technical Information Service, Springfield, VA 22161	19. Security Class (This Report) Unclassified	21. No. of Pages 445
	20. Security Class (This Page) Unclassified	22. Price

(See ANSI-Z39.18) *See Instructions on Reverse* OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

CONTENTS

	Page
Preface	iii
List of surface-water stations, in downstream order, for which records are published	x
Introduction	1
Cooperation	1
General hydrologic setting	2
Hydrologic-monitoring activity--water year 1987	3
Summary of hydrologic conditions--water year 1987	3
Precipitation and temperature	3
Streamflow	4
Quality of streamflow	7
Ground-water levels	8
Special networks and programs	20
Explanation of the records	20
Station identification numbers	20
Downstream-order system	21
Latitude-longitude system	21
Rectangular-grid system	21
Records of stage and water discharge	22
Data collection and computation	22
Data presentation	23
Identifying estimated daily discharge	24
Accuracy of the records	24
Other records available	24
Publications	25
Records of surface-water quality	25
Classification of records	25
Arrangement of records	25
Onsite measurements and sample collection	26
Water temperature	26
Sediment	26
Laboratory measurements	26
Data presentation	27
Remark codes	28
Publications	28
Records of ground-water levels	28
Data collection and computation	28
Publications	28
Access to WATSTORE data	29
Definition of terms	29
Publications on Techniques of Water-Resources Investigations	34
Station records, surface water and water quality	40
Smaller reservoirs in Missouri River basin in Montana	347
Discharge at partial-record stations and miscellaneous sites	358
Crest-stage partial-record stations	358
Annual maximum discharge at crest-stage partial record stations	358
Measurements at miscellaneous sites	374
Supplemental water-quality data for gaging stations and miscellaneous sites	387
Chemical quality of precipitation (national trends network)	418
Index	424

ILLUSTRATIONS

		Page
Figure 1.	Streamflow data for water year 1987 compared to data for water years 1961-85 at long-term streamflow-gaging stations.....	5
2.	Long-term hydrograph, by water year, for an observation well in Powder River County.....	19
3.	System for numbering miscellaneous sites (latitude and longitude.....	21
4-7.	Maps showing location of:	
4.	Surface-water gaging stations, water year 1987.....	36
5.	Water-quality stations, water year 1987.....	37
6.	Crest-stage partial-record stations, water year 1987.....	38
7.	Ground-water observation wells, water year 1987.....	39
8.	Schematic diagram showing diversions from St. Mary River in Part 5 to Milk River in Part 6.....	44
9-11.	Schematic diagrams showing diversions and storage in:	
9.	Sun River basin.....	89
10.	Lodge Creek basin.....	146
11.	Battle Creek and Frenchman River basins.....	155

TABLES

Table 1.	Precipitation and departure from normal, in inches.....	3
2.	Water content of mountain snowpack as percent of normal.....	3
3.	Comparisons of instantaneous peak discharge for water year 1987 with instantaneous peak discharge for period of record at long-term stations.....	4
4.	Comparisons of minimum daily discharge for water year 1987 with minimum daily discharge for period of record at long-term stations.....	6
5.	Percentage of normal storage by month for major hydroelectric and irrigation reservoirs during water year 1987.....	6

TABLES--Continued

Page

6. Comparison of minimum and maximum values for selected water-quality constituents and properties for water year 1987 and for the period of NASQAN record at six stations..... 7
7. Annual suspended-sediment load at selected stations for water year 1987 compared with water year 1986 and period of record..... 8
8. Water levels in observation wells..... 9
9. Water-supply paper numbers and parts for surface-water stations, 1899-1970..... 25
10. Descriptor values for weather conditions..... 27
11. Water-supply paper numbers and parts for water-quality stations, 1947-70..... 28
12. Water-supply paper numbers and parts for ground-water stations for northwestern United States, 1940-74..... 28

Factors for converting inch-pound units to International System units (SI).....inside back cover

SURFACE-WATER 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)

HUDSON BAY BASIN — Page

Lake Winnepeg (head of Nelson River):
SASKATCHEWAN RIVER BASIN
Old Man River:
St. Mary River:
Swiftcurrent Creek at Many Glacier (d)..... 40
Lake Sherburne at Sherburne (e)..... 41
Swiftcurrent Creek at Sherburne (d)..... 42
St. Mary River near Babb (d)..... 43
St. Mary Canal at St. Mary Crossing, near Babb (d)..... 45
St. Mary River at international boundary (dcms)..... 46

MISSOURI RIVER BASIN
Red Rock River (head of Missouri River) below Lima Reservoir, near Monida (d)..... 49
Beaverhead River (continuation of Red Rock River):
Clark Canyon Reservoir near Grant (e)..... 50
Beaverhead River at Barretts (d)..... 51
Beaverhead River near Twin Bridges (d)..... 52
RUBY RIVER BASIN
Ruby River above reservoir, near Alder (d)..... 53
Ruby River below reservoir, near Alder (d)..... 54
BIG HOLE RIVER BASIN
Big Hole River:
Big Hole River near Melrose (dt)..... 55
Jefferson River (continuation of Beaverhead River):
BOULDER RIVER BASIN
Boulder River near Boulder (d)..... 58
WILLOW CREEK BASIN
Willow Creek near Harrison (d)..... 59
Jefferson River near Three Forks (d)..... 60
MADISON RIVER BASIN
Firehole River near West Yellowstone (dt)..... 61
Gibbon River near West Yellowstone (dct)..... 64
Madison River below Hebgen Lake, near Grayling (d)..... 67
Madison River at Kirby Ranch, near Cameron (d)..... 68
Madison River below Ennis Lake, near McAllister (dt)..... 69
GALLATIN RIVER BASIN
Gallatin River near Gallatin Gateway (d)..... 72
East Gallatin River:
Bridger Creek near Bozeman (d)..... 73
Hyalite Creek at Hyalite Ranger Station, near Bozeman (d)..... 74
Gallatin River at Logan (d)..... 75
Missouri River at Toston (dcmts)..... 76
Canyon Ferry Lake near Helena (e)..... 81
Missouri River below Canyon Ferry Dam, near Helena (c)..... 82

SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED

MISSOURI RIVER BASIN--Continued — Page

PRICKLY PEAR CREEK BASIN
Prickly Pear Creek:
Prickly Pear Creek near Clancy (d) 84
Tenmile Creek near Rimini (d) 85
Missouri River below Holter Dam, near Wolf Creek (d) 86
SMITH RIVER BASIN
Smith River near Fort Logan (d) 87
Missouri River near Ulm (d) 88
SUN RIVER BASIN
Muddy Creek near Vaughn (d) 90
Muddy Creek at Vaughn (d) 91
Sun River near Vaughn (dcms) 92
Missouri River near Great Falls (d) 97
Missouri River at Fort Benton (d) 98
MARIAS RIVER BASIN
Two Medicine River below South Fork, near Browning (d) 99
Badger Creek below Four Horns Canal, near Browning (d) 100
Cut Bank Creek at Cut Bank (dc) 101
Marias River near Shelby (d) 103
Lake Elwell near Chester (e) 104
Marias River near Chester (d) 105
Teton River near Dutton (d) 106
Missouri River at Virgelle (d) 107
Missouri River near Landusky (dcms) 108
Fort Peck Lake:
MUSSELSHELL RIVER BASIN
Musselshell River at Harlowton (d) 113
Musselshell River near Shawmut (d) 114
Halfbreed Creek:
Halfbreed Creek near Klein (d) 115
Musselshell River near Roundup (d) 116
Musselshell River at Musselshell (d) 117
Musselshell River at Mosby (dcms) 118
BIG DRY CREEK BASIN
Big Dry Creek near Van Norman (d) 123
Fort Peck Lake at Fort Peck (e) 124
Missouri River below Fort Peck Dam (dc) 125
MILK RIVER BASIN
South Fork Milk River near Babb (d) 128
Milk River at western crossing of international boundary (dc) 129
North Fork Milk River above St. Mary Canal, near Browning (d) 130
North Milk River near international boundary (d) 131
Milk River at Milk River, Alberta (d) 132
Verdigris Coulee near the mouth, near Milk River, Alberta (d) 133
Milk River at eastern crossing of international boundary (d) 134
Big Sandy Creek:
Big Sandy Creek at reservation boundary, near Rocky Boy (dc) 135
Boxelder Creek near Rocky Boy (d) 137
Sage Creek near Whitlash (d) 138

SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED

MISSOURI RIVER BASIN--Continued — Page

MILK RIVER BASIN--Continued

Big Sandy Creek near Havre (dcs) 139
Milk River at Havre (d) 143
Little Boxelder Creek at mouth, near Havre (d) 144
Clear Creek near Chinook (d) 145
Lodge Creek:
Spangler Ditch near Govenlock, Saskatchewan (d) 147
Middle Creek near Saskatchewan Boundary (d) 148
Middle Creek below Middle Creek Reservoir, near Govenlock, Saskatchewan (d) 149
Middle Creek near Govenlock (d) 150
Middle Creek above Lodge Creek, near Govenlock (d) 151
Lodge Creek below McRae Creek, at international boundary (dc) 152
Reservoirs in Lodge Creek basin in Saskatchewan (e) 154
Battle Creek:
Gaff Ditch near Merryflat, Saskatchewan (d) 156
Cypress Lake west inflow canal near West Plains, Saskatchewan (d) 157
Cypress Lake west inflow canal drain near Oxarat, Saskatchewan (d) 158
Cypress Lake west outflow canal near West Plains, Saskatchewan (d) 159
Vidora Ditch near Consul, Saskatchewan (d) 160
Richardson Ditch near Consul, Saskatchewan (d) 161
McKinnon Ditch near Consul, Saskatchewan (d) 162
Nashlyn Canal near Consul, Saskatchewan (d) 163
Battle Creek at international boundary (dc) 164
Lyons Creek at international boundary (d) 166
Battle Creek near Chinook (d) 167
Milk River "A" Canal near Harlem (d) 168
Milk River near Harlem (d) 169
Fifteenmile Creek:
Fifteenmile Creek tributary near Harlem (d) 170
Peoples Creek:
Peoples Creek near Hays (d) 171
Little Peoples Creek near Hays (dcs) 172
South Fork Peoples Creek:
Lodge Pole Creek at Lodge Pole (d) 175
Willow Coulee near Dodson (d) 176
Peoples Creek near Dodson (dc) 177
Kuhr Coulee tributary near Dodson (d) 179
Milk River near Dodson (d) 180
Belanger Creek (head of Frenchman River):
Belanger Creek diversion canal near Vidora, Saskatchewan (d) 181
Cypress Lake:
Cypress Lake east outflow canal near Vidora, Saskatchewan (d) 182
Frenchman River:
Eastend Reservoir:
Eastend Canal at Eastend, Saskatchewan (d) 183
Frenchman River below Eastend Reservoir, near Eastend, Saskatchewan (d) 184

SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED

Page

MISSOURI RIVER BASIN--Continued
MILK RIVER BASIN--Continued
Frenchman River--Continued
Huff Lake:
Huff Lake pumping canal near Val Marie, Saskatchewan (d)..... 185
Huff Lake gravity canal near Val Marie, Saskatchewan (d)..... 186
Newton Lake:
Newton Lake Main Canal near Val Marie, Saskatchewan (d)..... 187
Frenchman River below Newton Lake, near Val Marie, Saskatchewan (d). 188
Frenchman River at international boundary (dc)..... 189
Reservoirs in Frenchman River basin in Saskatchewan (e)..... 191
Milk River at Juneberg Bridge, near Saco (dc)..... 192
Beaver Creek:
Beaver Creek near Zortman (d)..... 195
Little Warm Creek:
Little Warm Creek at reservation boundary, near Zortman (dc)..... 196
Little Warm Creek tributary near Lodge Pole (d)..... 198
Big Warm Creek near Zortman (d)..... 199
Beaver Creek below Guston Coulee, near Saco (d)..... 200
ROCK CREEK BASIN
Rock Creek below Horse Creek, near international boundary (dcms).... 201
South Creek:
South Creek tributary near Opheim (d)..... 204
South Creek tributary No. 2 near Opheim (d)..... 205
South Creek tributary No. 3 near international boundary (d)... 206
Rock Creek below McEachern Creek, near international boundary (d)... 207
Starbuck Coulee near international boundary (d)..... 208
Milk River near Vandalia (d)..... 209
Milk River at Tampico (d)..... 210
Willow Creek near Glasgow (d)..... 211
Milk River at Nashua (dcms)..... 212
Porcupine Creek at Nashua (dc)..... 215
Wolf Creek near Wolf Point (d)..... 217
Missouri River near Wolf Point (d)..... 218
REDWATER RIVER BASIN
Redwater River at Circle (d)..... 219
POPLAR RIVER BASIN
Poplar River at international boundary (dcs)..... 220
East Poplar River at international boundary (dcs)..... 224
East Fork Poplar River near Scobey (cs)..... 228
Poplar River above West Fork, near Bredette (c)..... 231
West Fork Poplar River near Bredette (c)..... 232
Poplar River near Poplar (dcms)..... 233
Beaver Creek at international boundary (dcs)..... 236

SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED

MISSOURI RIVER BASIN--Continued — Page

BIG MUDDY CREEK BASIN

Big Muddy Creek near Antelope (dcs) ... 239
Big Muddy Creek diversion canal near Medicine Lake (d) ... 242
Lake Creek near Dagmar (d) ... 243
Cottonwood Creek near Dagmar (d) ... 244
Sand Creek near Dagmar (d) ... 245
Big Muddy Creek near mouth, near Culbertson (dc) ... 246
Missouri River near Culbertson (d) ... 248

YELLOWSTONE RIVER BASIN

Yellowstone River:
Gardner River near Mammoth (d) ... 249
Yellowstone River at Corwin Springs (ds) ... 250
Yellowstone River near Livingston (dcms) ... 253
Shields River near Livingston (d) ... 257
Boulder River at Big Timber (d) ... 258
Stillwater River above Nye Creek, near Nye (d) ... 259
East Rosebud Creek (head of Rosebud Creek):
West Rosebud Creek near Roscoe (d) ... 260
Stillwater River near Absarokee (d) ... 261
Clarks Fork Yellowstone River near Belfry (dc) ... 262
Clarks Fork Yellowstone River at Edgar (d) ... 264
Rock Creek:
Red Lodge Creek above Cooney Reservoir, near Boyd (d) ... 265
Willow Creek near Boyd (d) ... 266
Red Lodge Creek below Cooney Reservoir, near Boyd (d) ... 267
Rock Creek at Rockvale (d) ... 268
Yellowstone River at Billings (dcms) ... 269
Pryor Creek above Pryor (c) ... 273
Pryor Creek at Pryor (d) ... 274
Pryor Creek near Huntley (d) ... 275
Bighorn River at Kane, WY (dcms) ... 276
Bighorn Lake:
Shoshone River near Lovell, WY (dc) ... 278
Shoshone River at Kane, WY (cm) ... 280
Bighorn Lake near St. Xavier (e) ... 281
Bighorn River near St. Xavier (d) ... 282
Bighorn River near Hardin (c) ... 283
Little Bighorn River below Dayton Gulch, near Burgess Junction, WY (d) ... 284
Dry Fork below Lick Creek, near Burgess Junction, WY (d) ... 285
Elkhorn Creek above Fuller Ranch ditch, near Parkman, WY (d) ... 286
West Fork Little Bighorn River near Parkman, WY (d) ... 287
Little Bighorn River at State line, near Wyola (d) ... 288
Spring Creek:
Red Canyon Creek near Parkman, WY (d) ... 289
Pass Creek:
West Pass Creek near Parkman, WY (d) ... 290
East Pass Creek near Dayton, WY (d) ... 291
Twin Creek near Parkman, WY (d) ... 292
Pass Creek near Wyola (d) ... 293

SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED

MISSOURI RIVER BASIN--Continued — Page

YELLOWSTONE RIVER BASIN--Continued

Yellowstone River--Continued

Little Bighorn River below Pass Creek, near Wyola (d)..... 294

Owl Creek near Lodge Grass (d)..... 295

Lodge Grass Creek at State line, near Wyola (d)..... 296

Lodge Grass Creek above Willow Creek Diversion, near Wyola (d) 297

Little Bighorn River near Hardin (dc)..... 298

Bighorn River above Tullock Creek, near Bighorn (d)..... 301

Bighorn River at Bighorn (cms)..... 302

Yellowstone River at Forsyth (d)..... 304

Rosebud Creek at reservation boundary, near Kirby (d)..... 305

Rosebud Creek near Colstrip (d)..... 306

Rosebud Creek at mouth, near Rosebud (d)..... 307

TONGUE RIVER BASIN

Tongue River:

Tongue River at State line, near Decker (dcm)..... 308

Tongue River at Tongue River Dam, near Decker (dcs)..... 311

Hanging Woman Creek below Horse Creek, near Birney (cs)..... 315

Hanging Woman Creek near Birney (dcs)..... 317

Tongue River at Birney Day School Bridge, near Birney (dc)..... 321

Tongue River at Miles City (dcms)..... 323

Yellowstone River at Miles City (d)..... 326

POWDER RIVER BASIN

Powder River at Moorhead (dcs)..... 327

Powder River at Broadus (ds)..... 332

Little Powder River above Dry Creek, near Weston, WY (dc)..... 335

Powder River near Locate (dcms)..... 337

O'Fallon Creek near Ismay (d)..... 341

Yellowstone River near Sidney (dcms)..... 342

Smaller reservoirs in Missouri River basin in Montana (e)..... 347

LITTLE MISSOURI RIVER BASIN

Little Missouri River at Camp Crook, SD (d)..... 355

Beaver Creek:

Beaver Creek near Trotters, ND (d)..... 356

WATER RESOURCES DATA FOR MONTANA, 1987

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, obtains a large amount of data pertaining to the water resources of Montana each water year. These data, accumulated during many water years, constitute a valuable data base for developing an improved understanding of the water resources of the State. To make these data readily available to interested parties outside the Geological Survey, the data are published annually in this report series entitled, "Water Resources Data, Montana."

Water resources data for water year 1987 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 186 gaging stations; stage and contents at 6 lakes and reservoirs; water quality at 44 gaging stations and 9 water-quality stations; and water levels for 250 observation wells. Also included are data for 131 crest-stage partial-record stations and 33 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. Also, numerous stations in Canada operated for the International Joint Commission under cooperative agreement with the U.S. Department of State are included in the above. In this volume the location of gaging stations are shown in figure 4, water-quality stations are shown in figure 5, and ground-water observation wells are shown in figure 7. These data represent that part of the National Water Data System collected by the U.S. Geological Survey and cooperating State and Federal agencies in Montana.

Records of discharge or stage of streams, and contents or stage of lakes and reservoirs were first published in a series of U.S. Geological Survey water-supply papers entitled "Surface Water Supply of the United States." Through September 30, 1960, these water-supply papers were in an annual series and then in a 5-year series for 1961-65 and 1966-70. Records of chemical quality, water temperatures, and suspended sediment were published from 1941 to 1970 in an annual series of water-supply papers entitled "Quality of Surface Waters of the United States." Records of ground-water levels were published from 1935 to 1974 in a series of water-supply papers entitled "Ground-Water Levels in the United States." Water-supply papers may be consulted in the libraries of the principal cities of the United States or may be purchased from U.S. Geological Survey, Books and Open-File Reports, Federal Center, Building 810, Box 25425, Denver, Colorado 80225.

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

Beginning with the 1971 water year, water data for streamflow, water quality, and ground water are published in official Survey reports on a State-boundary basis. These official Survey reports carry an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and the volume number. For example, this volume is identified as "U.S. Geological Survey Water-Data Report MT-87-1." These water data reports are for sale, in paper copy or on microfiche by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161.

Additional information, including current prices, for ordering specific reports may be obtained from the District Chief at the address given on the back of the title page or by telephone (406) 449-5263.

COOPERATION

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

Montana Department of Natural Resources and Conservation
L. Fasbender, 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
E. T. Ruppel, director

Assistance in the form of funds or services was given by the U.S. Department of State-International Joint Commission, Waterways Treaty Program, in collecting records published in this volume for 34 gaging stations and 4 water-quality stations; by the Corps of Engineers, U.S. Army, for 16 gaging stations and 4 water-quality stations; by the Bureau of Land Management, U.S. Department of the Interior, for 9 gaging stations and 3 water-quality stations; by the U.S Bureau of Reclamation, U.S. Department of the Interior, for 7 gaging stations; and 1 water quality station; and the U.S. Bureau of Indian Affairs, U.S. Department of the Interior, for 26 gaging stations and 13 water-quality stations.

Organizations that supplied data are acknowledged in station descriptions.

Volume 1: Hudson Bay Basin

Missouri River Basin

GENERAL HYDROLOGIC SETTING

The Hudson Bay and upper Missouri River basins in Montana drain about 83 percent of the State and provide slightly less than 50 percent of the State's total streamflow. The Hudson Bay basin comprises less than 1 percent of the drainage area of the combined basins. The major river in the Hudson Bay basin is the St. Mary River, which flows north from Montana's Glacier National Park into Canada to the Saskatchewan River and then into Hudson Bay. The Missouri River basin in Montana includes drainage of both the Missouri River and the Yellowstone River. The Missouri River, which is formed by the confluence of the Jefferson, Madison, and Gallatin Rivers in southwest Montana, flows north through the central part of the State and then east across northern Montana into North Dakota. Its major tributaries are the Dearborn, Smith, Sun, Teton, Marias, Judith, Musselshell, Milk, Redwater, and Poplar Rivers. The Milk River originates in Montana, flows north into Canada, and then flows southeast back into Montana. The Poplar River flows south from its source in Canada into Montana. The Yellowstone River, which originates in Wyoming, drains the south-central and southeastern sections of Montana. It joins the Missouri River just east of the Montana-North Dakota line. The major tributaries to the Yellowstone are the Shields, Boulder, and Stillwater Rivers that originate in Montana and the Clarks Fork Yellowstone, Bighorn, Tongue, and Powder Rivers that originate in Wyoming and flow north into Montana.

Two major multipurpose reservoirs have been constructed on the Missouri River. Canyon Ferry Lake, which was formed by the U.S. Bureau of Reclamation's Canyon Ferry Dam, is 25 miles long and has a usable capacity of about 2,043,000 acre-feet. Fort Peck Lake was formed by the U.S. Army Corps of Engineers' Fort Peck Dam. It is more than 100 miles long and has a storage capacity of 18,910,000 acre-feet. The Yellowstone River has no dams or storage reservoirs on its mainstem and is the longest free-flowing river in the conterminous United States.

The western and southwestern parts of the upper Missouri River basin are in the Northern Rocky Mountains physiographic province. The northern and eastern parts are in the Great Plains province. Climate and hydrologic conditions differ substantially between the two provinces. The elevation ranges from about 10,000 feet at the Continental Divide in Glacier National Park and in the headwaters of the Yellowstone River in Yellowstone National Park to about 1,880 feet where the Missouri and Yellowstone Rivers flow from the State.

Annual precipitation varies considerably throughout the basins, from 100 inches along the Continental Divide in Glacier National Park to about 12 inches in eastern Montana and in some of the intermontane valleys east of the divide. In mountain areas, much of this precipitation occurs as snow during the winter. Although much of the annual precipitation on the Great Plains also occurs as snow during the winter, intense rainstorms during the summer can add substantial quantities of precipitation to the annual totals in a very short time. In areas east of the mountains, generally one-half of the annual precipitation occurs from May through July.

Peak runoff from the basins can result from spring snowmelt, snowmelt mixed with rain, or intense rains. In addition, flooding may be caused by backwater from ice jams; this commonly occurs in the lower Yellowstone River basin. The record floods in April 1952 in northeastern Montana are an example of spring snowmelt flooding. Floods in June 1964, June 1975, and May 1981 are examples of those caused by snowmelt-rainfall runoff. The May 1978 flood in the southeastern part of the State is an example of flooding caused by intense rainfall--more than 5 inches in 2 days. Flash floods, although restricted in scope, are at times numerous in the north-central and eastern parts of the State.

Water generally is suitable for most uses throughout the basin except in parts of eastern Montana where, because of large concentrations of dissolved solids and selected constituents, recommended standards for domestic and agriculture uses may be exceeded. Contrasting water quality occurs between the western mountain region and the eastern plains. In the mountains, where the rocks generally are older (commonly of Precambrian age) and more resistant to weathering and runoff is rapid, the water characteristically is a calcium bicarbonate type. The dissolved-solids concentrations in mountain streams seldom exceed 500 mg/L (milligrams per liter), even during base-flow conditions. Water from the eastern two-thirds of the State, where Cretaceous and Tertiary rocks are dominant, generally is a sodium sulfate type; dissolved solids concentrations range from about 500 to 5,000 mg/L. Snowmelt and intense rainstorms sometimes alter this pattern, when rapid runoff results in smaller concentrations of dissolved solids, and calcium and bicarbonate become the dominant ions.

A notable exception to the general classification of water in eastern Montana occurs in the northeastern section of the State, where the runoff and base-flow waters typically are a sodium bicarbonate type. Significant concentrations of boron (as much as 2,000 micrograms per liter in the Poplar River) also are common. Another exception applies to waters in the downstream reaches of the Yellowstone and Missouri Rivers, which originate in the mountain areas. Characteristics of the mountain-type water are present, but gradually diminish as the water moves downstream and mixes with eastern Montana tributaries.

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

HYDROLOGIC-MONITORING ACTIVITY--WATER YEAR 1987

Five streamflow-gaging stations and eight water-quality stations were established in the basins during water year 1987 to aid in an assessment of the water resources. Eight streamflow-gaging stations and 11 water-quality sites were discontinued at the end of the water year, because sufficient data had been collected to meet users' needs or funding was not available to continue the data collection.

SUMMARY OF HYDROLOGIC CONDITIONS--WATER YEAR 1987

Precipitation and Temperature

Water year 1987 in the Hudson Bay and upper Missouri River basins was characterized by major variations in hydrologic conditions. Precipitation was near normal, with departures ranging from 7.1 percent greater than to 3.7 percent less than normal. Data for precipitation and departure from normal precipitation published by the National Weather Service for the basins are listed in table 1. Most National Weather Service stations measure precipitation only in valley locations. Data for mountain precipitation occurring as snow during the winter are published by the U.S. Soil Conservation Service in the report "Montana Water Supply Outlook"; data for 1987 are listed in table 2. Normals for precipitation and snowpack are based on different periods of record. Normal precipitation has a base period of 1951-80 and normal snowpack has a base period of 1961-85. Once sufficient long-term data for snowpack have been collected, the base period will be the same. Mountain precipitation for 1987 was substantially less than normal. Temperatures for the year were greater than normal. Temperatures from December through June ranged from 3.3 to 14.8 °F (degrees Fahrenheit) greater than normal. These factors of precipitation and temperature resulted in substantial fluctuations in streamflow throughout the year.

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

Division (number of stations)	October 1986 through March 1987		April through September 1987		Water year 1987	
	Precipitation	Departure from normal, 1951-80	Precipitation	Departure from normal, 1951-80	Precipitation	Departure from normal, 1951-80
Southwestern (26)	3.31	-2.04	12.34	+2.37	15.65	+0.33
North Central (42)	3.58	+.46	9.24	-.73	12.82	-.27
Central (37)	3.38	-1.00	10.98	+.45	14.36	-.55
South Central (25)	4.44	-.91	11.80	+1.10	16.24	+.19
Northeastern (27)	3.01	+.38	11.05	+.55	14.06	+.93
Southeastern (24)	3.28	-.14	11.34	+1.03	14.62	+.89

[1] Data from U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, 1987, Climatological data, Montana: v. 89, no. 10 through v. 90, no. 9.

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

Drainage basin	1987				
	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1
St. Mary	96	85	74	79	52
Missouri	70	66	62	66	27
Yellowstone	72	69	61	66	35

[1] Data from U. S. Department of Agriculture, Soil Conservation Service, 1987. Normal based on 1961-85 period of record.

The fall and winter of 1986-87 was unseasonably mild and dry. The National Weather Service reported that several high pressure systems pushed most of the winter storms around the upper Missouri River basin, leaving the basin with less than normal precipitation and greater than normal temperatures. December of 1986 was one of the warmest and driest on record. The precipitation reported from valley locations indicates that 1987 was a near normal year (table 1). However, data from the U.S. Soil Conservation Service's mountain network (table 2) indicate a different situation. By April 1, the snowpack ranged from 66 to 79 percent of normal and by May 1 from 27 to 52 percent of normal. Many of the snow courses measured on May 1 were at or near the record low for the periods of record, which on many courses extend back to 1934-35. Because of the greater than normal temperatures and little snowpack in April, much of the snowpack had melted by mid-May. Precipitation was substantially less than normal during June, but substantially greater than normal during July.

Streamflow

Streamflow data for water year 1987 are compared to data for water years 1961-85 at four long-term streamflow stations (fig. 1). The extremes in precipitation, occurring as snow, are reflected in the streamflow records. The drought that occurred in 1985, which appeared to have been broken by greater than normal precipitation in September 1986, was again evident in 1987. Owing to the lack of snowpack and less than normal precipitation in June, flows were at or approaching record lows. For example, monthly mean discharge of the Missouri River at Toston (station 06054500) was 3,175 ft^3/s, the smallest for the 52 years of record. Monthly mean discharge of the Yellowstone River at Billings (station 06214500) was 10,300 ft^3/s, which was the second smallest mean for June for the period of record (1904-86). The smallest mean for June was 9,849 ft^3/s in 1934. Conversely, the residual effects of the September 1986 flood in northeastern Montana were reflected by the October and November 1986 monthly mean discharges of the Redwater River at Circle (station 06177500) which exceeded the previous maximum monthly mean discharges for the period of record.

Compared to the 1961-85 yearly mean discharge, the 1987 annual discharge of the Marias River near Shelby (station 06099500) was 83 percent of normal, the Missouri River at Toston was 62 percent of normal, the Yellowstone River at Billings was 62 percent of normal, and the Redwater River at Circle was 82 percent of normal. By comparison, annual streamflows for water year 1986 were larger than for water year 1987 at all stations. In 1986, streamflow of the Marias River was 102 percent of normal, the Missouri River was 91 percent of normal, the Yellowstone River was 96 percent of normal, and the Redwater River was 391 percent of normal, based on the long-term averages.

No extraordinary floodflows were recorded this year. Peak discharges for several representative streamflow-gaging stations in the basin are listed in table 3. The recurrence interval of peak discharge at the selected stations was generally less than the 2-year event. The exception was in the north-central part of the State. Owing to the flooding in late September 1986, the Milk River at Nashua (station 06174500) peaked on October 3, 1986, with a flow of 13,700 ft^3/s, which corresponds to a 5-year recurrence interval.

Despite the near normal precipitation and streamflows of 1986, less than normal snowpack and warm temperatures of early 1987 had a detrimental effect on spring and early summer streamflow. Seven of the 17 stations used to index low flow recorded minimum daily flows with a 5-10 year recurrence interval. Because the snowpack that generally furnishes water to the basins was less than normal and melted early, streamflows in June were substantially less than normal. Minimum daily discharges for several representative streamflow-gaging stations are listed in table 4.

Despite the lack of snowmelt runoff, the managers of the major reservoirs were able to keep reservoir contents near normal. The percentage of normal (1961-85) storage by month for major reservoirs is given in table 5. The effects of less than normal streamflow are apparent from the decreasing reservoir storage during June and July.

Table 3.--*Comparisons of instantaneous peak discharge for water year 1987 with instantaneous peak discharge for period of record at long-term stations*

[<, less than]

Station number	Station name	Drainage area (square miles)	Peak discharge, water year 1987			Peak discharge, period of record	
			Date	Cubic feet per second	Recurrence interval (years)	Date	Cubic feet per second
05014500	Swiftcurrent Creek at Many Glacier, Mont.	30.9	05/01	835	<2	06/08/64	6,700
05017500	St. Mary River near Babb, Mont.	278	07/24	2,240	<2	06/09/64	16,500
06025500	Big Hole River near Melrose, Mont.	2,476	05/28	2,550	<2	06/10/72	14,300
06054500	Missouri River at Toston, Mont.	14,669	05/28	6,580	<2	06/06/48	32,000
06062500	Tenmile Creek near Helena, Mont.	32.7	05/27	145	<2	05/22/81	3,290
06089000	Sun River near Vaughn, Mont.	1,854	05/02	3,480	<2	06/09/64	53,500
06093200	Badger Creek below Four Horns Canal, near Browning, Mont.	152	05/01	1,240	<2	06/08/64	49,700
06115200	Missouri River near Landusky, Mont.	40,987	05/04	11,000	<2	06/06/53	137,000
06120500	Musselshell River at Harlowton, Mont.	1,125	05/28	367	<2	06/20/75	7,270
06154400	Peoples Creek near Hays, Mont.	220	10/01	69	<2	06/08/72	8,460
06174500	Milk River at Nashua, Mont.	22,332	10/03	13,700	<5	04/18/52	45,300
06191500	Yellowstone River at Corwin Springs, Mont.	2,623	06/08	7,620	<2	06/14,15,18	32,000
06200000	Boulder River at Big Timber, Mont.	523	05/17	2,470	<2	05/28/56	9,840
06214500	Yellowstone River at Billings, Mont.	11,795	05/28	17,100	<2	06/19/74	69,500
06289000	Little Bighorn River at State line, Mont.	193	04/30	546	<2	06/03/44	2,730
06308500	Tongue River at Miles City, Mont.	5,379	08/14	2,180	<2	06/15/62	13,300
06329500	Yellowstone River near Sidney, Mont.	69,103	05/31	23,000	<2	06/02/21	159,000

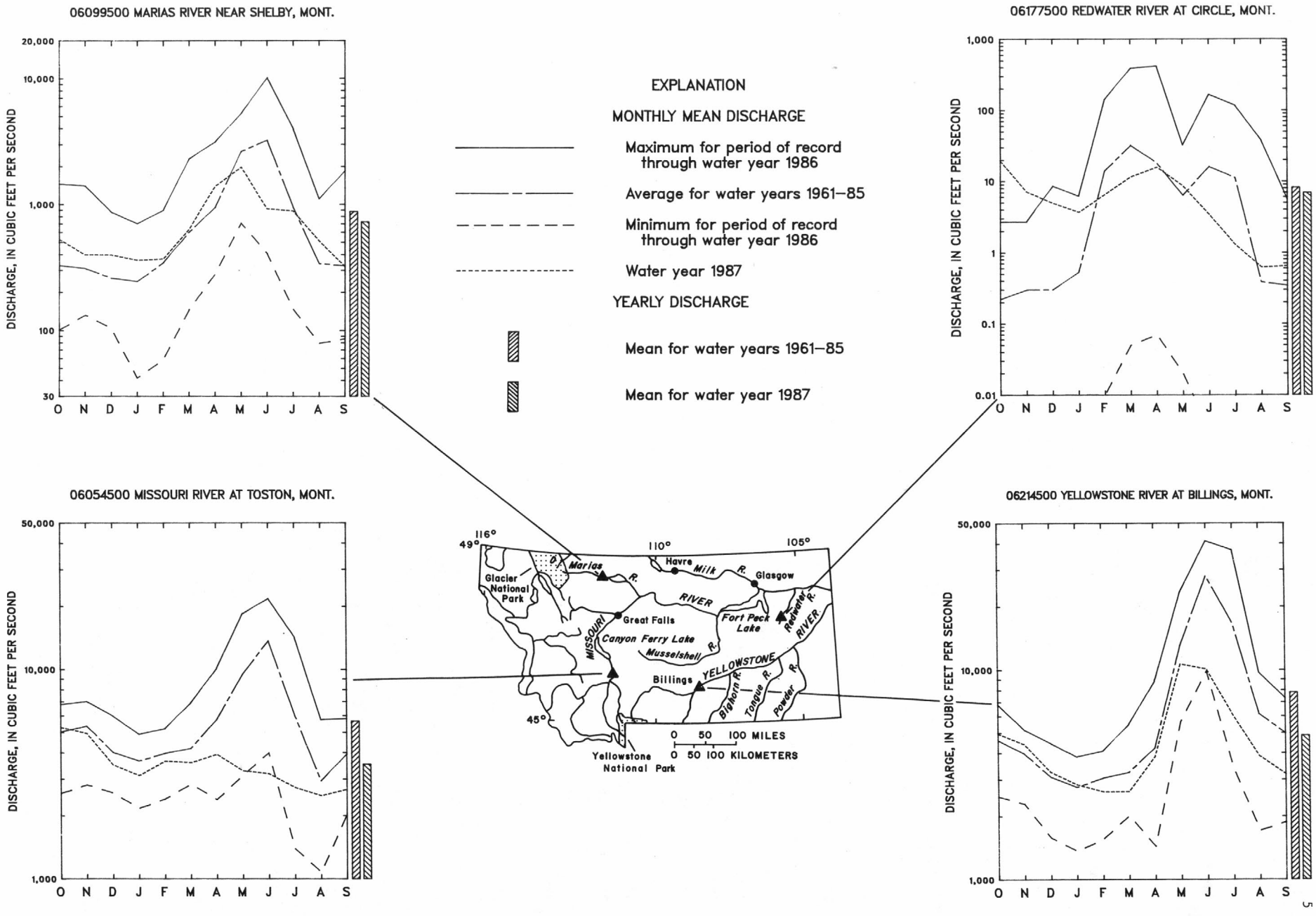


Figure 1.--Streamflow data for water year 1987 compared to data for water years 1961-85 at long-term streamflow-gaging stations.

Table 4.--*Comparisons of minimum daily discharge for water year 1987 with minimum daily discharge for period of record at long-term stations*[1]

[<, less than]

Station number	Station name	Drainage area (square miles)	Minimum discharge, water year 1987			Minimum discharge, period of record	
			Date	Cubic feet per second	Recurrence interval (years)	Date	Cubic feet per second
05014500	Swiftcurrent Creek at Many Glacier, Mont.	30.9	01/17	10	<5	11/14,16/76	0
05017500	St. Mary River near Babb, Mont.	278	01/01	42	10	01/05/63	26
06025500	Big Hole River near Melrose, Mont.	2,476	09/16	150	5	08/17/81	49
06054500	Missouri River at Toston, Mont.	14,669	05/15	1,090	10	04/30/41	562
06061500	Prickly Pear Creek near Clancy, Mont.	192	01/17,18	18	<2	01/26/58	.5
06089000	Sun River near Vaughn, Mont.	1,854	01/16	90	<2	05/24/44	20
06099500	Marias River near Shelby, Mont.	3,242	07/17	196	<2	08/20/19	10
06115200	Missouri River near Landusky, Mont.	40,987	07/06	3,810	<2	07/08/36	1,120
06120500	Musselshell River at Harlowton, Mont.	1,125	05/08	6.9	<5	(1)	0
06174500	Milk River at Nashua, Mont.	22,332	05/22	83	<2	(1)	0
06181000	Poplar River near Poplar, Mont.	3,174	07/16	4.4	<2	(1)	0
06191500	Yellowstone River at Corwin Springs, Mont.	2,623	03/29	729	<2	03/05,09/37	389
06200000	Boulder River at Big Timber, Mont.	523	01/16	50	5	08/26/61	10
06214500	Yellowstone River at Billings, Mont.	11,795	01/16	1,800	<2	12/12/32	430
06289000	Little Bighorn River at State line, Mont.	193	11/10	32	5	12/27/54	21
06308500	Tongue River at Miles City, Mont.	5,379	02/26	40	<2	08/13,14/40	0
06329500	Yellowstone River near Sidney, Mont.	69,103	08/13	4,150	<2	05/17/61	470

[1]At times.

Table 5.--*Percentage of normal storage by month for major hydroelectric and irrigation reservoirs during water year 1987*

Reservoir	Usable capacity (acre-feet)	Percent of normal storage based on 1961-85 period of record											
		Oct. 86	Nov.	Dec.	Jan. 87	Feb.	Mar.	Apr.	May	June	Jul.	Aug.	Sept.
Hydroelectric reservoirs:													
Canyon Ferry Lake	2,043,000	103	100	98	96	99	104	104	96	85	87	90	89
Fort Peck Lake	18,910,000	102	104	106	106	107	106	105	103	98	97	97	98
Irrigation reservoirs:													
Lima Reservoir	84,050	82	82	78	78	79	88	99	84	63	66	52	[1]0
Gibson Reservoir	99,050	138	111	121	121	122	129	158	110	70	61	66	107
Fresno Reservoir	103,000	106	104	104	122	125	112	101	103	95	96	119	116

[1]Drained for repair work.

Quality of Streamflow

The National Stream Quality Accounting Network (NASQAN) was established to assess the quality of the Nation's water through systematic and continuing measurements at key locations. Montana has 13 NASQAN stations in the Hudson Bay and upper Missouri River basins.

Statistical summaries for selected water-quality measurements at six NASQAN stations on the mainstem of the St. Mary, Missouri, and Yellowstone Rivers are given in table 6. The statistical summaries include minimum and maximum values for water year 1987 as well as for the period of NASQAN record.

Table 6.--*Comparison of minimum and maximum values for selected water-quality constituents and properties for water year 1987 and for the period of NASQAN[1] record at six stations*

[<, less than]

Station number	Station	Water year 1987			Period of NASQAN record through water year 1986		
		Number of samples	Minimum	Maximum	Number of samples	Minimum	Maximum
	Dissolved solids, in milligrams per liter						
05020500	St. Mary River at international boundary	6	76	125	69	70	195
06054500	Missouri River at Toston, Mont.	4	213	243	131	125	308
06115200	Missouri River near Landusky, Mont.	6	269	436	56	104	950
06192500	Yellowstone River near Livingston, Mont.	6	85	183	55	66	258
06214500	Yellowstone River at Billings, Mont.	4	134	279	106	83	439
06329500	Yellowstone River near Sidney, Mont.	6	318	608	203	158	874
	Dissolved phosphorus, in milligrams per liter						
05020500	St. Mary River at international boundary	6	<.01	.03	70	<.01	.04
06054500	Missouri River at Toston, Mont.	4	.01	.03	72	<.01	.09
06115200	Missouri River near Landusky, Mont.	6	<.01	.02	56	<.01	.39
06192500	Yellowstone River near Livingston, Mont.	6	<.01	.07	124	<.01	.09
06214500	Yellowstone River at Billings, Mont.	4	<.01	.02	69	<.01	.14
06329500	Yellowstone River near Sidney, Mont.	6	.01	.02	76	<.01	.07
	Dissolved oxygen, in percent of saturation						
05020500	St. Mary River at international boundary	6	85	104	94	83	112
06054500	Missouri River at Toston, Mont.	4	98	128	170	89	126
06115200	Missouri River near Landusky, Mont.	6	60	100	130	63	106
06192500	Yellowstone River near Livingston, Mont.	6	88	119	103	73	138
06214500	Yellowstone River at Billings, Mont.	4	87	101	155	78	152
06329500	Yellowstone River near Sidney, Mont.	6	86	95	237	43	109
	Dissolved arsenic, in micrograms per liter						
05020500	St. Mary River at international boundary	4	<1	<1	35	<1	<10
06054500	Missouri River at Toston, Mont.	4	21	36	54	8	52
06115200	Missouri River near Landusky, Mont.	4	10	17	39	2	25
06192500	Yellowstone River near Livingston, Mont.	4	14	21	28	6	27
06214500	Yellowstone River at Billings, Mont.	4	7	13	47	2	14
06329500	Yellowstone River near Sidney, Mont.	4	2	5	46	1	6
	Turbidity, in nephelometric turbidity units						
05020500	St. Mary River at international boundary	6	.6	7	64	.3	85
06054500	Missouri River at Toston, Mont.	4	2.4	6.4	63	.1	60
06115200	Missouri River near Landusky, Mont.	6	2.1	32	56	1.5	7,500
06192500	Yellowstone River near Livingston, Mont.	6	1.8	4.2	55	.6	38
06214500	Yellowstone River at Billings, Mont.	4	3.2	9.3	62	.2	140
06329500	Yellowstone River near Sidney, Mont.	6	3.9	1,400	75	1.0	2,500

[1]National Stream Quality Accounting Network.

Dissolved-solids concentration and streamflow have an inverse relationship. The smallest concentrations of dissolved solids generally occur during high flows of spring runoff when snowmelt and rainfall are the major sources of water. The largest concentrations occur most often during late summer and fall when base flow from ground-water sources is the dominant component of flow. The data in table 6 indicate that dissolved-solids concentrations at all stations during 1987 were confined to a comparatively small range, with neither maximum or minimum values close to those for the period of record. The small range can be attributed to climatic conditions during the year. The lack of snowpack in headwater drainages resulted in less than normal runoff. Less water for dilution of base flow prevented dissolved-solids concentrations from reaching minimum values that are normal for most spring periods.

Concentrations of dissolved phosphorus and percent saturation of dissolved oxygen at the six stations for water year 1987 either were within their previous ranges or similar to them. The largest dissolved phosphorus concentration (0.07 mg/L) was from the Yellowstone River near Livingston (station 06192500) on January 20. From the same sample, relatively large concentrations were detected for total phosphorus (0.19 mg/L) and dissolved ortho phosphorus (0.03 mg/L). The Missouri River near Landusky (station 06115200) had a minimum percent saturation of dissolved oxygen (60 percent) that was slightly less than the minimum for the period of record and the Missouri River at Toston had a maximum value (128 percent) that was slightly larger than all previous measurements at the station.

Concentrations of dissolved arsenic and units of turbidity for water year 1987 also were at or within the range for the period of record. Natural sources from thermal activities in Yellowstone National Park contribute arsenic to headwater tributaries of the Missouri and Yellowstone Rivers. The arsenic concentrations decrease in passage downstream owing to dilution from tributary inflow and reservoir and stream bottoms that function as sinks to the element. Unlike arsenic, turbidity of the streams generally increased downstream. This condition is especially evident in the Yellowstone River. Because of the series of reservoirs on the Missouri River, sediment settles out and turbidity is probably less in some stream reaches than would occur under natural conditions.

Annual suspended-sediment loads at three stations on major streams of eastern Montana are reported in table 7. For each station, the data include the annual suspended-sediment loads for the current (1987) and previous (1986) water years, plus the mean annual loads for the period of record.

Table 7.--*Annual suspended-sediment load at selected stations for water year 1987 compared with water year 1986 and period of record*

Station number	Station name	Water year 1987	Water year 1986	Period of record	
		Annual suspended-sediment load (tons)	Annual suspended-sediment load (tons)	Number of water years	Mean annual suspended-sediment load (tons)
06115200	Missouri River near Landusky, Mont.	2,380,000	11,800,000	16	9,500,000
06130500	Musselshell River at Mosby, Mont.	84,900	1,180,000	5	299,000
06329500	Yellowstone River near Sidney, Mont.	7,130,000	12,700,000	15	11,200,000

Suspended-sediment loads transported in 1987 were substantially less than loads transported in 1986 at all three stations. The decreased sediment loads were a result of smaller annual streamflows and the lack of major storms to erode and transport sediment. Annual loads in 1987 ranged from 25 percent of normal at the Missouri River near Landusky to 64 percent of normal at the Yellowstone River near Sidney. Unlike other recent years when both the Missouri and Yellowstone Rivers transported similar quantities of sediment, the 1987 annual load of the Missouri River near Landusky was one-third as large as that of the Yellowstone River near Sidney. The large difference in annual loads is primarily a result of less than normal flows in many of the northern tributaries of the Missouri River.

Ground-Water Levels

Water levels in 250 wells, which are part of a statewide network of 299 observation wells, were measured in water year 1987 in the Hudson Bay and Missouri River basins (table 8). Water levels in most wells in the network are measured annually; however, some water levels are measured more frequently.

The hydrograph (fig. 2) for a 68-foot deep (relatively shallow) observation well in Powder River County (well 04S45E04BDDB01) shows typical water-level fluctuations in a shallow alluvial aquifer of sand and gravel. The water table is unaffected by irrigation recharge or discharge; therefore, the water level changes in response to the natural hydrologic cycle. The effects on recharge of smaller quantities of precipitation and warmer temperatures during the winters of 1984 and 1987 are indicated on the hydrograph by the subdued peaks for those periods.

Most wells in the statewide network show no substantial changes in water level from year to year. Many of the wells in eastern Montana are completed in sandstone or coal aquifers in the Tongue River Member of the Fort Union Formation (Paleocene age); measurements show that water levels in this area remain relatively stable. Water from Tongue River Member aquifers is used primarily for livestock and domestic supply. Substantial changes in water levels in these sandstone and coal wells have been recorded only where industrial activity, such as coal mining, has affected the local ground-water levels.

Other wells in the statewide network are completed in shallow alluvial and glacial-drift aquifers. Some of these wells show moderate declines or rises in water levels from year to year as a result of variations in climatic conditions. However, few wells in the network show long-term changes in water levels as a result of human activities.

Table 8.--*Water levels in observation wells*

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

Local number	Depth of well	Aquifer	Water-level date	Water level
37N47E01ABBB01	53	Pleistocene outwash deposits	12/18/86	19.75
			03/24/87	20.10
			06/23/87	20.34
			08/25/87	19.65
37N47E01ABBB02	83	Tongue River Member of Fort Union Formation	12/18/86	20.30
			03/24/87	20.63
			06/23/87	20.78
			08/25/87	20.40
37N47E12BBBB01	147	Tongue River Member of Fort Union Formation	12/18/86	78.40
			03/24/87	78.48
			06/23/87	77.62
			08/25/87	78.51
37N47E13AADD01	208	Tongue River Member of Fort Union Formation	12/18/86	13.57
			03/24/87	13.26
			06/23/87	14.22
			08/25/87	18.83
37N47E13ADAA01	45	Pleistocene outwash deposits	12/18/86	14.12
			03/24/87	13.79
			06/23/87	14.76
			08/25/87	14.37
37N47E17DABB02	266	Tongue River Member of Fort Union Formation	12/18/86	217.83
			03/24/87	217.90
			06/23/87	217.89
			08/25/87	218.04
37N47E23AADD02	120	Tongue River Member of Fort Union Formation	12/18/86	81.75
			03/24/87	81.69
			06/23/87	81.92
			08/25/87	81.90
37N48E05AAAA01	218	Fort Union Formation	03/24/87	+0.96
			06/23/87	+0.90
			08/25/87	+0.92
37N48E05BABB01	43	Pleistocene outwash deposits	12/18/86	5.80
			03/24/87	5.69
			06/23/87	5.98
			08/25/87	5.91
37N48E23BBDC01	400	Fox Hills-Hell Creek aquifer	12/18/86	60.52
			03/24/87	60.75
			06/23/87	60.86
			08/25/87	60.76
36N09E05DBAD01	1,015	Eagle Sandstone	10/28/86	1.24
36N25E06CBCB01	75	Flaxville Formation	10/12/86	62.26
			08/31/87	61.46
36N26E33DBD 01	67	Flaxville Formation	10/12/86	51.33
			08/31/87	51.21
35N24E09DBBC01	53	Flaxville Formation	10/12/86	39.77
			08/31/87	38.61
35N33E19DBA 01	246	Judith River Formation of Montana Group	11/20/86	178.37
34N24E06DCCC01	200	Fox Hills-Hell Creek aquifer	10/12/86	66.51
			08/31/87	66.35
33N48E18DCB 01	325	Hell Creek Formation	09/01/87	161.93
32N15E17DDDC01	180	Quaternary alluvium	09/22/87	37.99
31N14E03CDDC01	215	Judith River Formation of Montana Group	10/13/86	42.76
			09/16/87	33.41

Table 8.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Water-level date	Water level
31N24E06BCC 01	70	Pleistocene alluvium	10/12/86	4.53
			08/30/87	6.85
30N38E09CADB01	195	Judith River Formation of Montana Group	11/20/86	45.58
			09/16/87	48.73
29N13E21AABA02	210	Pleistocene alluvium	02/20/87	18.76
			03/18/87	18.66
			04/14/87	18.66
			05/20/87	18.68
			06/03/87	18.69
			06/16/87	18.65
			07/16/87	18.68
			08/18/87	18.81
			09/22/87	18.86
27N56E34AABC01	118	Tongue River Member of Fort Union Formation	10/18/86	39.39
			09/25/87	39.14
26N20E36ADCC01	1,470	Eagle Sandstone	10/12/86	85.55
			08/31/87	88.69
26N49E13ACAB01	180	Fox Hills-Hell Creek aquifer	10/17/86	43.41
			09/25/87	43.54
26N54E17DCAA01	240	Tongue River Member of Fort Union Formation	10/17/86	90.68
			09/25/87	91.10
26N59E22DBDD01	212	Tongue River Member of Fort Union Formation	10/18/86	33.13
			09/25/87	34.83
25N47E04DAAB01	200	Fox Hills-Hell Creek aquifer	10/17/86	68.36
			09/25/87	68.06
25N50E24CBDA01	220	Lebo Shale Member of Fort Union Formation	10/17/86	11.05
			09/25/87	11.39
24N44E20CABD01	300	Fox Hills-Hell Creek aquifer	10/16/86	178.66
			09/24/87	178.82
24N47E35BBBA01	101	Lebo Shale Member of Fort Union Formation	10/17/86	17.26
			09/25/87	17.99
24N47E35BBBC01	640	Fox Hills-Hell Creek aquifer	10/17/86	194.92
			09/25/87	195.86
24N54E29CACB01	190	Tongue River Member of Fort Union Formation	10/17/86	55.09
			09/25/87	55.27
24N56E25DDAC01	60	Tongue River Member of Fort Union Formation	10/18/86	5.62
			09/25/87	6.52
23N43E34BABC01	175	Fox Hills-Hell Creek aquifer	10/16/86	104.62
			09/24/87	104.47
23N51E20BBBD01	175	Fort Union Formation	10/17/86	16.14
			09/25/87	16.11
22N58E10CCCC01	135	Fort Union Formation	10/18/86	70.45
			09/25/87	68.19
21N23E13CBBB01	1,630	Eagle Sandstone	10/11/86	+83.10
			09/27/87	+141.35
21N51E10ABCD01	131	Tongue River Member of Fort Union Formation	10/17/86	13.95
			09/24/87	13.98
21N53E08ADCC01	70	Tongue River Member of Fort Union Formation	09/24/87	26.16
21N56E28ADDC01	220	Tongue River Member of Fort Union Formation	10/18/86	87.45
			09/25/87	87.45
20N02E01AABA01	605	Madison Group	09/28/87	13.99
20N03E28CCCD01	85	Flood Shale Member of Black Leaf Formation	11/06/86	42.79
			09/28/87	43.38

Table 8.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Water-level date	Water level
20N03E32ADDC01	215	Flood Shale Member of Black Leaf Formation	11/06/86 09/28/87	52.47 52.36
20N47E36ADDD01	220	Tongue River Member of Fort Union Formation	10/16/86 09/24/87	46.08 46.43
20N52E17BBBB01	180	Tongue River Member of Fort Union Formation	10/17/86 09/24/87	74.40 74.99
20N53E04DAAA01	280	Tongue River Member of Fort Union Formation	10/17/86 09/27/87	142.03 141.91
20N53E14BBCC01	206	Tongue River Member of Fort Union Formation	10/17/86 09/24/87	87.40 87.19
20N53E20CCCC01	259	Tongue River Member of Fort Union Formation	10/17/86 09/24/87	139.88 139.72
20N54E01DCDD01	220	Tongue River Member of Fort Union Formation	10/17/86 09/25/87	40.23 40.09
20N55E32AAAA01	200	Tongue River Member of Fort Union Formation	10/18/86 09/25/87	156.96 156.75
20N56E08DDCD01	223	Tongue River Member of Fort Union Formation	10/18/86 09/25/87	137.61 138.04
20N56E08DDCD02	180	Tongue River Member of Fort Union Formation	10/18/86 09/25/87	109.20 109.16
19N03E01AABA01	65	Kootenai Formation	11/06/86 09/28/87	38.58 39.59
19N06E23BADA01	75	Swift Formation of Ellis Group	11/06/86 09/28/87	43.79 45.20
19N06E26ACAD01	435	Madison Group	11/06/86 09/28/87	197.20 202.02
19N44E35DDDD01	140	Tongue River Member of Fort Union Formation	10/16/86 09/24/87	38.48 38.73
19N53E24CCDC01	220	Tongue River Member of Fort Union Formation	10/18/86 09/24/87	143.84 143.86
18N30E19BBBA01	1,003	Judith River Formation of Montana Group	10/10/86	+41.42
18N38E20BBAB01	518	Hell Creek Formation	10/16/86 09/23/87	39.28 39.33
18N40E01DBBB01	159	Fort Union Formation	10/16/86 09/23/87	33.17 33.52
18N44E13AAAC01	278	Tongue River Member of Fort Union Formation	10/16/86 09/24/87	95.66 94.82
18N50E16CBBB01	161	Lebo Shale Member of Fort Union Formation	10/16/86 09/24/87	46.32 46.40
17N47E16DDDD01	242	Tongue River Member of Fort Union Formation	10/16/86 09/24/87	146.02 146.09
16N44E25BBAA01	263	Tongue River Member of Fort Union Formation	10/16/86 09/23/87	88.28 88.34
16N44E25BBAB01	1,460	Fox Hills-Hell Creek aquifer	10/16/86 09/23/87	156.98 157.12
16N44E25BBAC01	103	Tongue River Member of Fort Union Formation	10/16/86 09/23/87	31.34 30.38
16N50E06DDCD01	380	Tongue River Member of Fort Union Formation	10/17/86 09/24/87	291.2 291.2

Table 8.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Water-level date	Water level
16N51E36DCCC01	202	Tullock Member of Fort Union Formation	10/16/86 09/24/87	152.27 153.25
15N19E09BABC01	90	Third Cat Creek Sandstone of Kootenai Formation	10/11/86 09/27/87	40.84 36.72
15N46E04BBBC01	160	Tongue River Member of Fort Union Formation	10/16/86 09/23/87	108.73 108.67
15N53E12ABAB01	317	Lebo Shale Member of Fort Union Formation	10/19/86 09/23/87	132.66 132.58
15N53E12ABAB02	193	Tongue River Member of Fort Union Formation	10/19/86 09/23/87	81.57 81.04
15N53E12ABAB03	172	Tongue River Member of Fort Union Formation	10/19/86 09/23/87	79.05 78.57
15N55E12ABDC01	675	Fox Hills-Hell Creek aquifer	10/20/86 09/23/87	57.76 58.07
14N49E21AAAA01	440	Tullock Member of Fort Union Formation	10/18/86 09/23/87	117.72 120.63
13N51E31BCDD01	565	Hell Creek Formation	10/18/86 09/23/87	+0.50 +0.14
13N51E31BCDD02	340	Tullock Member of Fort Union Formation	10/18/86 09/23/87	107.04 107.32
13N51E31BDCB01	860	Fox Hills-Hell Creek aquifer	10/18/86 09/23/87	28.77 29.61
13N53E18ABAA01	62	Tongue River Member of Fort Union Formation	10/18/86 09/23/87	33.67 34.06
13N56E30CCBC01	100	Fox Hills-Hell Creek aquifer	10/19/86	38.70
12N55E20DCCD01	1,185	Fox Hills-Hell Creek aquifer	10/19/86 09/26/87	80.93 80.10
12N55E25CDCC01	1,275	Fox Hills-Hell Creek aquifer	10/19/86 09/26/87	42.58 45.84
12N55E27BADD01	1,000	Fox Hills-Hell Creek aquifer	10/19/86 09/26/87	+15.6 +21.4
12N56E23CCDA01	1,449	Fox Hills-Hell Creek aquifer	10/19/86 09/26/87	244.44 243.75
12N56E23DCCA01	1,195	Fox Hills-Hell Creek aquifer	10/19/86 09/26/87	273.81 277.12
12N56E24CABD01	145	Fox Hills-Hell Creek aquifer	10/19/86 09/26/87	134.72 133.34
12N56E25CBDB01	1,480	Fox Hills-Hell Creek aquifer	10/19/86 09/26/87	304.4 303.9
12N56E34DAAC01	1,467	Fox Hills-Hell Creek aquifer	10/19/86 09/26/87	278.65 276.36
11N03W30BBBC01	127	Quaternary alluvium	09/30/87	30.41
11N03W30DADA01	44	Quaternary alluvium	09/30/87	.01
11N36E28BACD01	2,745	Third Cat Creek Sandstone of Kootenai Formation	10/15/86 09/22/87	+100.7 +92.5
11N54E29CACD01	800	Fox Hills-Hell Creek aquifer	10/19/86	+50.1
11N57E21CDBB01	1,230	Fox Hills-Hell Creek aquifer	10/19/86 09/26/87	61.39 60.42

Table 8.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Water-level date	Water level
11N57E32BBBD01	980	Fox Hills-Hell Creek aquifer	10/19/86	68.21
10N04W02CBAA01	110	Cretaceous bedrock	11/16/86	30.03
			02/01/87	30.80
			04/26/87	31.90
			07/03/87	34.00
			07/25/87	33.53
10N04W10DDDA01	23	Quaternary alluvium	09/30/87	5.73
10N03W03BACB01	65	Quaternary alluvium	09/30/87	2.50
10N03W08BBAA01	23	Quaternary alluvium	09/30/87	10.25
10N03W09ACCC01	64	Quaternary alluvium	09/30/87	2.46
10N03W11DDCC01	40	Quaternary alluvium	09/30/87	17.16
10N03W17ACAD01	28	Quaternary alluvium	09/30/87	16.32
10N03W22AAAA01	23	Quaternary alluvium	09/30/87	10.62
10N02W18DDCD01	70	Tertiary sediments	09/30/87	47.09
10N36E06CACA01	195	Judith River Formation of Montana Group	10/15/86	91.07
			09/22/87	89.09
10N45E28BBBA01	951	Fox Hills-Hell Creek aquifer	10/16/86	223.48
			09/23/87	223.58
10N45E28BBBA02	362	Tullock Member of Fort Union Formation	10/16/86	111.20
			09/23/87	111.26
10N45E28BBBB01	762	Hell Creek Formation	10/16/86	223.01
			09/23/87	223.16
10N55E25CDCD01	1,150	Fox Hills-Hell Creek aquifer	10/19/86	73.37
			09/26/87	75.59
10N58E19ABBA01	166	Fox Hills-Hell Creek aquifer	10/19/86	124.37
			09/26/87	125.68
08N31E36DDDD01	1,175	Fox Hills-Hell Creek aquifer	10/15/86	206.94
			09/22/87	206.17
08N31E36DDDD02	850	Hell Creek Formation	10/15/86	209.10
			09/22/87	209.03
08N31E36DDDD03	486	Hell Creek Formation	10/15/86	130.34
			09/22/87	131.61
08N50E18BDBC01	280	Tullock Member of Fort Union Formation	10/20/86	41.41
			09/27/87	41.68
07N47E24AAD 01	50	Fort Union Formation	10/15/86	33.67
			09/23/87	33.92
07N50E05CCBD01	700	Fox Hills-Hell Creek aquifer	10/20/86	397.36
07N57E24BBCB01	362	Tongue River Member of Fort Union Formation	10/19/86	217.28
			09/26/87	216.87
06N44E36CACD01	902	Fox Hills-Hell Creek aquifer	10/15/86	128.59
			09/22/87	128.65
06N44E36CACD02	609	Hell Creek Formation	10/15/86	128.71
			09/22/87	128.72
06N44E36CACD03	316	Hell Creek Formation	10/15/86	140.40
			09/22/87	140.57
05N01E27CCBB01	215	Tertiary sediments	10/24/86	88.57
05N25E16CCCC01	1,350	Fox Hills-Hell Creek aquifer	10/15/86	537.8
			09/22/87	536.3
05N25E16CCCC02	427	Hell Creek Formation	10/15/86	133.55
			09/22/87	132.60

Table 8.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Water-level date	Water level
05N55E23AADB01	1,080	Fox Hills-Hell Creek aquifer	10/19/86 09/26/87	37.17 37.48
05N58E14BBBB01	360	Tongue River Member of Fort Union Formation	10/19/86 09/26/87	97.02 96.86
04N01E02BBCC01	191	Tertiary sediments	10/24/86	38.34
04N01E10BBCB01	447	Tertiary sediments	10/24/86	115.57
04N01E13BCAC01	209	Tertiary sediments	10/24/86	38.47
04N01E15BCBB01	348	Tertiary sediments	10/24/86	142.00
04N23E14ABBA01	80	Fox Hills-Hell Creek aquifer	10/21/86 09/28/87	29.01 32.50
04N23E16BCCC01	1,100	Eagle Sandstone	10/21/86 09/28/87	345.5 391.2
04N40E31DCAA01	199	Hell Creek Formation	10/07/86 09/24/87	50.98 49.20
02N27E35DBAB01	5,070	Mission Canyon Limestone	09/28/87	+1,003.5
02N40E31DCCD01	165	Tongue River Member of Fort Union Formation	10/07/86 09/24/87	107.92 107.86
02N43E24CCBC01	60	Quaternary alluvium	10/07/86 09/24/87	16.23 16.30
02N43E24CDDA01	21	Quaternary alluvium	10/07/86 09/24/87	10.69 9.92
01N04E25DCD 01	101	Quaternary alluvium	10/09/86	10.59
01N25E36CBDA01	12	Quaternary alluvium	04/28/87	9.07
01N26E10ABBA01	193	Eagle Sandstone	10/21/86 09/28/87	27.51 28.08
01N26E31CCBC01	17	Quaternary alluvium	04/28/87	11.10
01N41E21DBDB01	131	Tongue River Member of Fort Union Formation	10/07/86 09/24/87	72.34 72.62
01N41E22CCAD01	72	Holocene spoil banks	10/07/86 09/24/87 09/24/87	19.66 17.58 23.42
01N41E36DCBA01	150	Tongue River Member of Fort Union Formation	10/07/86 09/24/87	134.47 134.87
01N54E18DDAC01	8,422	Mission Canyon Limestone	10/20/86 08/01/87 09/27/87	+771.1 +776.5 +773.4
01N54E18DDBA01	400	Fox Hills-Hell Creek aquifer	10/20/86 09/27/87	43.84 43.94
01S25E05CD 01	62	Quaternary alluvium	04/28/87	10.28
01S25E17AAAA01	42	Quaternary alluvium	04/28/87	6.92
01S33E19DAA 01	25	Pleistocene terrace deposits	10/16/86 05/12/87	17.76 18.27
01S33E24BCBC02	26	Quaternary alluvium	10/15/86 05/12/87	8.98 11.67
02S23E16DADD01	63	Quaternary alluvium	04/28/87	26.12
02S41E19DABA01	43	Quaternary alluvium	10/07/86 09/24/87	7.06 7.31

Table 8.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Water-level date	Water level
02S44E35DAAB01	84	Quaternary alluvium	10/07/86	28.81
			09/24/87	29.86
02S49E22DCCA04	118	Tongue River Member of Fort Union Formation	10/20/86	77.11
			09/27/87	77.05
03S15W16DCCD01	205	Tertiary sediments	08/04/87	22.68
03S33E09DCC 01	74	Pleistocene terrace deposits	10/16/86	43.80
			12/04/86	45.06
			01/08/87	47.50
			02/27/87	48.38
			04/09/87	48.78
			06/03/87	46.38
			07/08/87	44.98
			08/05/87	45.28
03S33E16BBBB01	19	Quaternary alluvium	10/16/86	1.92
			12/04/86	2.06
			01/08/87	2.28
			02/27/87	2.69
			04/09/87	2.66
			06/03/87	2.39
			07/08/87	2.05
			08/05/87	1.94
03S33E16BBBB02	46	Quaternary alluvium	10/16/86	31.22
			12/04/86	31.19
			01/08/87	31.20
			02/27/87	31.22
			04/09/87	31.26
			06/03/87	31.26
			07/08/87	31.26
			08/05/87	31.22
03S35E18DABD01	400	Parkman Sandstone of Montana Group	10/15/86	101.54
03S44E09ADD 01	84	Quaternary alluvium	10/07/86	39.27
			09/24/87	39.49
03S45E05DBAA01	148	Tongue River Member of Fort Union Formation	10/07/86	47.06
			09/24/87	45.76
04S32E35AAAA01	39	Quaternary alluvium	10/16/86	13.04
			12/04/86	14.86
			01/08/87	15.71
			02/27/87	16.60
			04/09/87	17.10
			06/03/87	8.36
			07/08/87	6.33
			08/05/87	5.11
04S45E04BDDB01	68	Quaternary alluvium	10/07/86	[1]7.05
			11/19/86	[1]6.96
			03/25/87	[1]6.78
			06/12/87	[1]7.30
			09/24/87	[1]8.47
04S45E15BCDD01	60	Quaternary alluvium	10/07/86	9.45
			09/24/87	10.32
04S45E28BDDD01	269	Tongue River Member of Fort Union Formation	10/07/86	126.89
			09/24/87	126.91
05S45E04ABCC01	223	Tongue River Member of Fort Union Formation	10/07/86	141.06
			09/24/87	140.86
05S45E16ADDD01	320	Tongue River Member of Fort Union Formation	10/07/86	144.71
			09/24/87	144.80
05S45E23ABCA02	44	Quaternary alluvium	10/07/86	12.08
			09/24/87	12.97
05S45E23BBAA01	169	Tongue River Member of Fort Union Formation	10/07/86	35.92
			09/24/87	36.05

Table 8.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Water-level date	Water level
05S45E23BBAA02	106	Tongue River Member of Fort Union Formation	10/07/86 09/24/87	45.38 46.00
05S45E23BBAA03	65	Tongue River Member of Fort Union Formation	10/07/86 09/24/87	46.20 46.85
05S51E10ABAB01	1,010	Fox Hills-Hell Creek aquifer	09/27/87	+3.2
06S41E08CCAC01	128	Tongue River Member of Fort Union	09/26/87	41.76
06S41E17ADDD01	19	Quaternary alluvium	09/26/87	14.30
06S41E25CDAC01	144	Tongue River Member of Fort Union Formation	09/26/87	68.45
06S41E26BBDD01	23	Quaternary alluvium	09/26/87	19.60
06S41E29ADCA01	393	Tongue River Member of Fort Union Formation	09/26/87	264.70
06S41E29ADCA02	322	Tongue River Member of Fort Union Formation	09/26/87	239.63
06S41E34CDAA01	364	Tongue River Member of Fort Union Formation	10/10/86 09/26/87	182.55 182.57
06S41E34CDAA02	155	Tongue River Member of Fort Union Formation	10/10/86 09/26/87	93.27 93.22
06S42E31DBBA01	68	Quaternary alluvium	10/10/86 09/26/87	31.70 31.82
07S08W03BDC 02	40	Quaternary alluvium	11/19/86 01/06/87 02/18/87 04/01/87 05/12/87 06/25/87 08/05/87 09/16/87	17.34 18.00 18.21 18.17 15.33 14.64 13.67 16.10
07S08W17DDC 02	50	Tertiary sediments	11/18/86 01/06/87 02/17/87 04/01/87 05/12/87 06/25/87 08/06/87 09/17/87	28.07 31.11 34.44 33.29 32.78 26.86 24.72 27.06
07S44E34BAAD01	86	Tongue River Member of Fort Union Formation	10/09/86 09/25/87	54.47 54.43
07S44E35DCCA01	213	Tongue River Member of Fort Union Formation	10/09/86 09/25/87	149.79 149.91
07S44E35DCCA02	132	Tongue River Member of Fort Union Formation	10/09/86 09/25/87	103.94 103.84
07S45E32CADD01	207	Tongue River Member of Fort Union Formation	10/08/86 09/25/87	151.41 151.19
07S45E32CADD02	42	Tongue River Member of Fort Union Formation	10/08/86 09/25/87	28.31 28.44
07S45E32DCBA02	18	Quaternary alluvium	10/08/86 09/25/87	7.75 8.37
07S49E13ABBB01	--	Fox Hills-Hell Creek aquifer	10/20/86 09/27/87	+10.08 +10.08
07S49E28DAAC01	452	Tullock Member of Fort Union Formation	10/20/86 09/27/87	89.59 89.36
7.5S40E32DBDA01	120	Tongue River Member of Fort Union Formation	09/26/87	70.05

Table 8.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Water-level date	Water level
08S09W01CCCC01	47	Tertiary sediments	09/16/87	23.16
08S40E26ACBC01	172	Tongue River Member of Fort Union Formation	10/09/86 09/25/87	68.75 62.45
08S42E14DBAD02	103	Tongue River Member of Fort Union Formation	10/08/86	50.06
08S43E20DABA01	222	Tongue River Member of Fort Union Formation	10/09/86 09/26/87	89.89 89.45
08S43E21BBDD03	13	Quaternary alluvium	10/09/86 09/26/87	4.73 5.44
08S43E21BDBB01	223	Tongue River Member of Fort Union Formation	10/09/86 09/26/87	56.28 56.27
08S43E21BDBB02	146	Tongue River Member of Fort Union Formation	10/09/86 09/26/87	48.07 48.04
08S43E23CACA03	29	Quaternary alluvium	10/09/86 09/26/87	12.81 14.23
08S43E23CDAA01	78	Tongue River Member of Fort Union Formation	10/09/86 09/26/87	49.70 49.57
08S43E23CDAA02	329	Tongue River Member of Fort Union Formation	10/09/86 09/26/87	166.89 166.93
08S43E31BBDA01	131	Tongue River Member of Fort Union Formation	10/08/86 09/26/87	129.15 127.19
08S43E31BBDA02	257	Tongue River Member of Fort Union Formation	10/08/86 09/26/87	241.49 239.80
08S44E02BACD01	15	Quaternary alluvium	10/09/86 09/25/87	6.67 7.59
08S44E03CBBD01	201	Tongue River Member of Fort Union Formation	10/09/86 09/25/87	131.60 131.82
08S44E03CBBD02	129	Tongue River Member of Fort Union Formation	10/09/86 09/25/87	73.30 73.57
08S44E09DABB01	28	Quaternary alluvium	10/09/86 09/25/87	22.18 22.87
08S44E12ACDC01	351	Tongue River Member of Fort Union Formation	10/09/86 09/25/87	187.06 187.22
08S44E12ACDC02	252	Tongue River Member of Fort Union Formation	10/09/86 09/25/87	126.19 126.26
08S44E12ADBC02	14	Quaternary alluvium	10/09/86 09/25/87	5.41 7.80
08S44E14ABAB01	337	Tongue River Member of Fort Union Formation	10/09/86 09/25/87	218.12 218.00
08S44E14ABAB02	250	Tongue River Member of Fort Union Formation	10/09/86 09/25/87	189.89 166.80
08S44E14ABAB03	161	Tongue River Member of Fort Union Formation	10/09/86 09/25/87	109.80 109.88
08S44E19CBBB01	190	Tongue River Member of Fort Union Formation	10/09/86 09/26/87	157.67 157.54
08S44E19CBBB02	130	Tongue River Member of Fort Union Formation	10/09/86 09/26/87	77.23 76.89
08S44E19CBCB02	36	Quaternary alluvium	10/09/86 09/26/87	24.98 26.30
08S45E16DBCB01	188	Tongue River Member of Fort Union Formation	10/08/86 09/25/87	84.16 84.48

Table 8.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Water-level date	Water level
08S45E16DBCB02	66	Tongue River Member of Fort Union Formation	10/08/86 09/25/87	32.98 33.63
08S45E34BCBC01	253	Tongue River Member of Fort Union Formation	10/08/86 09/25/87	126.57 126.74
08S46E17CBCD01	18	Quaternary alluvium	10/07/86 09/25/87	3.00 4.42
08S46E18DDAC01	18	Quaternary alluvium	10/07/86 09/25/87	5.96 6.48
08S46E27CDAB01	233	Tongue River Member of Fort Union Formation	10/08/86 09/25/87	126.95 127.21
08S46E27CDAB02	138	Tongue River Member of Fort Union Formation	10/08/86 09/25/87	89.74 90.24
08S46E32DDAC01	30	Quaternary alluvium	10/07/86 09/25/87	15.88 17.80
09S40E09DBAD01	120	Holocene spoil banks	10/09/86 09/25/87	106.90 106.32
09S40E20BDAC01	380	Tongue River Member of Fort Union Formation	10/09/86 09/25/87	252.55 250.29
09S42E01BCAD02	34	Quaternary alluvium	10/08/86 09/26/87	23.56 24.43
09S42E11BDAA01	222	Tongue River Member of Fort Union Formation	10/08/86 09/26/87	144.05 144.11
09S43E04ABDD02	26	Quaternary alluvium	10/09/86 09/26/87	13.18 13.52
09S43E04CBAB01	186	Tongue River Member of Fort Union Formation	10/09/86 09/26/87	68.81 68.99
09S43E07CADB01	165	Tongue River Member of Fort Union Formation	10/08/86 09/26/87	57.90 58.60
09S43E07CADB02	218	Tongue River Member of Fort Union Formation	10/08/86 09/26/87	86.67 86.42
09S43E12ADBB02	40	Quaternary alluvium	10/09/86 09/26/87	15.40 15.86
09S43E21BADA01	229	Tongue River Member of Fort Union Formation	10/08/86 09/26/87	98.18 96.58
09S43E21BADA02	135	Tongue River Member of Fort Union Formation	10/08/86 09/26/87	50.32 49.66
09S43E22ACCA01	129	Tongue River Member of Fort Union Formation	10/08/86 09/26/87	29.50 28.05
09S44E07BBCC03	92	Tongue River Member of Fort Union Formation	10/09/86 09/26/87	44.85 44.36
09S45E03DABB01	144	Tongue River Member of Fort Union Formation	10/08/86 09/25/87	23.81 23.92
09S45E03DABB04	65	Tongue River Member of Fort Union Formation	09/25/87	26.68
09S45E03DABB05	71	Tongue River Member of Fort Union Formation	09/25/87	25.07
09S45E11ADDB01	307	Tongue River Member of Fort Union Formation	10/08/86 09/25/87	236.65 239.50
09S45E11CCAA01	218	Tongue River Member of Fort Union Formation	10/08/86 09/25/87	53.69 55.80
09S46E08BACB01	240	Tongue River Member of Fort Union Formation	10/07/86 09/25/87	170.97 170.67

Table 8.--*Water levels in observation wells*--Continued

Local number	Depth of well	Aquifer	Water-level date	Water level
09S46E09ADCD01	176	Tongue River Member of Fort Union Formation	10/08/86 09/25/87	110.03 109.82
09S46E09DABA01	110	Tongue River Member of Fort Union Formation	10/08/86 09/25/87	93.76 93.53
09S46E09DABA02	209	Tongue River Member of Fort Union Formation	10/08/86 09/25/87	155.95 153.85
09S46E09DBAB02	30	Quaternary alluvium	10/08/86 09/25/87	17.55 18.10
09S46E11BACC02	18	Quaternary alluvium	10/08/86 09/25/87	9.43 11.24
09S46E11BBAB01	262	Tongue River Member of Fort Union Formation	10/08/86 09/25/87	150.21 150.38
09S46E11BBAB02	208	Tongue River Member of Fort Union Formation	10/08/86 09/25/87	141.61 141.62

[1]Measured value; continuous water-level data for the period of record are shown in figure 2.

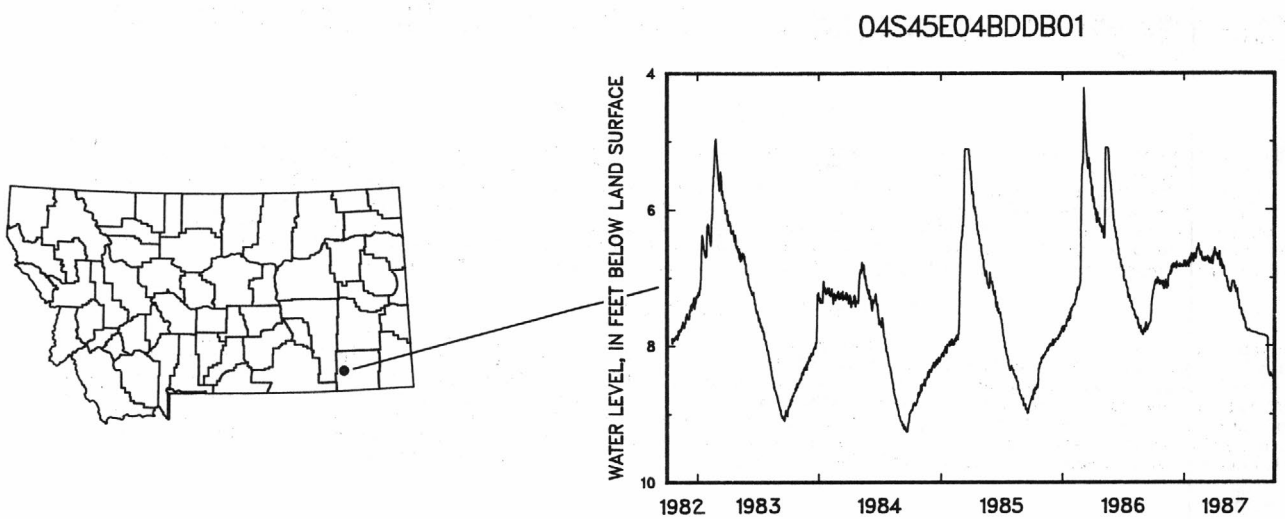


Figure 2.--Long-term hydrograph, by water year, for an observation well in Powder River County.

SPECIAL NETWORKS AND PROGRAMS

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

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

05020500	St. Mary River at international boundary
06054500	Missouri River at Toston, Mont.
06089000	Sun River near Vaughn, Mont.
06115200	Missouri River near Landusky, Mont.
06130500	Musselshell River at Mosby, Mont.
06174500	Milk River at Nashua, Mont.
06181000	Poplar River near Poplar, Mont.
06192500	Yellowstone River near Livingston, Mont.
06214500	Yellowstone River at Billings, Mont.
06294700	Bighorn River at Bighorn, Mont.
06308500	Tongue River at Miles City, Mont.
06326500	Powder River near Locate, Mont.
06329500	Yellowstone River near Sidney, Mont.

The National Trends Network (NTN) is an approximate 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

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

EXPLANATION OF THE RECORDS

The surface-water and ground-water records published in this report are for water year 1987 that began October 1, 1986, and ended September 30, 1987. A calendar of the water year is provided on the inside of the front cover. The records contain streamflow data, stage and content data for lakes and reservoirs, water-quality data for surface and ground water, and ground-water-level data. The locations of the stations and wells where the data were collected are shown in figures 4, 5, 6, and 7. The following sections of the introductory text are presented to provide users with a more detailed explanation of how the hydrologic data published in this report were collected, analyzed, computed, and arranged for presentation.

Station Identification Numbers

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

Downstream-Order System

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

The station-identification number is assigned according to downstream order. In assigning station numbers, no distinction is made between partial-record stations and other stations; therefore, the station number for 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 eight-digit number for each station, such as 06090300, which appears just to the left of the station name, includes the two-digit Part number "06" plus the six-digit downstream-order number "090300." The Part number designates the major river basin; for example, Part "06" is the Missouri River basin. All records for a drainage basin encompassing more than one State can be arranged in downstream order by assembling pages from the various State reports by station number to include all records in the basin.

Latitude-Longitude System

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

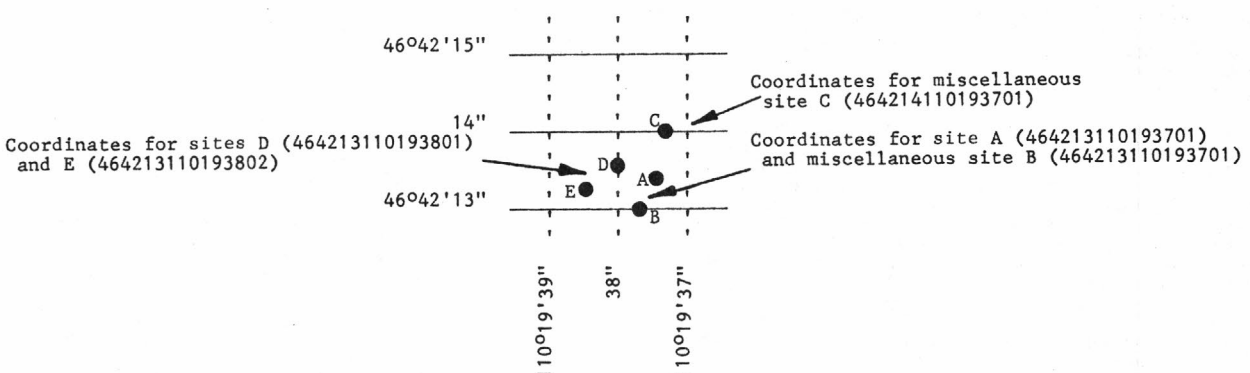


Figure 3.--System for numbering miscellaneous sites (latitude and longitude).

Rectangular-Grid System

In this report, wells are numbered according to geographic position within the rectangular-grid system of land subdivision. The location (local) number consists of as many as 14 characters. The first three characters specify the township and its position north (N) or south (S) of the Montana Base Line. The next three characters specify the range and its position west (W) or east (E) of the Montana Principal Meridian. The next two characters are the section number. The next one to four characters designate the quarter section (160-acre tract), quarter-quarter section (40-acre tract), quarter-quarter-quarter section (10-acre tract), and quarter-quarter-quarter-quarter section (2.5-acre tract), respectively, in which the well is located. The subdivisions of the section are designated A, B, C, and D in a counterclockwise direction, beginning in the northeast quadrant. The last two characters form a sequence number based on the order of inventory. For example, well 37N47E01ABBB01 is the first well inventoried in the NW¼NW¼NW¼NE¼ sec. 1, T. 37 N., R. 47 E.

Records of Stage and Water Discharge

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

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.

Data Collection and Computation

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

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

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

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

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

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

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

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

Data Presentation

The records published for each gaging station consist of two parts, the manuscript or station description and the data table for the current water year. The manuscript provides, under various headings, descriptive information, such as station location; period of record; average discharge; historical extremes; record accuracy; and other remarks pertinent to station operation and regulation. The following information, as appropriate, is provided with each continuous record of discharge or lake content. Comments to follow clarify information presented under the various headings of the station description.

LOCATION.--Information on locations is obtained from the most accurate maps available. The location of the gage with respect to the cultural and physical features in the vicinity and with respect to the reference place mentioned in the station name is given. River mileages, given for many stations, were determined by methods given in "River Mileage Measurement," Bulletin 14, Revision of October 1968, prepared by the Water Resources Council or were provided by the U.S. Army Corps of Engineers, or Montana Department of Natural Resources and Conservation, Water Resources Division.

DRAINAGE AREA.--Drainage areas are measured using the most accurate maps available. Because the type of maps available varies from one drainage basin to another, the accuracy of drainage areas likewise varies. Drainage areas are updated as better maps become available.

PERIOD OF RECORD.--This indicates the period for which there are published records for the station or for an equivalent station. An equivalent station is one that was in operation at a time that the present station was not, and whose location was such that records from it can reasonably be considered equivalent with records from the present station.

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

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

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

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

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

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

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

EXTREMES OUTSIDE PERIOD OF RECORD.--Included here is information concerning major floods or unusually low flows that occurred outside the stated period of record. The information may or may not have been obtained by the U.S. Geological Survey.

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

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

Although rare, occasionally the records of a discontinued gaging station may need revision. Because, for these stations, there would be no current or, possibly, future station manuscript published to document the revision in a "Revised Records" entry, users of data for these stations who obtained the record from previously published data reports may wish to contact the offices whose addresses are given on the back of the title page of this report to determine if the published records were ever revised after the station was discontinued. Of course, if the data were obtained by computer retrieval, the data would be current and there would be no need to check because any published revision of data is always accompanied by revision of the corresponding data in computer storage.

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

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

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 annual maximum stage and discharge at crest-stage stations, and the second is a table of discharge measurements at low-flow partial-record 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. 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.

Identifying Estimated Daily Discharge

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

Accuracy of the Records

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

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

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

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

Other Records Available

Information used in the preparation of the records in this publication, such as discharge-measurement notes, gage-height records, temperature measurements, and rating tables is on file in the Montana district office. Also, most of the daily mean discharges are in computer-readable form and have been analyzed statistically. Information on the availability of the unpublished information or on the results of statistical analyses of the published records may be obtained from the office whose address is given on the back of the title page of this report.

Publications

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

Table 9.--*Water-supply paper numbers and parts for surface-water stations, 1899-1970*

Year	Part 5	Part 6	Part 12	Year	Part 5	Part 6	Part 12
1899	36	36,37	38				
1900	49	49	51,52				
1901	65,66,75	66,75	66,75	1936	805	806	812
1902	83,85	84	85	1937	825	826	832
1903	98,99,100	99	100	1938	855	856	862
1904	128,130	130	135	1939	875	876	882
1905	171	172	178	1940	895	896	902
1906	207	208	214	1941	925	926	932
1907	245	246	252	1942	955	956	962
1908	245	246	252	1943	975	976	982
1909	265	266	272	1944	1005	1006	1012
1910	285	286	292	1945	1035	1036	1042
1911	305	306	312	1946	1055	1056	1062
1912	325	326	332A	1947	1085	1086	1092
1913	355	356	362A	1948	1115	1116	1122
1914	385	386	392	1949	1145	1146	1152
1915	405	406	412	1950	1175	1176	1182
1916	435	436	442	1951	1208	1209	1216
1917	455	456	462	1952	1238	1239	1246
1918	475	476	482	1953	1278	1279	1286
1919	505	506	512	1954	1338	1339	1346
1920	505	506	512	1955	1388	1389	1396
1921	525	526	532	1956	1438	1439	1446
1922	545	546	552	1957	1508	1509	1516
1923	565	566	572	1958	1558	1559	1566
1924	585	586	592	1959	1628	1629	1636
1925	605	606	612	1960	1708	1709	1716
1926	625	626	632	1961-65	1913	1916	1933
1927	645	646	652	1966-70	2113	2116	2133
1928	665	666	672				
1929	685	686	692				
1930	700	701	707				
1931	715	716	722	1950	1308	1309	1316
1932	730	731	737	Compilation			
1933	745	746	752				
1934	760	761	767	1960	1728	1729	1736
1935	785	786	792	Compilation			

Records of Surface-Water Quality

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because interpretation of records of surface-water quality nearly always requires corresponding discharge data. Records of surface-water quality in this report may involve a variety of types of data and measurement frequencies.

Classification of Records

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

A careful distinction needs to be made between "continuing records", as used in this report, and "continuous recordings," which refers to a continuous graph or a series of discrete values punched at short intervals on a paper tape. Some records of water quality, such as temperature and specific conductance, may be obtained through continuous recordings; however, because of costs, most data are obtained only monthly or less frequently. Locations of stations for which records on the quality of surface water appear in this report are shown in figure 5.

Arrangement of Records

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

Onsite Measurements and Sample Collection

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

One sample can define adequately the water quality at a given time if the mixture of solutes throughout the stream cross section is homogeneous. However, the concentration of solutes at different locations in the cross section may vary widely with different rates of water discharge, depending on the source of material and the turbulence and mixing of the stream. Most streams must be sampled through several vertical sections to obtain a representative sample needed for an accurate mean concentration and for use in calculating load. Samples for analysis of the water-sediment mixture are collected using modified suspended-sediment samplers. All samples obtained for the National Stream Quality Accounting Network (see definitions) are obtained from at least several verticals.

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

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

Water Temperature

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

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

Sediment

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

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

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

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

Laboratory Measurements

Sediment samples, samples for indicator bacteria, and daily samples for specific conductance are analyzed locally. All other samples are analyzed in the Geological Survey laboratory in Arvada, Colorado, or the Montana Bureau of Mines and Geology laboratory in Butte, Montana. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chap. C1. Methods used by the Geological Survey laboratory are given in TWRI, Book 1, Chap. D2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4.

Data Presentation

For continuing-record stations, information pertinent to the history of station operation is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, drainage area, period of record, type of data available, instrumentation, general remarks, cooperation, and extremes for parameters currently measured daily. Tables of chemical, physical, biological, radiochemical data, and so forth, obtained at a frequency less than daily are presented first. Tables of "daily values" of specific conductance, pH, water temperature, dissolved oxygen, and suspended sediment then follow in sequence.

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

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

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

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

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

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

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

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

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

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

Table 10.--*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		

Remark Codes

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

PRINTED OUTPUT	REMARK
E	Estimated value
>	Actual value is known to be greater than the value shown
<	Actual value is known to be less than the value shown
K	Results based on colony count outside the acceptance range (non-ideal colony count)

Publications

The annual series of water-supply papers that give information on quality of surface waters in Montana are shown in the following table. Data for Hudson Bay and Missouri River basins are given in parts 5-6 and data for Upper Columbia River basin are given in part 12.

Table 11.--*Water-supply paper numbers and parts for water-quality stations, 1947-70*

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

Records of Ground-Water Levels

Only water-level data from a national network of observation wells are given in this report. These data are intended to provide a sampling and historical record of water-level changes in the Nation's most important aquifers. Locations of the observation wells in this network in Montana are shown in figure 7.

Data Collection and Computation

Measurements of water levels are made in many types of wells under varying conditions, but the methods of measurement are standardized to the extent possible. The equipment and measuring techniques used at each observation well ensure that measurements at each well are of consistent accuracy and reliability.

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

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

Publications

Publication of ground-water level data for the United States in water-supply papers was begun by the Geological Survey in 1935. From 1935 through 1939, a single water-supply paper for each year covering the entire nation was issued (Water-Supply Papers---777, 817, 840, 845, and 886). From 1940 through 1974, separate water-supply papers were issued for 6 sections of the United States. Water-level data for Montana are in the water-supply papers listed in the following table, each report containing one or more calendar years (January-December) of data. Data in this report are for the 12-month water year ending September 30.

Table 12.--*Water-supply paper numbers and parts for ground-water stations for northwestern United States, 1940-1974*

Year	WSP No.	Year	WSP No.	Year	WSP No.
1940	910	1947	1100	1954	1325
1941	940	1948	1130	1955	1408
1942	948	1949	1160	1956-60	1760
1943	990	1950	1169	1961-65	1845
1944	1020	1951	1195	1966-70	1980
1945	1927	1952	1225	1971-74	2161
1946	1075	1953	1269		

Information about reports and other data on ground water in Montana may be obtained from the district office, at the address given on the back of the title page.

ACCESS TO WATSTORE DATA

The 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 the office whose addresses are 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

DEFINITION OF TERMS

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

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

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, while others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

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

Fecal streptococcal bacteria are bacteria found also in the intestine of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as Gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms which produce red or pink colonies within 48 hours at 35°C plus or minus 1.0°C on KF-streptococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

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

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

Bottom material: See Bed material.

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

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

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

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

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

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

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

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

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

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

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

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

Dissolved-solids concentration of water is determined either analytically by the "residue-on-evaporation" method, or mathematically by totaling the concentrations of individual constituents reported in a comprehensive chemical analysis. During the analytical determination of dissolved solids, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. Therefore, in the mathematical calculation of dissolved-solids concentration, the bicarbonate value, in milligrams per liter, is multiplied by 0.492 to reflect the change.

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

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

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

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

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

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

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

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

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

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

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

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

Microsiemens per centimeter at 25°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 represents the mass of solute per unit volume (liter) of water. Concentration of suspended sediment also is expressed in mg/L and is based on the mass of dry sediment per liter of water-sediment mixture.

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

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

The National Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

Organism is any living entity.

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

Total organism count is the total number of organisms collected and enumerated in any particular sample.

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

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

Particle size is the diameter, in millimeters (mm), of a particle determined by either sieve or sedimentation methods. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube) determine fall diameter of particles in either distilled water (chemically dispersed) or in native water (the river water at the time and point of sampling).

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

Classification	Size (mm)	Method of analysis
Clay.....	0.00024 - 0.004	Sedimentation
Silt.....	.004 - .062	Sedimentation
Sand.....	.062 - 2.0	Sedimentation or sieve
Gravel.....	2.0 - 64.0	Sieve

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

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

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

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

Picocurie (PC, pCi) is one trillionth (1×10^{-12}) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields 3.7×10^{10} radioactive disintegrations per second. A picocurie yields 2.22 dpm (disintegrations per minute).

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

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

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

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

Sediment is solid material that originates mostly from disintegrated rocks and is transported by, suspended in, or deposited from water; it includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics land usage, and quantity and intensity of precipitation.

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

Suspended-sediment concentration is the velocity-weighted concentration of suspended sediment in the sampled zone (from the water surface to a point approximately 0.3 ft above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L).

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

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

Suspended-sediment load is a general term that refers to material in suspension. It is not synonymous with either discharge or concentration.

Sodium-adsorption-ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions within soil and is an index of sodium or alkali hazard to the soil. Waters range in respect to sodium hazard from those which can be used for irrigation on almost all soils to those which are generally unsatisfactory for irrigation.

Solute is any substance that is dissolved in water.

Specific conductance is a measure of the ability of a water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25°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 (as used in tables of chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is associated with the material retained on a 0.45-micrometer filter.

Suspended, recoverable is the amount of a given constituent that is in solution after the part of a representative water-suspended sediment sample that is retained on a 0.45 µm membrane filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all the particulate matter is not achieved by the digestion treatment and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

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

Suspended, total is the total amount of a given constituent in the part of a representative water-suspended sediment sample that is retained on a 0.45 µm membrane filter. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to determine when the results should be reported as "suspended, total."

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

Thermograph is an instrument that continuously records variations of temperature on a chart. The more general term "temperature recorder" is used in the table headings and refers to any instrument that records temperature whether on a chart, a tape, or any other medium.

Time-weighted average is computed by multiplying the number of days in the sampling period by the concentration of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the stream each day for the year.

Tons per acre-foot indicates the dry mass of dissolved solids in 1 acre-foot of water. It is computed by multiplying the concentration of the constituent, in milligrams per liter, by 0.00136.

Tons per day (T/DAY) is the quantity of a substance in solution or suspension that passes a stream section during a 24-hour period.

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

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

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

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

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

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

Water year in Geological Survey reports dealing with surface-water supply is the 12-month period October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 1985, is called the "1985 water year."

WDR is used as an abbreviation for "Water-Data Report" in the REVISED RECORDS paragraph to refer to State annual hydrologic-data reports (WRD was used as an abbreviation for "Water-Resources Data" in reports published prior to 1976).

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

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

The U.S. Geological Survey publishes a series of manuals describing procedures for planning and conducting 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) pertains to surface water. The chapter, the unit of publication, is limited to a narrow field of subject matter. This format permits flexibility in revision and publication as the need arises.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

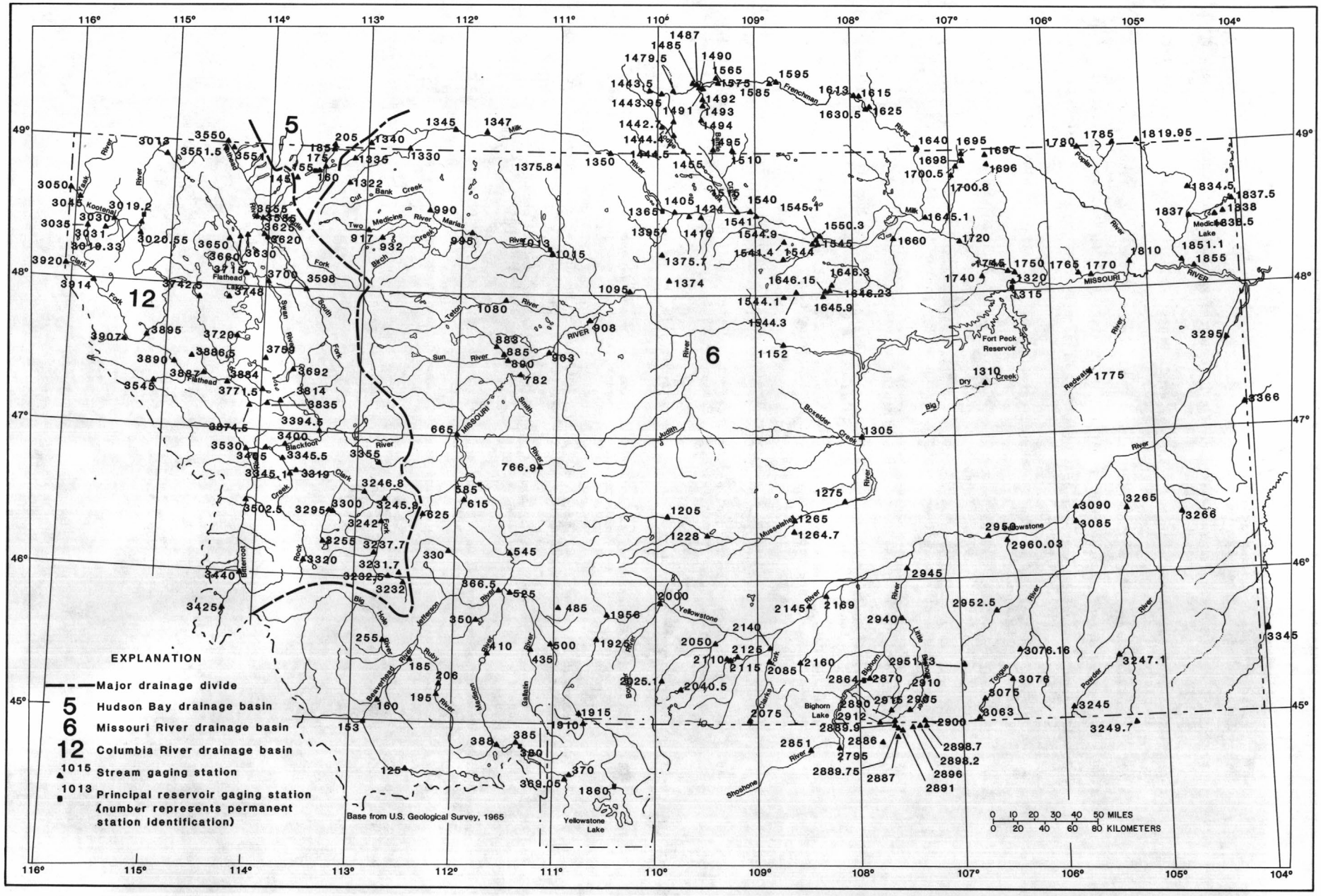


Figure 4.--Map showing location of surface-water gaging stations, water year 1987.

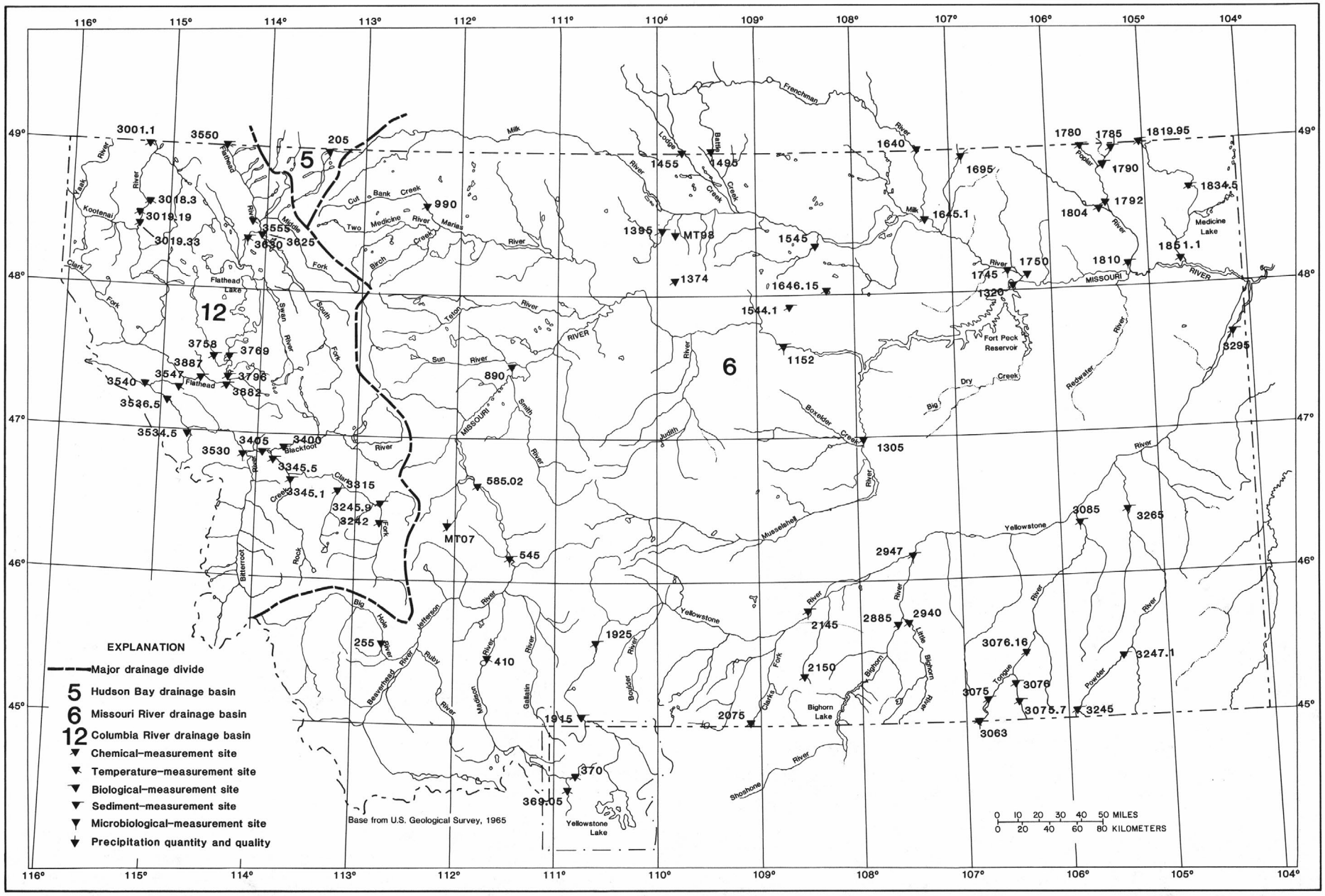


Figure 5.--Map showing location of water quality stations, water year 1987.

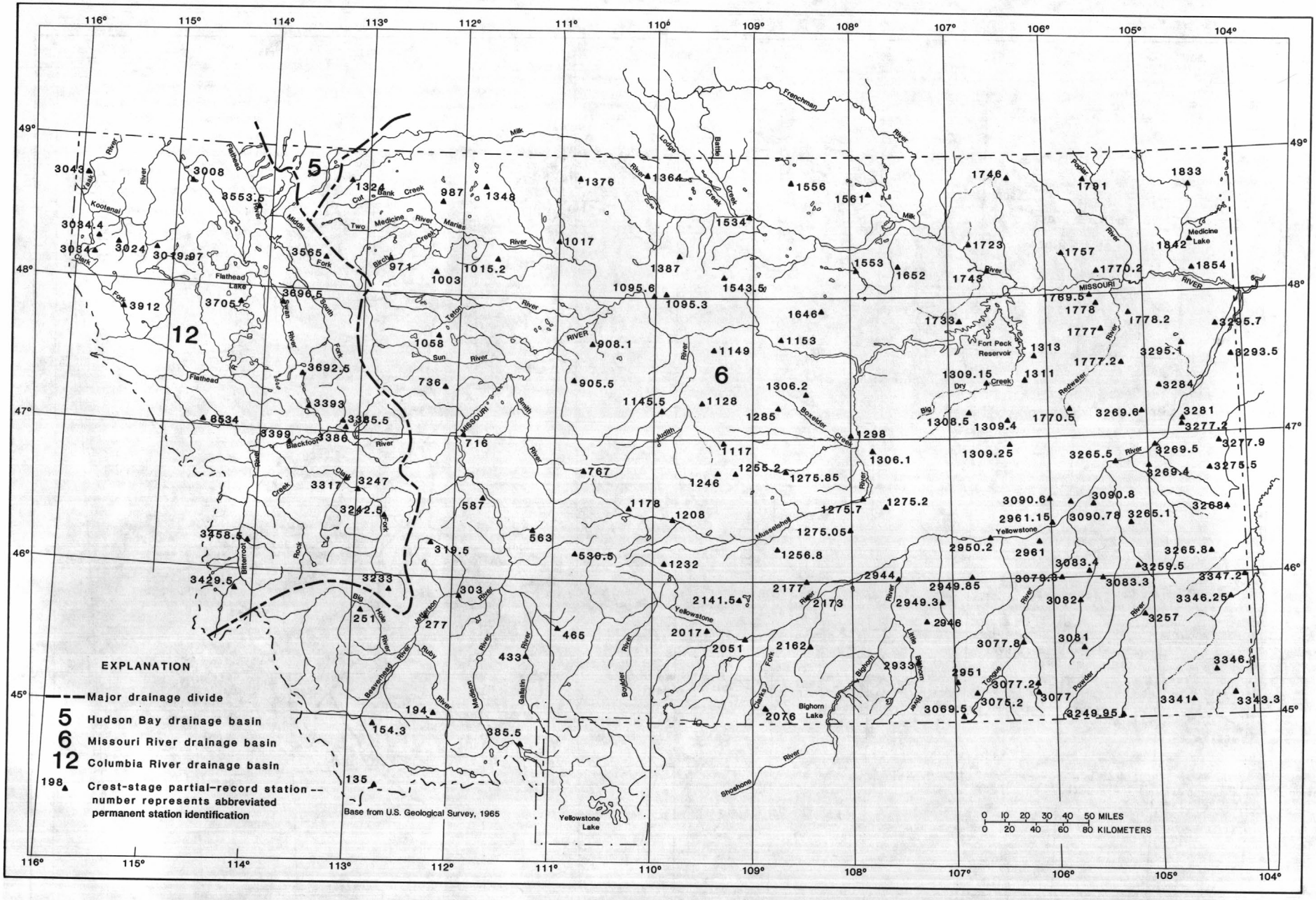


Figure 6.--Map showing crest-stage partial-record stations, water year 1987.

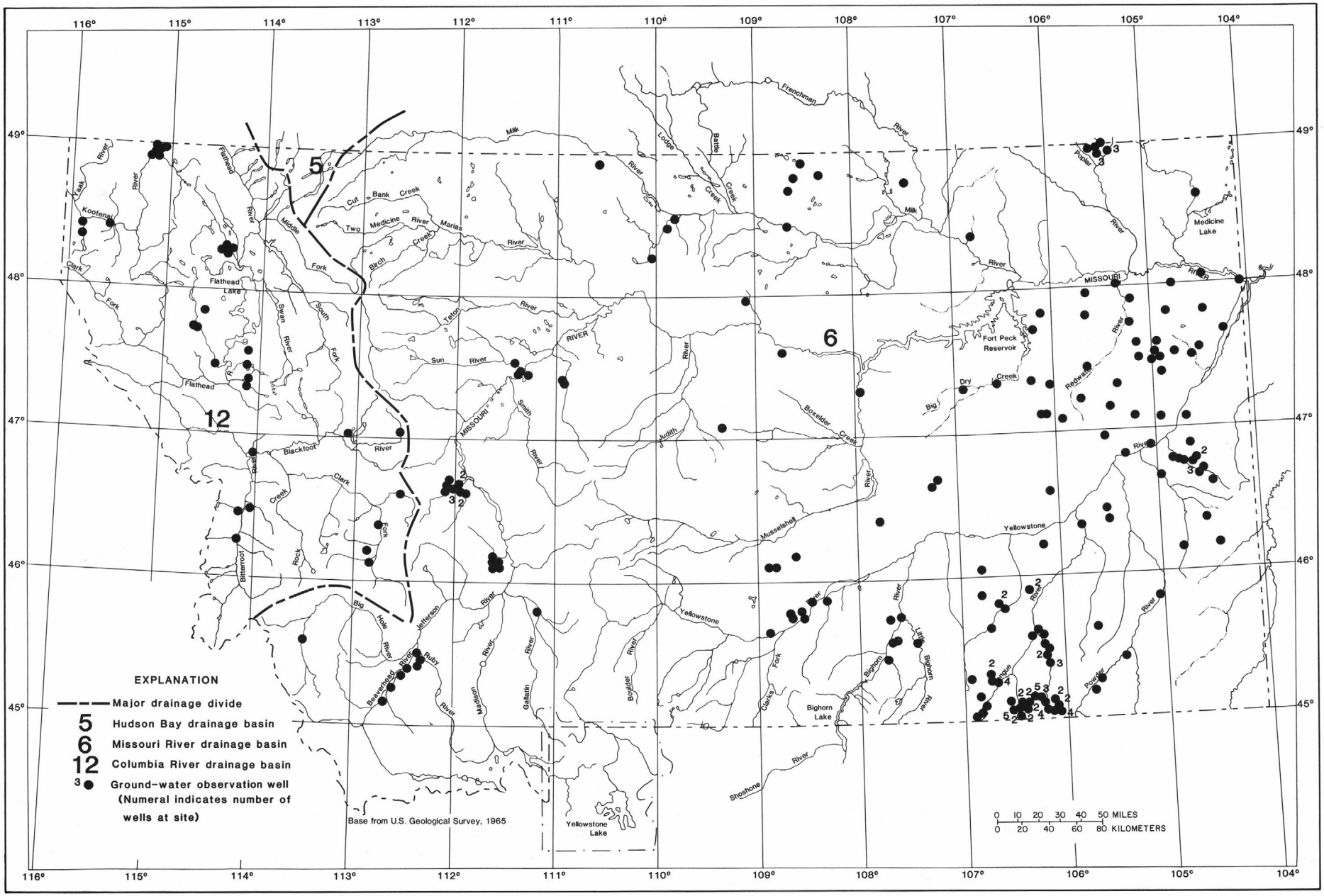


Figure 7.--Map showing location of ground-water observation wells, water year 1987.

SASKATCHEWAN RIVER BASIN

05014500 SWIFTCURRENT CREEK AT MANY GLACIER, MT

(Hydrologic bench-mark station)

LOCATION.--Lat 48°47'57", long 113°39'21", in SE¼ sec.11, T.35 N., R.16 W., Glacier County, Hydrologic Unit 10010002, Glacier National Park, on right bank 100 ft upstream from outlet of Swiftcurrent Lake at Many Glacier, and 11 mi southwest of Babb.

DRAINAGE AREA.--30.9 mi^2.

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

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

GAGE.--Water-stage recorder. Datum of gage is 4,876.78 ft above National Geodetic Vertical Datum of 1929. Prior to May 23, 1916, nonrecording gage on left bank of lake opposite present gage and at present datum, and May 23, 1916, to June 15, 1918, nonrecording gage at present site and datum. Several observations of water temperatures and specific conductance were made during the year and are available in files of Helena district office.

REMARKS.--Estimated daily discharges: Dec. 1-3, 8-12, Jan. 9 to Feb. 9, Feb. 12 to Apr. 15, Apr. 18-29. Records good except those for estimated daily discharges, which are poor. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--31 years, (1917-19, 1958-87), 143 ft^3/s, 62.85 in/yr, 103,600 acre-ft/yr.

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

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

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 1	1100	*835	*4.23	May 13	0600	681	3.86

Minimum daily discharge, 10 ft^3/s, Jan. 17.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	99	89	e68	19	e16	e15	e65	814	478	148	143	89
2	100	77	e64	20	e17	e16	e65	646	352	154	114	106
3	95	73	e60	17	e17	e18	e60	433	272	161	107	80
4	84	70	57	17	e17	e22	e65	319	240	156	95	78
5	89	76	56	19	e21	e30	e70	296	277	167	89	73
6	116	79	52	23	e23	e60	e75	350	347	161	91	68
7	176	78	43	31	e25	e110	e80	419	358	136	89	66
8	214	71	e40	32	e30	e100	e90	481	348	114	82	63
9	202	64	e35	e28	e25	e90	e100	549	328	104	84	58
10	188	55	e31	e29	20	e80	e120	615	318	109	86	59
11	159	56	e29	e30	19	e70	e110	566	305	104	89	58
12	138	56	e31	e32	e19	e60	e105	546	296	95	84	56
13	121	55	33	e28	e20	e65	e100	647	286	93	75	55
14	109	63	34	e25	e21	e75	e95	513	296	100	89	53
15	100	56	33	e20	e22	e90	e100	454	296	107	93	49
16	91	55	29	e15	e21	e85	114	474	354	114	95	43
17	84	60	28	e10	e20	e85	239	404	322	123	152	41
18	82	61	28	e11	e19	e85	e320	326	252	154	164	38
19	76	60	27	e11	e19	e80	e300	277	258	213	138	36
20	71	63	26	e12	e19	e80	e250	237	265	258	114	33
21	66	96	24	e12	e18	e75	e220	202	255	255	104	31
22	63	95	24	e12	e17	e70	e190	169	231	401	95	33
23	59	82	26	e13	e15	e65	e170	148	214	709	84	34
24	55	155	25	e15	e13	e70	e150	143	149	501	109	36
25	53	193	24	e14	e11	e75	e160	161	133	352	126	37
26	50	151	21	e14	e12	e80	e180	233	136	269	128	36
27	56	126	20	e15	e13	e70	e210	418	146	226	119	38
28	74	107	20	e16	e14	e60	e300	511	159	202	109	37
29	78	91	20	e18	---	e50	e550	418	159	188	102	36
30	92	73	19	e20	---	e55	717	352	148	175	97	34
31	102	---	19	e19	---	e60	---	498	---	164	89	---
TOTAL	3142	2486	1046	597	523	2046	5370	12619	7978	6213	3235	1554
MEAN	101	82.9	33.7	19.3	18.7	66.0	179	407	266	200	104	51.8
MAX	214	193	68	32	30	110	717	814	478	709	164	106
MIN	50	55	19	10	11	15	60	143	133	93	75	31
AC-FT	6230	4930	2070	1180	1040	4060	10650	25030	15820	12320	6420	3080

CAL YR 1986 TOTAL 49520.4 MEAN 136 MAX 980 MIN 7.6 AC-FT 98220
WTR YR 1987 TOTAL 46809.0 MEAN 128 MAX 814 MIN 10 AC-FT 92850

e Estimated

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

LOCATION.--Lat 48°49'42", long 113°31'16", in SE¼SE¼SE¼ sec.35, T.36 N., R.15 W., Glacier County, Hydrologic Unit 10010002, Blackfeet Indian Reservation, in gatehouse at dam on Swiftcurrent Creek, 4.5 mi southwest of Babb.

DRAINAGE AREA.--64.1 mi^2.

PERIOD OF RECORD.--May 1915 to September 1923 (fragmentary), May 1924 to September 1925, November 1925 to June 1926 September 1926 to March 1936 (no winter records some years), May 1936 to September 1952 (monthend contents and daily elevations). October 1952 to current year (monthend contents only). Monthend contents for some periods, published in WSP 1308. Published as Sherburne Lake Reservoir at Sherburne 1915, 1917-28, 1931-52, and as Sherburne Lake Reservoir near Babb 1929-30.

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 4,709.45 ft above National Geodetic Vertical Datum of 1929. Prior to May 7, 1931, nonrecording gage at present site, and May 8, 1931, to Sept. 30, 1974, water-stage recorder at present site, all at datum 9.45 ft lower.

REMARKS.--Reservoir is formed on a natural lake by earthfill dam completed in 1921. Prior to 1919, flashboards on a temporary dam provided limited storage. Storage behind main dam began in 1919. The following capacity figures are from capacity table effective Jan. 1, 1983; see previous reports for superseded figures. Usable capacity, 64,790 acre-ft between gage height 29.3 ft, 9.3 ft, above lowest outlet gage sill, and 88.00 ft, spillway crest. Streambed above gates prevents withdrawal of storage to sill elevation. Dead storage, 3,060 acre-ft below gage height, 29.30 ft. Figures given herein represent usable contents. Water is used for irrigation on Milk River project of U.S. Bureau of Reclamation.

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

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

EXTREMES FOR CURRENT YEAR.--Maximum contents, 65,140 acre-ft, June 16, gage height, 88.20 ft; minimum, 20,360 acre-ft, Apr. 14, gage height, 54.42 ft.

MONTHEND GAGE HEIGHT AND CONTENTS AT 2400, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

Date	Gage height (feet)	Contents (acre-feet)	Change in Contents (acre-feet)
Sept. 30	56.08	22,080	--
Oct. 31	61.77	28,290	+ 6,210
Nov. 30	67.57	35,070	+ 6,780
Dec. 31	70.06	38,140	+ 3,070
CAL YR 1986			+ 5,790
Jan. 31	71.29	39,730	+ 1,590
Feb. 28	72.32	41,100	+ 1,370
Mar. 31	59.07	25,290	-15,810
Apr. 30	64.46	31,380	+ 6,090
May 31	87.92	64,660	+33,280
June 30	87.88	64,590	- 70
July 31	87.85	64,540	- 50
Aug. 31	72.92	41,910	-22,630
Sept. 30	65.62	32,740	- 9,170
WTR YR 1987			+10,660

SASKATCHEWAN RIVER BASIN

05016000 SWIFTCURRENT CREEK AT SHERBURNE, MT

(International gaging station)

LOCATION.--Lat 48°49'49", long 113°30'59", in NW¼SW¼SW¼ sec.36, T.36 N., R.15 W., Glacier County, Hydrologic Unit 10010002, Blackfeet Indian Reservation, on left bank 1,200 ft downstream from outlet of Lake Sherburne Dam at Sherburne and 4.2 mi southwest of Babb.

DRAINAGE AREA.--64.6 mi^2.

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

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

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

REMARKS.--Estimated daily discharges: Mar. 1-8 and Oct. 30-31. Records good. Flow regulated by Lake Sherburne (see preceding page).

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

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,420 ft^3/s, June 25, 1969, gage height, 7.63 ft; maximum gage height, 7.77 ft, July 15, 1981; no flow at times when gates in dam are closed.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 737 ft^3/s, Sept. 1, gage height, 5.69 ft; minimum daily, 0.03 ft^3/s, Oct. 30-31.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	---	---	e.40	290	1.7	688	431	270	716	74	---	---
2	---	---	e.40	271	1.4	566	461	243	725	74	---	---
3	---	---	e.50	271	1.2	388	461	208	720	74	---	---
4	---	---	e115	269	1.1	321	459	250	714	73	---	---
5	---	---	e190	268	1.1	336	443	397	708	73	---	---
6	---	---	e190	288	1.1	397	213	489	700	73	---	---
7	---	---	e280	300	.97	469	127	504	646	73	---	---
8	---	---	e390	322	.95	530	179	503	415	73	---	---
9	---	---	521	334	1.1	525	321	502	160	73	---	---
10	---	---	574	370	1.4	514	369	528	75	73	---	---
11	---	---	570	390	1.1	482	369	543	75	70	---	---
12	---	---	563	387	.97	407	368	541	75	70	---	---
13	---	---	531	296	.93	311	424	566	75	70	---	---
14	---	---	485	178	.88	214	455	555	75	70	---	---
15	---	---	463	109	.86	276	506	536	75	28	---	---
16	---	---	457	96	.85	383	505	560	75	1.8	---	---
17	---	---	455	37	.85	425	460	601	75	.31	---	---
18	---	---	450	1.9	.83	426	443	615	74	.30	---	---
19	---	---	470	87	.74	422	443	613	74	.28	---	---
20	---	---	440	141	.74	425	470	611	74	.27	---	---
21	---	---	381	95	.76	397	485	606	74	.14	---	---
22	---	---	364	26	.73	356	267	604	74	.11	---	---
23	---	---	360	1.3	.72	274	45	600	74	.10	---	---
24	---	---	316	1.3	.70	206	45	654	74	.10	---	---
25	---	---	287	1.4	.75	185	45	711	74	.08	---	---
26	---	---	285	1.4	.94	126	45	725	74	.06	---	---
27	---	---	284	90	1.4	90	74	720	74	.05	---	---
28	---	---	300	97	1.0	154	92	715	74	.05	---	---
29	---	---	317	1.9	.92	196	182	707	74	.04	---	---
30	---	---	314	1.8	.94	309	239	704	74	e.03	---	---
31	---	---	312	---	310	---	250	697	---	e.03	---	---
TOTAL	---	---	10665.30	5023.0	339.63	10798	9676	17078	7066	1044.75	---	---
MEAN	---	---	344	167	11.0	360	312	551	236	33.7	---	---
MAX	---	---	574	390	310	688	506	725	725	74	---	---
MIN	---	---	.40	1.3	.70	90	45	208	74	.03	---	---
AC-FT	---	---	21150	9960	674	21420	19190	33870	14020	2070	---	---

e Estimated

05017500 ST. MARY RIVER NEAR BABB, MT

LOCATION.--Lat 48°50'00", long 113°25'08", in NW¼NW¼SE¼ sec.34, T.36 N., R.14 W., Glacier County, Hydrologic Unit 10010002, Blackfeet Indian Reservation, on right bank 0.7 mi upstream from outlet of Lower St. Mary Lake and 2.0 mi southeast of Babb.

DRAINAGE AREA.--276 mi^2.

PERIOD OF RECORD.--July 1901 to October 1902, May 1910 to September 1925, October 1950 to current year. Monthly discharge only for some periods, published in WSP 1308. Published as "at Main" in 1901-02, and as "below Swiftcurrent Creek, at Babb" 1910-15. Records published as "near Babb" for April 1902 to September 1915, May 1929 to September 1950 at sites about 1.5 mi downstream not equivalent because flow of Swiftcurrent Creek not included 1902-15 and because diversion by St. Mary Canal not included 1929-50.

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

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

REMARKS.--Estimated daily discharges: Aug. 16-18. Records good. Entire flow of Swiftcurrent Creek below Lake Sherburne is diverted into Lower St. Mary Lake upstream from station. Flow of Swiftcurrent Creek regulated by Lake Sherburne (station number 05015500) since 1919. October 1950 to September 1976, monthly discharge and runoff figures adjusted for change in contents in Lake Sherburne. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--53 years (1901-2, 1910-25, 1950-87), 773 ft^3/s, 560,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,500 ft^3/s, June 9, 1964, gage height, 12.96 ft, from highwater mark in well, from rating curve extended above 6,100 ft^3/s on basis of slope-area measurement of peak flow; minimum, 26 ft^3/s, Jan. 5, 1963, Jan. 8, 1958.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,240 ft^3/s, July 24, gage height, 4.26 ft; minimum daily, 42 ft^3/s, Jan. 1.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	301	339	305	42	81	71	417	1480	2050	925	1280	1080
2	301	322	293	49	81	71	398	1780	2160	1010	1170	1080
3	297	301	269	66	79	73	393	1900	2010	1060	1070	1070
4	293	285	250	90	77	90	393	1840	1800	1070	981	1060
5	289	273	243	108	75	123	393	1690	1640	1100	953	1040
6	293	265	235	122	75	157	408	1550	1600	1040	993	1020
7	297	250	214	129	73	194	427	1490	1630	920	1020	1010
8	326	239	197	134	73	253	462	1490	1720	817	1010	927
9	357	224	191	134	71	334	498	1560	1800	791	1000	773
10	403	214	162	131	71	446	525	1690	1840	835	1000	619
11	427	207	139	131	70	529	551	1830	1820	848	987	521
12	437	194	129	134	68	577	525	1920	1760	835	973	453
13	437	187	116	131	68	611	557	2030	1680	823	959	408
14	432	187	104	126	66	611	551	2100	1580	835	986	380
15	422	187	92	121	66	595	517	2070	1520	841	970	361
16	412	187	84	116	64	589	498	2050	1580	867	e990	344
17	393	184	75	111	64	578	520	2000	1620	899	e1020	331
18	379	191	70	108	62	573	525	1870	1600	958	e1050	314
19	366	197	86	108	62	600	543	1700	1590	1040	1070	297
20	352	214	108	104	62	600	594	1520	1550	1080	1080	281
21	361	221	113	101	62	573	634	1370	1510	1150	1060	269
22	370	224	113	97	62	546	628	1230	1440	1550	1040	261
23	375	239	99	94	66	520	606	1100	1330	2160	1020	250
24	370	265	88	92	71	493	595	994	1200	2220	1060	243
25	366	293	75	90	71	462	611	920	1070	2140	1110	239
26	361	309	66	88	71	447	633	919	974	1970	1160	246
27	370	305	60	86	70	442	679	1150	874	1790	1170	250
28	361	305	53	86	70	432	803	1490	829	1640	1150	246
29	352	305	50	84	---	427	925	1640	848	1520	1140	235
30	352	305	45	81	---	422	1140	1660	854	1450	1110	232
31	361	---	44	79	---	417	---	1720	---	1370	1100	---
TOTAL	11213	7418	4168	3173	1951	12856	16949	49753	45479	37554	32682	15840
MEAN	362	247	134	102	69.7	415	565	1605	1516	1211	1054	528
MAX	437	339	305	134	81	611	1140	2100	2160	2220	1280	1080
MIN	289	184	44	42	62	71	393	919	829	791	953	232
AC-FT	22240	14710	8270	6290	3870	25500	33620	98690	90210	74490	64820	31420

CAL YR 1986 TOTAL 250776 MEAN 687 MAX 4640 MIN 44 AC-FT 497400
WTR YR 1987 TOTAL 239036 MEAN 655 MAX 2220 MIN 42 AC-FT 474100

e Estimated

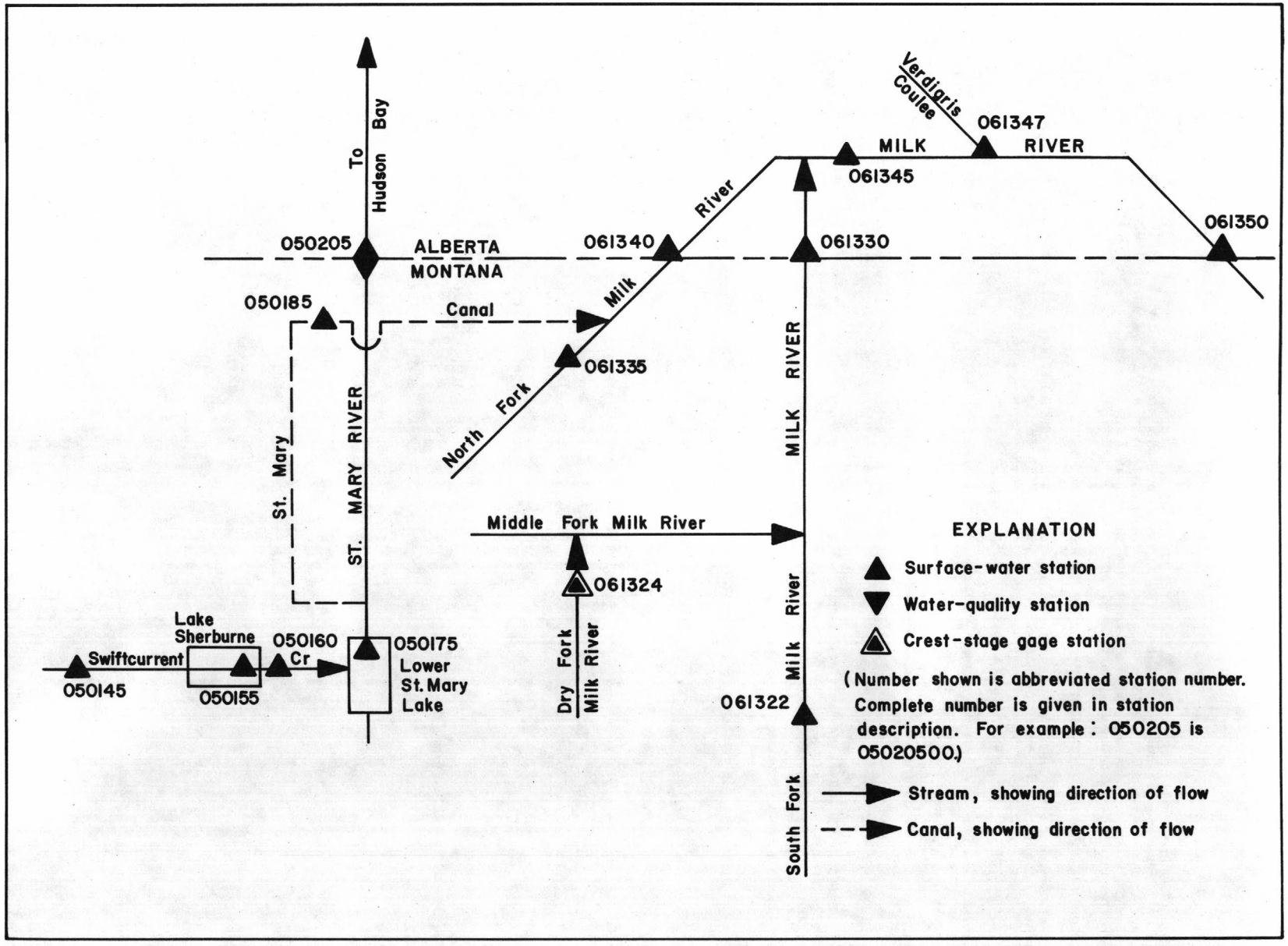


Figure 8.--Schematic diagram showing diversions from St. Mary River in Part 5 to Milk River in Part 6.

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

(International gaging station)

LOCATION.--Lat 48°56'50", long 113°22'28", in NE¼SW¼SW¼ sec.19, T.37 N., R.13 W., Glacier County, Hydrologic Unit 10010002, Blackfeet Indian Reservation, on left bank 50 ft upstream from inlet of St. Mary siphon, 6.6 mi northeast of Babb, and 9 mi downstream from intake.

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

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

REMARKS.--Estimated daily discharges: Mar. 1, 2, 7, 10. Records good. Canal diverts water from left bank of St. Mary River near Babb and discharges into North Fork Milk River. This water flows in the natural channel of Milk River through Canada and then back into Montana where it is used for irrigation in Milk River Valley east of Havre. Some water may be returned to St. Mary River at Kennedy Creek and St. Mary crossings.

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

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

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.00	380	279	618	609	566	581	.00		
2			e.00	314	283	623	614	562	582	.00		
3			.00	312	283	642	615	561	582	.00		
4			.00	318	280	660	615	556	582	.00		
5			6.1	317	278	662	620	554	581	.00		
6			107	315	296	674	461	561	582	.00		
7			e120	315	445	674	296	574	580	.00		
8			185	321	474	676	257	572	471	.00		
9			246	320	485	677	301	573	186	.00		
10			e247	310	503	676	401	572	6.3	.00		
11			403	283	530	676	401	577	.00	.00		
12			465	249	580	635	400	585	.00	.00		
13			481	208	609	532	429	593	.00	.00		
14			499	113	645	524	501	588	.00	.00		
15			513	111	672	523	527	563	.00	.00		
16			512	111	688	553	529	566	.00	.00		
17			513	110	683	604	535	582	.00	.00		
18			512	108	561	619	539	596	.00	.00		
19			518	107	650	639	538	598	.00	.00		
20			516	107	689	636	537	600	.00	.00		
21			513	107	641	634	545	599	.00	.00		
22			508	126	525	630	525	598	.00	.00		
23			497	178	413	628	440	598	.00	.00		
24			472	178	308	622	543	595	.00	.00		
25			451	176	307	615	543	584	.00	.00		
26			426	175	309	611	538	583	.00	.00		
27			423	176	404	606	539	583	.00	.00		
28			420	176	594	604	551	584	.00	.00		
29			418	177	609	606	570	583	.00	.00		
30			416	214	609	605	570	582	.00	.00		
31			414	---	610	---	568	582	---	.00		
TOTAL			10801.10	6412	15242	18684	15657	17970	4733.30	.00		
MEAN			348	214	492	623	505	580	158	.00		
MAX			518	380	689	677	620	600	582	.00		
MIN			.00	107	278	523	257	554	.00	.00		
AC-FT			21420	12720	30230	37060	31060	35640	9390	.0		

e Estimated

SASKATCHEWAN RIVER BASIN

05020500 ST. MARY RIVER AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°00'12", long 113°18'48", in SW¼ sec.5, T.1, R.25 W., fourth meridian, in Alberta, Hydrologic Unit 10010002, on right bank 0.4 mi north of international boundary, 2.5 mi downstream from Boundary Creek, 7.5 mi southwest of Kimball, Alberta, and 11.5 mi northeast of Babb, MT.
DRAINAGE AREA.--465 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1902 to current year. Monthly discharge only for some periods, published in WSP 1308. Published as "near Cardston, Alberta" and "at Cook's Ranch, Alberta" 1902-12 and as "near Kimball, Alberta" 1913-55.
REVISED RECORDS.--WSP 1308: 1902, 1908-12. WSP 1508: 1902, 1908-9. W 1983: Drainage area.
GAGE.--Water-stage recorder. Elevation of gage is 4,120 ft, from topographic map. Prior to Jan. 1, 1913, non-recording gages at two sites within 0.3 mi of present site at different datums. Jan. 1, 1913, to Oct. 25, 1955, water-stage recorder at several sites about 8 mi downstream from present site at various datums. Oct. 26, 1955, to Mar. 23, 1965, water-stage recorder at site 100 ft upstream at datum 2 ft higher.
REMARKS.--Estimated daily discharges: Nov. 10 to Feb. 15, Feb. 24 to Mar. 5, and Mar. 28-30. Water-discharge records good except those for estimated daily discharges, which are fair. Since 1917, St. Mary Canal has diverted water from the river near Babb, MT, to North Fork Milk River. Some regulation by Lake Sherburne on Swiftcurrent Creek.
COOPERATION.--This is one of a number of stations which are maintained jointly by Canada and the United States.
AVERAGE DISCHARGE.--14 years (1902-16), prior to operation of St. Mary Canal, 1,003 ft^3/s, 726,700 acre-ft/yr; 71 years (1916-87), 685 ft^3/s, 496,300 acre-ft/yr.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,000 ft^3/s, June 5, 1908, gage height, 12.75 ft, from flood-marks, site and datum then in use, from rating curve extended above 6,000 ft^3/s; minimum daily, 16 ft^3/s, Nov. 29, 1936.
EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,600 ft^3/s, July 23, gage height, 6.25 ft; minimum daily, 54 ft^3/s, Nov. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	e70	e125	e110	121	1620	1740	422	931	666	293	100	e56
2	e80	e125	e115	208	1880	1850	505	830	659	284	100	e60
3	e95	e120	e120	249	1960	1650	559	718	632	273	105	e65
4	e110	e120	e125	332	1890	1410	575	617	621	265	100	e72
5	e120	e115	e130	350	1710	1230	620	555	611	259	98	78
6	e130	e115	140	333	1550	1170	783	585	585	257	94	87
7	e135	e115	143	314	1380	1200	791	605	570	257	91	99
8	e140	e110	113	327	1370	1280	706	580	642	241	89	e65
9	e150	e110	96	364	1460	1370	622	570	770	236	89	e70
10	e170	e110	184	378	1580	1380	560	540	760	236	87	e75
11	e180	e110	155	430	1670	1380	570	545	649	225	87	e75
12	e180	e105	145	435	1700	1380	545	525	556	222	85	e70
13	e170	e105	181	496	1780	1390	479	493	507	213	82	e70
14	e150	e100	175	594	1780	1300	424	574	479	211	82	e70
15	e140	e100	151	555	1690	1210	390	595	448	208	77	e70
16	e150	104	143	575	1660	1220	411	580	435	200	e62	e68
17	e160	105	137	653	1630	1200	469	560	412	179	e65	e68
18	e170	102	131	637	1620	1180	624	584	393	165	e70	e70
19	e165	94	133	610	1300	1160	770	610	375	151	e75	e70
20	e160	94	163	654	1090	1120	778	626	360	143	e85	e70
21	e155	93	143	688	996	1080	829	590	343	155	e90	e70
22	e150	96	111	659	966	1020	1620	580	336	139	e85	e70
23	e145	83	91	596	938	918	2490	555	320	131	e80	e68
24	e140	e90	105	590	903	786	2230	653	314	129	e75	e66
25	e135	e90	96	600	823	649	2020	734	307	133	e70	e68
26	e135	e90	107	631	855	536	1800	790	320	123	e60	e70
27	e130	e95	83	681	1300	424	1560	784	340	119	e58	e73
28	e130	e100	e55	847	1580	364	1370	766	320	117	e58	e75
29	e130	---	e65	1080	1540	360	1200	723	314	116	e57	e73
30	e125	---	e80	1350	1470	352	1120	711	301	109	e54	e68
31	e120	---	93	---	1460	---	1030	688	---	107	---	e64
TOTAL	4320	2921	3819	16337	45151	33309	28872	19797	14345	5896	2410	2193
MEAN	139	104	123	545	1456	1110	931	639	478	190	80.3	70.7
MAX	180	125	184	1350	1960	1850	2490	931	770	293	105	99
MIN	70	83	55	121	823	352	390	493	301	107	54	56
AC-FT	8570	5790	7570	32400	89560	66070	57270	39270	28450	11690	4780	4350

CAL YR 1987 TOTAL 179370 MEAN 491 MAX 2490 MIN 54 AC-FT 355800

e Estimated.

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

WATER-QUALITY RECORDS

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

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

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)
OCT								
28...	0900	442	20	1	175	8.0	5.5	659
DEC								
10...	1545	205	0	0	210	-4.0	0.0	656
FEB								
11...	1250	109	20	1	224	11.0	0.0	658
APR								
16...	1115	528	40	1	225	15.0	5.5	649
30...	1010	1320	--	--	190	19.0	9.0	--
JUN								
17...	0930	1250	10	1	162	14.0	11.0	658
30...	1520	363	--	--	191	20.0	17.0	--
AUG								
18...	1100	564	0	0	180	16.0	12.5	662
SEP								
01...	1845	641	--	--	172	24.0	18.0	--

DATE	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BICAR-BONATE WATER WHOLE IT-FLD (MG/L) (00450)	CAR-BONATE WATER WHOLE IT-FLD (MG/L) (00447)	ALKA-LINITY WH WAT TOTAL FIELD MG/L AS CACO3 (00410)
OCT							
28...	11.2	103	K1	K1	111	0	90
DEC							
10...	12.9	103	<1	<1	136	0	109
FEB							
11...	12.5	99	<1	K3	133	0	107
APR							
16...	11.2	104	K1	K3	131	0	104
30...	--	--	--	--	--	--	--
JUN							
17...	8.1	85	K2	K4	110	0	90
30...	--	--	--	--	--	--	--
AUG							
18...	9.3	101	K5	K2	--	--	93
SEP							
01...	--	--	--	--	--	--	--

DATE	TIME	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
OCT										
28...	0900	7.90	6.5	93	3	23	8.5	1.8	0.1	0.40
DEC										
10...	1545	7.70	0.60	100	0	26	9.1	2.3	0.1	0.30
FEB										
11...	1250	8.00	0.60	110	4	28	10	2.7	0.1	0.30
APR										
16...	1115	7.60	6.5	110	10	29	10	3.0	0.1	0.70
JUN										
17...	0930	8.30	2.4	79	0	20	7.1	1.1	0.1	0.30
AUG										
18...	1100	8.30	1.7	93	0	23	8.6	1.9	0.1	0.70

05020500 ST. MARY RIVER AT INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)
OCT 28...	89	6.9	0.40	<0.10	2.6	107	98	0.15	128	<0.010
DEC 10...	101	7.4	0.50	<0.10	3.1	111	110	0.15	61	<0.010
FEB 11...	111	7.4	0.50	<0.10	2.9	125	120	0.17	37	<0.010
APR 16...	111	11	0.10	<0.10	3.0	116	120	0.16	165	<0.010
JUN 17...	79	5.9	0.10	0.10	2.6	76	91	0.10	257	<0.010
AUG 18...	90	6.6	0.80	0.10	2.5	106	100	0.14	161	<0.010

DATE	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHORUS, TOTAL (MG/L AS P) (00665)	PHOSPHORUS, DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P) (00671)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 28...	<0.100	0.020	--	0.30	<0.010	0.030	<0.010	13	16	94
DEC 10...	<0.100	<0.010	<0.010	<0.20	<0.010	<0.010	<0.010	2	1.1	81
FEB 11...	<0.100	<0.010	<0.010	<0.20	0.020	0.010	<0.010	4	1.2	78
APR 16...	<0.100	<0.010	0.020	0.80	<0.010	0.010	<0.010	31	44	87
JUN 17...	<0.100	0.020	<0.010	0.70	0.020	0.010	<0.010	11	37	--
AUG 18...	<0.100	0.020	<0.010	0.30	0.010	<0.010	<0.010	6	9.1	88

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)
OCT 28...	0900	<10	<1	120	<0.5	<1	<1	<3	1	5	<5
FEB 11...	1250	<10	<1	130	<0.5	<1	3	<3	10	<3	<5
JUN 17...	0930	<10	<1	100	0.6	<1	3	<3	4	4	<5
AUG 18...	1100	10	<1	120	<0.5	<1	<1	<3	2	11	<5

DATE	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
OCT 28...	<4	<1	<0.1	<10	<1	<1	<1	65	<6	4
FEB 11...	6	<1	<0.1	<10	1	<1	<1	80	<6	4
JUN 17...	8	1	--	<10	<1	<1	<1	47	<6	4
AUG 18...	<4	1	<0.1	<10	<1	<1	<1	69	<6	3

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

LOCATION.--Lat 44°39'22", long 112°22'14", in NE¼SE¼SE¼ sec. 31, T.13 S., R.6 W., Beaverhead County, Hydrologic Unit 10020001, on right bank just downstream from Lima Reservoir, 7 mi northwest of Monida, and at mile 2,542.1.

DRAINAGE AREA.--570 mi^2.

PERIOD OF RECORD.--January 1911 to December 1918, April 1919, May 1925 to October 1933, April 1934 to September 1935, May 1936 to October 1938, May 1939 to September 1969, June 1974 to September 1982, April 1985 to current year (seasonal records only). No winter records 1974-1982. Monthly discharge only for some periods, published in WSP 1309. Prior to October 1950, published as "below Red Rock Reservoir".

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

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

REMARKS.--Estimated daily discharges: Oct. 30, 31. Seasonal records good. Flow regulated by Lima Reservoir (station number 06012000). No storage during 1934. Diversions for irrigation of about 10,000 acres upstream from reservoir. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

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

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

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

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 663 ft^3/s, Sept. 9, gage height, 3.62 ft; no flow May 1.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	131						5.8	43	469	328	96	524
2	131						5.8	49	473	327	96	642
3	131						5.8	50	474	325	96	631
4	130						5.8	50	478	324	96	630
5	130						5.9	50	475	322	96	630
6	130						5.9	50	479	321	133	636
7	129						6.4	50	480	320	153	640
8	129						6.4	56	479	319	152	642
9	130						6 3	112	479	307	152	644
10	130						6.3	116	447	273	152	645
11	131						15	116	431	246	159	638
12	131						42	114	416	193	222	602
13	130						51	113	382	136	263	233
14	130						50	186	381	134	310	53
15	130						50	393	382	134	339	48
16	130						51	616	382	133	336	43
17	130						51	596	382	133	336	44
18	131						51	469	381	96	335	44
19	131						51	530	381	73	333	42
20	131						51	528	380	60	331	39
21	131						51	481	379	49	336	35
22	131						51	449	378	49	340	32
23	130						50	460	377	49	338	31
24	131						50	512	375	49	336	31
25	130						50	539	374	49	335	33
26	129						50	535	372	49	337	36
27	130						51	535	371	81	336	41
28	131						51	534	349	100	337	44
29	130						51	529	331	98	210	43
30	e130						50	496	329	98	108	43
31	e130						---	468	---	98	254	---
TOTAL	4039						1028.4	9825	12266	5273	7453	8419
MEAN	130						34.3	317	409	170	240	281
MAX	131						51	616	480	328	340	645
MIN	129						5.8	43	329	49	96	31
AC-FT	8010						2040	19490	24330	10460	14780	16700

e Estimated

06015300 CLARK CANYON RESERVOIR NEAR GRANT, MT

LOCATION.--Lat 45°00'06", long 112°51'27", in SE¼SW¼ sec 32, T.9 S., R.10 W., Beaverhead County, Hydrologic Unit 10020001, in shaft house near left end of dam on Beaverhead River, 1.5 mi upstream from Clark Canyon Creek, 10 mi east of Grant, and at mile 2,483.9.

DRAINAGE AREA.--2,321 mi^2.

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

GAGE.--Water-stage recorder in shaft house. Datum of gage is referenced to National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

REMARKS.--Reservoir is formed by zoned earthfill dam with concrete control works and spillway completed in October 1964. Storage began Aug. 28, 1964 (uncontrolled storage began June 10, 1964). Usable capacity, 255,600 acre-ft between elevation 5,455.00 ft, invert of outlet works, and 5,560.40 ft, top of flood control. Dead storage, 1,509 acre-ft, below elevation 5,455.00 ft. Normal operating level, 177,500 acre-ft at elevation 5,546.00 ft. Minimum operating level, 1,450 acre-ft at elevation 5,470.60 ft. Figures given herein represent usable contents total contents published in previous water-supply papers and annual reports for May 1964 to September 1975. Water is used for irrigation, flood control, and recreation.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 283,000 acre-ft, June 25, 1984, elevation, 5,564.70 ft; minimum since normal operating level was reached, 58,960 acre-ft, Oct. 11, 1974, elevation, 5,516.80 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents at 2400, 169,000 acre-ft, Apr. 22-26, elevation, 5,544.63 ft; minimum, 123,300 acre-ft, Aug. 14, elevation, 5,535.07 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

Date	Elevation (feet)	Contents (acre-feet)	Change in Contents (acre-feet)
Sept. 30	5,538.13	137,300	---
Oct. 31	5,540.85	150,200	+ 12,900
Nov. 30	5,542.58	158,700	+ 8,500
Dec. 31	5,543.04	161,000	+ 2,300
CAL YR 1986			+ 31,500
Jan. 31	5,542.94	160,500	- 500
Feb. 28	5,543.07	161,100	+ 600
Mar. 31	5,544.02	165,900	+ 4,800
Apr. 30	5,544.50	168,400	+ 2,500
May 31	5,541.67	154,200	- 14,200
June 30	5,539.90	145,600	- 8,600
July 31	5,539.08	141,700	- 3,900
Aug. 31	5,536.74	130,800	- 10,900
Sept. 30	5,539.34	143,000	+ 12,200
WTR YR 1987			+ 5,700

06016000 BEAVERHEAD RIVER AT BARRETTS, MT

LOCATION.--Lat 45°06'59", long 112°44'59", in SE¼SW¼SE¼ sec.19, T.8 S., R.9 W., Beaverhead County, Hydrologic Unit 10020002, on left bank 1.4 mi upstream from Barretts, 2.2 mi downstream from Grasshopper Creek, 8.9 mi southwest of Dillon, and at mile 2,469.2.

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

PERIOD OF RECORD.--August 1907 to September 1986, October 1986 to September 1987 (seasonal records only). Monthly discharge only for some periods, published in WSP 1309. Prior to October 1963, published as "at Barratts".

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

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

REMARKS.--Estimated daily discharges: May 31 to June 4, 23-24, July 20-27, Aug. 21 to Sept. 15. Records good. Some regulation by Lima Reservoir (station number 06012000) and nearly complete regulation by Clark Canyon Reservoir (station number 06015300) since August 1964. Diversions for irrigation of about 90,000 acres above station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

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

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

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 1,030 ft^3/s, May 16, gage height, 2.42 ft; minimum daily, 236 ft^3/s, Mar. 29, but may have been less during period of doubtful gage-height record, Aug. 21 to Sept. 15.

Discharge, in cubic feet per second, 1988 water year

October 1987

1	329	8	256	15	209	22	215	29	221
2	332	9	232	16	210	23	220	30	221
3	334	10	223	17	209	24	220	31	223
4	334	11	222	18	210	25	221		
5	313	12	221	19	205	26	221		
6	284	13	209	20	172	27	221		
7	282	14	208	21	208	28	221		

TOTAL	7,406
MEAN	239
MAX	334
MIN	172
AC-FT	14,690

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	318					269	257	382	e360	415	628	e240
2	314					270	264	367	e390	455	634	e240
3	322					257	276	354	e430	546	659	e240
4	357					262	285	377	e470	558	674	e240
5	358					268	295	455	489	562	717	e240
6	356					285	294	542	531	593	726	e240
7	355					284	288	678	569	665	675	e240
8	355					297	282	772	606	683	651	e240
9	353					297	270	802	618	677	662	e240
10	355					287	263	858	534	655	647	e240
11	359					279	264	866	519	699	596	e240
12	354					268	264	889	500	620	562	e240
13	361					277	258	935	497	536	537	e240
14	376					271	262	972	502	530	540	e260
15	373					272	273	974	510	580	554	e280
16	370					267	283	998	520	623	568	286
17	365					264	290	986	527	671	508	283
18	366					269	298	815	546	623	445	282
19	365					265	310	605	550	484	399	279
20	367					254	293	563	515	e400	361	275
21	371					255	287	467	487	e360	e360	274
22	371					253	291	448	480	e360	e360	285
23	371					250	303	365	e460	e360	e360	307
24	371					252	316	322	e445	e390	e320	322
25	371					250	320	308	434	e420	e270	330
26	371					253	330	313	431	e440	e240	327
27	374					244	328	314	435	e480	e240	328
28	374					247	301	314	434	519	e240	329
29	376					236	321	311	430	591	e240	331
30	381					250	368	300	422	633	e240	333
31	380					253	---	e330	---	640	e240	---
TOTAL	11210					8205	8734	17982	14641	16768	14853	8231
MEAN	362					265	291	580	488	541	479	274
MAX	381					297	368	998	618	699	726	333
MIN	314					236	257	300	360	360	240	240
AC-FT	22240					16270	17320	35670	29040	33260	29460	16330

e Estimated

06018500 BEAVERHEAD RIVER NEAR TWIN BRIDGES, MT

LOCATION.--Lat 45°23'01", long 112°27'07", in SW¼NW¼SE¼ sec.22, T.5 S., R.7 W., Madison County, Hydrologic Unit 10020002, on left bank at downstream side of bridge on State Highway 41, 11.5 mi upstream from Ruby River, 12.7 mi southwest of Twin Bridges, 14.5 mi northeast of Dillon, and at mile 2,340.4.

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

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

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

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

REMARKS.--Estimated daily discharges: Feb. 25-27. Records good. Flow partly regulated by Lima Reservoir (station number 06012000 and Clark Canyon Reservoir (station number 06015300) since August 1964. Diversions upstream from station for irrigation of about 135,400 acres of which about 5,000 acres are irrigated by imported water from Birch and Willow Creeks and of which about 9,200 acres lies downstream from station including 600 acres in Ruby River drainage. Several observations of water temperature and specific conductance were made this year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--52 years, 431 ft^3/s, 312,300 acre-ft/yr.

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

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 633 ft^3/s, July 19, gage height, 5.50 ft; maximum gage height, 5.71 ft, Nov. 13; minimum discharge, 41 ft^3/s, May 12, 13, gage height, 3.10 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	508	553	515	441	429	418	408	135	213	112	103	299
2	513	548	511	460	430	419	418	154	215	106	85	294
3	503	545	490	451	432	414	433	153	192	101	83	293
4	513	549	474	454	432	420	447	142	131	86	78	294
5	532	550	491	460	431	432	460	118	94	82	76	290
6	538	562	509	458	414	457	468	108	89	82	97	269
7	524	565	517	449	413	478	460	85	77	73	113	272
8	520	564	508	423	414	462	448	70	106	97	109	284
9	526	531	455	409	415	470	426	76	118	103	110	252
10	519	487	449	402	416	463	408	71	139	98	103	246
11	531	517	436	426	417	454	432	62	123	172	118	236
12	531	502	476	438	419	442	446	48	114	337	127	240
13	527	524	462	434	422	444	443	45	117	291	131	248
14	541	529	486	401	427	460	388	45	113	231	139	239
15	548	537	476	397	422	444	371	51	98	203	188	227
16	546	537	476	405	425	444	371	71	113	182	265	194
17	538	539	450	409	421	439	362	207	111	222	282	188
18	532	536	440	427	428	444	352	341	105	527	271	173
19	535	537	452	420	423	458	381	253	119	563	232	185
20	532	543	447	383	415	437	384	251	110	412	255	194
21	533	562	436	413	413	433	380	321	95	338	228	193
22	536	567	467	395	418	433	352	446	119	316	203	171
23	536	555	467	418	416	429	347	414	108	290	220	156
24	536	558	453	415	393	429	317	334	111	243	238	146
25	537	558	461	422	e380	429	303	274	122	222	275	136
26	539	536	456	419	e380	431	298	268	124	216	306	142
27	540	530	439	418	e390	430	250	331	124	210	274	139
28	542	552	433	423	412	419	196	346	123	159	295	145
29	543	552	430	417	---	401	144	290	120	140	337	162
30	554	535	464	421	---	424	135	251	112	133	321	175
31	556	---	432	424	---	435	---	227	---	106	321	---
TOTAL	16509	16260	14458	13132	11647	13592	11028	5988	3655	6453	5983	6482
MEAN	533	542	466	424	416	438	368	193	122	208	193	216
MAX	556	567	517	460	432	478	468	446	215	563	337	299
MIN	503	487	430	383	380	401	135	45	77	73	76	136
AC-FT	32750	32250	28680	26050	23100	26960	21870	11880	7250	12800	11870	12860

CAL YR 1986 TOTAL 127705 MEAN 350 MAX 567 MIN 63 AC-FT 253300
WTR YR 1987 TOTAL 125187 MEAN 343 MAX 567 MIN 45 AC-FT 248300

e Estimated

06019500 RUBY RIVER ABOVE RESERVOIR, NEAR ALDER, MT

LOCATION.--Lat 45°10'31", long 112°08'52", in SW¼SW¼SW¼ sec.31, T.7 S., R.4 W., Madison County, Hydrologic Unit 10020003, on left bank at Puller Hot Springs, 0.4 mi upstream from Cottonwood Creek, 6 mi upstream from Ruby Dam, 10.5 mi south of Alder, and at mile 54.4.

DRAINAGE AREA.--538 mi^2.

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

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

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

REMARKS.--Estimated daily discharges: Dec. 17-21, Dec. 26 to Jan. 24, Feb. 26, Mar. 22. Records good except those for estimated daily discharges, which are fair. Diversion for irrigation of about 3,000 acres upstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--49 years, 182 ft^3/s, 131,900 acre-ft/yr.

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

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

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 17	0830	*629	*3.87	No peak greater than base discharge this year.			

Minimum discharge, 81 ft^3/s, Jan. 16, Mar. 29, gage height, 2.27 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	132	122	117	e90	99	99	106	405	233	105	139	123
2	133	118	120	e90	99	100	102	288	209	104	132	123
3	131	127	113	e92	100	100	108	217	189	102	128	125
4	126	129	112	e92	99	103	115	192	178	99	124	125
5	124	131	119	e94	99	108	122	194	157	99	123	127
6	123	134	125	e94	99	115	134	197	148	92	123	127
7	122	119	123	e94	99	118	128	195	154	89	121	121
8	119	122	122	e94	99	120	131	186	161	86	120	118
9	119	121	119	e92	99	114	114	177	148	88	114	114
10	120	115	120	e94	100	109	113	165	156	95	109	112
11	117	118	115	e98	100	108	119	161	158	178	105	112
12	110	121	117	e100	101	107	112	147	147	172	104	114
13	112	122	118	e98	101	111	108	141	133	146	109	114
14	114	132	112	e96	102	113	112	125	123	136	110	114
15	109	135	111	e94	101	107	125	111	117	123	134	107
16	109	134	108	e92	102	109	139	181	115	119	174	105
17	108	133	e105	e90	100	106	133	434	116	131	139	103
18	115	127	e100	e90	102	110	158	279	107	319	125	105
19	115	133	e100	e90	97	107	167	260	97	320	120	103
20	115	132	e100	e92	97	101	140	218	99	210	118	101
21	114	134	e98	e92	98	100	146	213	100	194	116	103
22	116	128	100	e92	100	e100	151	226	139	220	120	103
23	114	128	100	e94	101	101	191	193	136	186	127	103
24	113	129	101	e94	100	103	227	172	125	167	169	100
25	118	128	100	95	97	98	260	181	117	154	188	99
26	124	116	e98	96	e95	104	284	210	113	143	174	102
27	128	125	e98	98	96	102	317	219	105	143	151	107
28	135	127	e96	99	96	100	348	283	104	153	121	100
29	132	127	e96	98	---	89	405	270	102	165	136	85
30	135	121	e94	97	---	101	402	242	109	167	137	86
31	129	---	e92	99	---	105	---	216	---	151	130	---
TOTAL	3731	3788	3349	2920	2778	3268	5217	6698	4095	4656	4040	3281
MEAN	120	126	108	94.2	99.2	105	174	216	136	150	130	109
MAX	135	135	125	100	102	120	405	434	233	320	188	127
MIN	108	115	92	90	95	89	102	111	97	86	104	85
AC-FT	7400	7510	6640	5790	5510	6480	10350	13290	8120	9240	8010	6510

CAL YR 1986 TOTAL 65689 MEAN 180 MAX 1100 MIN 90 AC-FT 130300
WTR YR 1987 TOTAL 47821 MEAN 131 MAX 434 MIN 85 AC-FT 94850

e Estimated

06020600 RUBY RIVER BELOW RESERVOIR, NEAR ALDER, MT

LOCATION.--Lat 45°14'32", long 112°06'36", in SE¼SE¼NE¼ sec.8, T.7 S., R.4 W., Madison County, Hydrologic Unit 10020003, on right bank 0.2 mi downstream from Ruby Dam, 5.7 mi south of Alder, and at mile 47.8.

DRAINAGE AREA.--596 mi^2.

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

REVISED RECORDS.--1985 (M).

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

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

AVERAGE DISCHARGE.--24 years, 224 ft^3/s, 162,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,010 ft^3/s, May 16, 1984, gage height, 8.52 ft, from flood-mark; minimum, 1.4 ft^3/s, Dec. 5, 1974, dam closure, result of discharge measurement; minimum daily, 19 ft^3/s, Feb. 15-19, 1967.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 744 ft^3/s, May 13, gage height, 4.75 ft; minimum daily, 32 ft^3/s, on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	89	74	60	50	49	33	36	399	190	320	193	237
2	90	74	53	51	48	33	36	359	191	320	193	237
3	91	74	53	51	47	33	36	273	192	318	201	237
4	92	73	55	52	47	33	37	227	201	317	205	237
5	92	72	55	53	47	33	37	239	210	316	205	235
6	93	72	56	54	47	33	37	259	210	318	211	235
7	94	72	57	55	47	33	37	288	212	334	242	232
8	95	72	57	55	47	33	37	379	263	333	265	231
9	92	72	57	55	46	33	37	419	299	330	278	231
10	79	71	58	54	46	34	37	422	299	328	278	230
11	80	71	58	53	38	34	37	464	299	329	276	229
12	80	71	57	52	33	34	36	482	298	302	275	229
13	81	71	52	52	33	34	36	653	297	281	273	228
14	82	71	46	52	32	34	37	598	295	252	272	242
15	78	70	45	52	32	34	37	521	307	225	271	251
16	64	69	44	51	32	34	37	445	313	242	270	249
17	65	68	43	51	32	34	37	406	313	251	253	265
18	65	68	43	51	33	34	37	405	336	232	244	290
19	66	67	43	51	33	34	37	407	350	217	243	295
20	67	67	43	51	32	34	37	353	351	217	243	289
21	69	68	43	51	32	34	41	310	350	218	242	286
22	71	68	44	50	32	35	64	285	349	204	241	282
23	71	69	44	50	32	35	98	285	337	195	240	286
24	72	69	44	50	32	35	148	265	286	189	240	291
25	73	69	45	50	32	35	189	253	306	186	240	286
26	74	70	45	50	32	35	231	239	287	186	240	282
27	74	71	46	50	32	36	268	218	268	185	240	278
28	74	72	47	49	33	36	311	212	267	185	239	273
29	74	72	47	49	---	35	354	195	270	185	239	266
30	74	72	48	49	---	36	397	188	285	185	238	262
31	74	---	49	49	---	36	---	190	---	189	237	---
TOTAL	2435	2119	1537	1593	1058	1059	2836	10638	8431	7889	7527	7701
MEAN	78.5	70.6	49.6	51.4	37.8	34.2	94.5	343	281	254	243	257
MAX	95	74	60	55	49	36	397	653	351	334	278	295
MIN	64	67	43	49	32	33	36	188	190	185	193	228
AC-FT	4830	4200	3050	3160	2100	2100	5630	21100	16720	15650	14930	15270

CAL YR 1986 TOTAL 70776 MEAN 194 MAX 1110 MIN 43 AC-FT 140400
WTR YR 1987 TOTAL 54823 MEAN 150 MAX 653 MIN 32 AC-FT 108700

06025500 BIG HOLE RIVER NEAR MELROSE, MT

LOCATION.--Lat 45°31'36", long 112°42'03", in SE¼SE¼SW¼ sec.34, T.3 S., R.9 W., Madison County, Hydrologic Unit 10020004, on left bank 50 ft downstream from bridge, on U.S. Highway 91, 0.1 mi downstream from Rock Creek, 7 mi south of Melrose, and at mile 31.1.

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

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 5,032.87 ft above National Geodetic Vertical Datum of 1929. Prior to June 14, 1927, water-stage recorder, and July 17, 1927, to Sept. 30, 1931, nonrecording gage, at site 1.7 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Dec. 6 to Feb. 5, 20-28. Water-discharge records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 136,000 acres upstream from station.

AVERAGE DISCHARGE.--64 years, 1,162 ft^3/s, 841,900 acre-ft/yr.

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

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,550 ft^3/s, May 1, gage height, 3.40 ft; minimum, 137 ft^3/s, Sept. 16, gage height, 0.84 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	706	635	454	e310	e365	324	520	2420	1420	335	369	236
2	716	610	470	e315	e365	324	592	2280	1390	323	339	226
3	741	599	429	e315	e370	329	734	1930	1260	309	318	226
4	737	589	379	e320	e370	349	955	1610	1080	303	290	216
5	707	581	398	e320	e375	406	1300	1440	920	304	262	211
6	687	607	e385	e310	379	406	1450	1300	858	294	246	207
7	669	588	e360	e300	388	412	1410	1210	847	275	235	205
8	653	591	e340	e280	408	434	1300	1200	949	266	222	193
9	639	512	e330	e270	411	494	1130	1180	1210	281	209	177
10	636	371	e320	e260	409	671	916	1150	1310	321	193	172
11	638	309	e315	e260	401	757	905	1080	1220	409	178	165
12	634	374	e320	e270	400	733	875	969	1070	443	171	160
13	627	454	e330	e270	381	781	766	938	935	468	171	153
14	635	555	e340	e270	350	741	734	967	821	457	191	151
15	638	593	e350	e270	322	687	860	906	746	396	210	145
16	631	611	e340	e260	297	749	1130	923	706	346	222	144
17	626	610	e320	e250	305	725	1430	1220	665	388	225	146
18	614	542	e300	e255	345	733	1500	1260	672	603	224	150
19	613	551	e295	e260	364	643	1440	1200	765	702	227	151
20	615	579	e290	e270	e355	546	1180	1230	784	726	219	147
21	610	633	e290	e280	e340	532	1040	1280	724	697	206	150
22	599	617	e295	e290	e325	494	1130	1410	662	652	206	152
23	593	604	e300	e290	e315	494	1310	1460	617	601	208	151
24	614	627	e305	e290	e305	494	1540	1390	578	555	231	153
25	615	628	e305	e290	e300	494	1680	1250	534	520	279	161
26	612	535	e305	e300	e300	494	1790	1360	488	472	305	169
27	612	535	e300	e340	e305	482	1900	1670	434	433	291	175
28	617	581	e300	e370	e315	464	2010	1970	401	401	276	179
29	622	575	e300	e370	---	390	2050	1760	380	383	251	193
30	636	498	e300	e365	---	412	2170	1460	348	386	244	200
31	641	---	e305	e360	---	444	---	1340	---	394	232	---
TOTAL	19933	16694	10370	9180	9865	16438	37747	42763	24794	13443	7450	5264
MEAN	643	556	335	296	352	530	1258	1379	826	434	240	175
MAX	741	635	470	370	411	781	2170	2420	1420	726	369	236
MIN	593	309	290	250	297	324	520	906	348	266	171	144
AC-FT	39540	33110	20570	18210	19570	32600	74870	84820	49180	26660	14780	10440

CAL YR 1986 TOTAL 414300 MEAN 1135 MAX 8510 MIN 260 AC-FT 821800
WTR YR 1987 TOTAL 213941 MEAN 586 MAX 2420 MIN 144 AC-FT 424400

e Estimated

06025500 BIG HOLE RIVER NEAR MELROSE, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1956-57, 1960-64, 1977 to current year.
PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: August 1956 to September 1957, August 1960 to September 1964, June 1977 to current year.
INSTRUMENTATION.--Temperature recorder since June 22, 1977.
EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum, 23.0°C, July 17, 1961, Aug. 6, 1983, July 20, 1985; minimum, 0.0°C on many days during winter periods.
SEDIMENT CONCENTRATION (water years 1956-57, 1960-64): Maximum daily mean, 200 mg/L, June 29, 1961; minimum daily mean, 1 mg/L, on many days in 1960-64.
SEDIMENT LOAD (water years 1956-57, 1960-64): Maximum daily, 4,300 tons, June 9, 1964; minimum daily, less than 0.5 ton on several days in 1961.
EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 22.5°C, Jul. 14; minimum, 0.0°C on many days during winter period.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
NOV 18...	1445	532	167	11.0	0.5
JAN 13...	1105	272	215	3.0	0.0
FEB 17...	1435	389	194	3.5	0.5
MAR 31...	0915	508	191	1.0	2.5
MAY 11...	1615	1120	112	20.5	16.0
JUN 26...	0800	--	224	14.0	14.0
AUG 04...	1430	295	218	29.0	18.5
SEP 23...	1130	158	283	12.0	11.5

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	9.5	7.0	8.0	5.0	2.5	4.0	.5	.0	.0	.0	.0	.0
2	8.0	6.5	7.5	4.5	1.5	3.0	.5	.0	.0	.0	.0	.0
3	8.5	5.0	7.0	5.0	2.0	3.5	.0	.0	.0	.0	.0	.0
4	8.5	5.5	7.0	5.5	2.0	4.0	.0	.0	.0	.0	.0	.0
5	11.0	6.5	8.5	5.5	3.0	4.5	.0	.0	.0	.0	.0	.0
6	11.5	7.5	9.5	5.0	3.0	4.0	1.0	.0	.5	.0	.0	.0
7	11.5	7.5	9.5	3.0	1.5	2.5	.5	.0	.0	.0	.0	.0
8	11.0	8.0	9.5	1.5	.0	.5	.0	.0	.0	.0	.0	.0
9	11.0	7.0	9.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10	9.0	6.0	7.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11	7.5	4.0	5.5	.5	.0	.0	.0	.0	.0	.0	.0	.0
12	7.0	3.0	5.0	.5	.0	.0	.0	.0	.0	.0	.0	.0
13	7.5	3.5	5.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	8.0	4.0	6.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
15	8.0	4.0	6.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16	8.5	4.0	6.5	.5	.0	.0	.0	.0	.0	.0	.0	.0
17	8.0	4.0	6.0	1.5	.0	.5	.0	.0	.0	.0	.0	.0
18	7.5	4.5	6.0	1.0	.0	.5	.0	.0	.0	.0	.0	.0
19	8.5	5.0	7.0	2.0	.5	1.0	.0	.0	.0	.0	.0	.0
20	8.0	4.5	6.5	2.5	.5	1.5	.0	.0	.0	.0	.0	.0
21	8.0	4.5	6.5	3.0	1.5	2.5	.0	.0	.0	.0	.0	.0
22	8.0	4.0	6.0	1.0	.0	.5	.0	.0	.0	.0	.0	.0
23	7.5	3.5	5.5	1.5	.0	1.0	.0	.0	.0	.0	.0	.0
24	7.5	3.5	5.5	3.5	1.5	2.5	.0	.0	.0	1.0	.0	.5
25	8.0	4.5	6.0	2.0	.0	1.0	.0	.0	.0	1.5	1.0	1.0
26	7.0	4.5	6.0	.5	.0	.5	.0	.0	.0	.5	.0	.0
27	6.0	5.0	5.5	2.5	.5	1.5	.0	.0	.0	.5	.0	.5
28	6.5	3.5	5.0	2.0	1.0	1.5	.0	.0	.0	.5	.0	.5
29	6.5	4.0	5.0	2.0	.5	1.5	.0	.0	.0	.0	.0	.0
30	6.5	4.5	5.5	.5	.0	.0	.0	.0	.0	.0	.0	.0
31	5.0	3.5	4.5	---	---	---	.0	.0	.0	.0	.0	.0
MONTH	11.5	3.0	6.56	5.5	.0	1.40	1.0	.0	.016	1.5	.0	.081

BIG HOLE RIVER BASIN

06025500 BIG HOLE RIVER NEAR MELROSE, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	.5	.0	.0	3.0	.0	1.5	8.5	4.0	6.0	11.5	9.5	10.5
2	.5	.0	.0	3.0	.5	2.0	8.5	2.5	5.5	10.5	8.0	9.0
3	.5	.0	.5	4.0	.5	2.5	8.5	3.0	5.5	11.0	7.0	9.0
4	.5	.0	.5	4.5	1.0	3.0	8.0	3.5	5.5	13.5	8.5	11.0
5	.5	.0	.0	5.0	2.0	3.5	7.0	3.5	5.5	15.0	10.5	12.5
6	.5	.0	.0	5.0	3.0	4.0	6.0	3.0	4.5	16.5	11.5	14.0
7	.5	.0	.0	5.5	3.0	4.0	7.0	3.5	5.0	17.0	12.5	14.5
8	.0	.0	.0	4.5	2.5	3.5	5.5	4.0	5.0	15.5	13.0	14.0
9	.0	.0	.0	4.0	1.0	2.5	7.0	2.0	4.0	15.0	13.0	14.0
10	.0	.0	.0	3.5	1.0	2.0	7.0	2.5	5.0	16.0	12.0	14.0
11	.5	.0	.0	4.0	1.0	2.5	9.0	5.0	7.0	17.0	11.5	14.0
12	.0	.0	.0	4.5	1.5	3.0	7.0	3.5	5.0	15.5	12.0	13.5
13	.0	.0	.0	3.5	2.0	3.0	9.0	2.5	5.5	17.0	12.0	14.5
14	.0	.0	.0	4.0	1.0	2.5	11.0	4.5	7.5	17.5	12.0	14.5
15	.5	.0	.0	5.0	1.0	3.0	11.5	6.0	8.5	16.5	13.0	15.0
16	1.5	.0	.5	4.0	2.5	3.5	12.0	7.5	9.5	14.5	11.5	13.5
17	1.5	.5	1.0	5.0	1.5	3.5	10.5	8.5	9.5	11.5	10.0	10.5
18	1.5	.0	1.0	4.5	2.5	3.5	8.5	5.0	7.5	11.5	9.0	10.0
19	1.0	.0	.5	3.5	1.5	2.5	7.5	4.0	5.5	12.0	9.5	10.5
20	1.0	.0	.5	4.5	.0	2.0	9.0	3.5	6.0	10.0	7.5	8.5
21	1.5	.0	.5	3.5	1.0	2.0	11.5	5.5	8.5	9.5	5.0	7.0
22	1.0	.0	.5	4.5	.0	2.5	12.5	8.0	10.5	11.5	7.5	9.0
23	.5	.0	.5	6.5	2.0	4.0	13.5	9.5	11.0	13.5	9.0	10.5
24	.5	.0	.5	6.5	2.0	4.0	13.5	9.5	11.5	13.5	10.0	11.5
25	.5	.0	.5	6.5	1.0	4.0	13.5	10.5	12.0	15.5	11.5	13.0
26	.5	.0	.5	4.5	3.0	4.0	14.0	10.5	12.0	15.0	11.0	13.0
27	.5	.0	.5	4.5	1.5	3.0	14.0	11.0	12.5	13.0	11.0	12.0
28	1.0	.0	.5	2.5	.0	1.0	13.0	11.5	12.5	13.0	11.0	12.0
29	---	---	---	2.0	.0	.5	13.5	11.0	12.0	15.0	11.0	13.0
30	---	---	---	6.0	.0	3.0	13.0	10.5	12.0	14.0	12.5	13.0
31	---	---	---	9.0	3.0	5.5	---	---	---	13.0	11.5	12.0
MONTH	1.5	.0	.30	9.0	.0	2.94	14.0	2.0	7.92	17.5	5.0	12.0

	JUNE			JULY			AUGUST			SEPTEMBER		
1	12.0	9.5	11.0	21.5	16.0	18.5	21.0	15.0	18.0	19.0	14.5	17.0
2	13.0	8.0	10.0	19.5	15.5	17.5	21.0	14.5	17.5	17.5	14.5	16.0
3	15.0	9.5	12.0	21.0	14.5	17.5	20.5	13.5	17.0	16.0	13.0	14.5
4	18.0	12.0	15.0	20.0	15.0	17.5	21.0	14.5	17.5	16.5	12.0	14.0
5	17.0	14.0	15.5	18.5	15.0	16.5	21.5	15.5	18.5	17.0	11.0	14.0
6	17.5	13.5	15.5	18.0	13.0	15.5	19.5	15.0	17.5	16.5	12.0	14.5
7	16.5	13.5	15.0	17.5	13.5	15.5	20.0	14.0	17.0	17.0	11.5	14.5
8	19.0	14.0	16.0	17.0	14.0	15.5	21.0	14.5	18.0	17.0	12.0	14.5
9	17.5	15.0	16.0	17.0	14.0	15.0	20.5	15.5	18.5	17.0	11.5	14.5
10	17.0	14.0	15.5	14.0	11.5	13.0	20.0	15.0	17.5	17.5	12.5	15.0
11	18.0	14.0	16.0	15.5	10.5	12.5	20.0	14.5	17.0	17.5	12.5	15.0
12	19.0	14.0	16.0	19.0	11.0	15.0	18.0	13.0	16.0	17.5	12.0	15.0
13	20.5	13.5	16.5	21.0	13.5	17.0	17.5	13.5	15.5	16.5	12.5	14.5
14	21.0	15.5	18.0	22.5	15.0	18.5	16.5	12.5	14.5	17.0	12.0	14.5
15	18.5	16.0	17.0	20.0	16.0	18.0	16.0	12.5	14.0	16.5	13.0	15.0
16	18.5	14.0	16.0	20.5	15.5	17.5	17.0	12.5	15.0	14.0	11.0	12.5
17	17.5	13.0	15.0	16.5	11.5	13.5	18.0	11.5	14.5	12.5	8.5	10.5
18	16.0	12.5	14.5	13.0	10.5	11.5	18.5	12.0	15.0	13.5	8.5	11.0
19	15.5	11.5	13.5	14.5	10.5	12.5	19.0	12.5	16.0	14.5	9.5	12.5
20	18.0	11.5	14.5	17.0	10.5	14.0	20.0	14.0	17.0	15.5	10.0	13.0
21	18.0	14.0	16.0	15.0	13.5	14.5	18.5	14.0	16.5	15.5	10.5	13.0
22	18.0	13.0	15.5	18.0	12.5	15.0	19.0	13.5	16.5	16.0	10.5	13.5
23	16.5	12.0	14.5	19.5	13.0	16.0	18.5	14.5	16.5	16.5	11.0	13.5
24	18.5	11.0	14.5	22.0	14.5	18.0	16.0	14.0	15.0	16.0	12.0	14.0
25	19.5	12.5	16.0	21.5	16.0	18.5	16.0	13.0	14.5	15.0	11.5	13.5
26	21.5	14.0	18.0	22.0	15.5	19.0	17.5	11.0	14.0	14.0	12.0	13.0
27	21.0	15.5	18.0	22.0	17.0	19.5	16.5	12.0	14.5	13.5	10.0	11.5
28	20.5	16.0	18.0	21.5	16.5	19.0	17.5	12.0	15.0	13.0	8.0	10.5
29	21.0	15.0	18.0	19.5	17.0	18.5	18.5	13.0	16.0	13.5	8.5	11.0
30	21.0	15.5	18.5	21.5	15.0	18.5	19.0	13.5	16.0	14.0	9.0	11.5
31	---	---	---	21.5	16.0	18.5	20.0	14.0	17.0	---	---	---
MONTH	21.5	8.0	15.5	22.5	10.5	16.4	21.5	11.0	16.2	19.0	8.0	13.6

06033000 BOULDER RIVER NEAR BOULDER, MT

LOCATION.--Lat 46°12'40", long 112°05'27", in SE¼NE¼SW¼ sec. 3, T.5 N., R.4 W., Jefferson County, Hydrologic Unit 10020006, on left bank 40 ft downstream from county bridge, 1.1 mile downstream of Muskrat Creek, 2.0 mi southeast of Boulder, and at mile 44.1.

DRAINAGE AREA.--381 mi^2.

PERIOD OF RECORD.--April 1929 to December 1932, March 1934 to September 1972, October 1984 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1279: 1931.

GAGE.--Water-stage recorder. Elevation of gage is 4,810 ft, by barometer. Prior to Aug. 29, 1946, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Jan. 14-17, Feb. 26. Records good. Diversions for irrigation of about 3,500 acres upstream 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.--44 years (1930-32, 1935-72, 1985-87) 120 ft^3/s, 86,940 acre-ft/yr.

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

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

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

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 30	0130	510	6.69	May 28	1030	*687	*7.02

Minimum discharge, 15 ft^3/s, Jan. 20, gage height, 4.79 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	72	50	40	24	27	30	58	441	366	41	59	24
2	70	46	46	23	27	31	54	384	299	43	50	22
3	68	49	41	23	28	33	80	315	259	59	45	22
4	65	47	32	24	29	38	134	275	225	54	43	22
5	66	45	38	24	29	43	183	255	193	60	39	23
6	68	49	40	25	30	52	216	237	184	52	36	22
7	67	46	39	26	30	55	182	216	171	47	39	23
8	65	35	39	26	31	51	163	203	210	45	36	24
9	64	24	37	24	31	46	104	188	204	51	33	23
10	64	22	33	22	31	71	84	173	237	109	30	22
11	63	24	33	21	31	73	94	152	173	207	28	22
12	58	30	33	20	32	60	79	135	146	134	28	19
13	59	34	35	20	32	70	68	144	131	99	28	17
14	59	38	35	e19	33	68	76	124	112	79	35	17
15	58	40	35	e19	32	69	108	109	101	64	42	18
16	57	41	33	e18	32	81	157	113	104	59	44	22
17	55	42	32	e18	32	68	209	167	98	88	45	22
18	55	39	29	17	32	69	186	156	109	326	37	22
19	54	41	27	17	31	60	144	159	121	242	34	21
20	54	44	25	17	30	49	119	176	107	161	31	21
21	54	49	24	16	32	47	137	162	89	126	30	21
22	53	47	24	17	32	51	166	164	81	114	30	21
23	50	46	24	17	31	48	221	197	76	118	29	20
24	48	50	26	17	31	44	257	177	71	106	30	18
25	47	48	27	18	30	43	300	217	58	86	36	17
26	47	38	28	19	e28	49	337	306	54	74	42	17
27	48	51	28	21	29	41	364	331	50	66	38	17
28	50	49	27	21	29	36	415	592	46	66	33	19
29	50	48	26	23	---	28	450	436	45	69	30	19
30	50	35	25	23	---	48	461	334	43	69	28	19
31	53	---	25	25	---	56	---	338	---	67	26	---
TOTAL	1791	1247	986	644	852	1608	5606	7376	4163	2981	1114	616
MEAN	57.8	41.6	31.8	20.8	30.4	51.9	187	238	139	96.2	35.9	20.5
MAX	72	51	46	26	33	81	461	592	366	326	59	24
MIN	47	22	24	16	27	28	54	109	43	41	26	17
AC-FT	3550	2470	1960	1280	1690	3190	11120	14630	8260	5910	2210	1220

CAL YR 1986 TOTAL 47861 MEAN 131 MAX 1020 MIN 21 AC-FT 94930
WTR YR 1987 TOTAL 28984 MEAN 79.4 MAX 592 MIN 16 AC-FT 57490

e Estimated

06035000 WILLOW CREEK NEAR HARRISON, MT

LOCATION.--Lat 46°43'23", long 111°44'25", in SE¼SW¼NW¼ sec.28, T.1 S., R.1 W., Madison County, Hydrologic Unit 10020005, on right bank 2.2 mi upstream from Willow Creek Dam, 2.5 mi northeast of Harrison, and at mile 13.6.

DRAINAGE AREA.--83.8 mi^2.

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

REVISED RECORDS.--WSP 1559: Drainage area.

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

REMARKS.--Seasonal records good. Diversions for irrigation of about 12,500 acres of which 3,500 acres is in Norwegian Creek drainage. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 813 ft^3/s, Feb. 3, 1963, gage height, 4.24 ft, from floodmarks, from rating curve extended above 300 ft^3/s; minimum, 1.4 ft^3/s, Sept. 17, 1956, gage height, 0.39 ft.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 265 ft^3/s, July 18, gage height, 2.45 ft; minimum, 3.1 ft^3/s, May 12-14, gage height, 0.39 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34						33	113	151	11	57	58
2	44						32	98	113	7.1	49	57
3	41						33	86	95	6.5	44	56
4	39						35	73	88	5.8	40	56
5	46						38	56	87	5.1	33	55
6	44						41	34	96	6.2	29	55
7	41						42	17	110	8.2	40	58
8	39						44	6.9	167	11	31	56
9	42						42	5.0	154	15	27	53
10	40						40	3.9	149	37	25	51
11	37						39	4.0	127	155	23	51
12	35						37	3.5	110	86	22	48
13	38						36	3.1	98	55	25	47
14	41						34	3.4	95	50	27	47
15	44						35	3.5	94	41	42	45
16	43						40	17	93	34	55	45
17	41						45	120	81	95	38	46
18	42						51	85	62	240	31	46
19	42						53	50	65	181	28	45
20	40						50	77	58	140	28	44
21	39						47	71	43	134	28	43
22	38						49	72	84	129	33	42
23	37						55	53	60	115	39	41
24	38						56	41	49	106	47	32
25	38						61	57	37	99	86	30
26	37						65	133	31	92	67	28
27	39						68	163	24	81	57	31
28	40						81	162	24	67	51	29
29	39						94	145	23	67	47	26
30	40						104	125	16	78	52	21
31	38						---	141	---	62	60	---
TOTAL	1236						1480	2022.3	2484	2219.9	1261	1342
MEAN	39.9						49.3	65.2	82.8	71.6	40.7	44.7
MAX	46						104	163	167	240	86	58
MIN	34						32	3.1	16	5.1	22	21
AC-FT	2450						2940	4010	4930	4400	2500	2660

06036650 JEFFERSON RIVER NEAR THREE FORKS, MT

LOCATION.--Lat 45°53'52", long 111°35'45", in SW¼SW¼NW¼ sec.27, T.2 N., R.1 E., Broadwater County, Hydrologic Unit 10020005, on left bank 50 ft downstream from bridge on U.S. Highway 10, 2.5 mi northwest of Three Forks, and at mile 2,329.3.

DRAINAGE AREA.--9,532 mi^2.

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

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

REMARKS.--Estimated daily discharges: Nov. 10-21, Dec. 6 to Mar. 4. Records good except those for estimated daily discharges, 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 Ruby River Reservoir (station number 06020500) and Clark Canyon Reservoir (station number 06015300). Diversions for irrigation of about 390,000 acres upstream from station.

AVERAGE DISCHARGE.--9 years, 2,421 ft^3/s, 1,754,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,900 ft^3/s, May 24, 1981, gage height recorded, 8.06 ft, 8.21 ft, from floodmark; maximum gage height, 9.39 ft, Dec. 10, 1980 (ice jam); minimum discharge, 249 ft^3/s, July 30, 31, 1985, gage height, 1.66 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,610 ft^3/s, May 29, gage height, 4.67 ft; maximum gage height, 7.60 ft, Dec. 12 (ice jam); minimum discharge, 359 ft^3/s, Aug. 11, 12, gage height, 1.98 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2110	1960	1650	e1200	e1400	e1200	1380	2720	2670	517	627	986
2	2150	1950	1600	e1200	e1400	e1300	1400	2840	2620	466	627	955
3	2160	1940	1550	e1300	e1500	e1300	1480	2750	2420	440	592	914
4	2150	1910	1550	e1300	e1500	e1300	1590	2340	2220	534	516	915
5	2150	1910	1530	e1300	e1500	1340	1810	1870	1880	697	473	954
6	2160	1950	e1500	e1300	e1500	1410	2180	1490	1640	639	434	931
7	2140	1940	e1400	e1200	e1400	1490	2450	1220	1450	552	428	907
8	2130	1940	e1400	e1100	e1400	1480	2460	1000	1480	488	409	872
9	2080	1880	e1400	e1100	e1400	1450	2350	857	1540	437	403	865
10	2050	e1500	e1200	e1100	e1400	1470	2180	753	1690	426	389	847
11	2040	e1400	e1200	e1100	e1400	1610	1950	719	1880	624	374	788
12	2030	e1400	e1100	e1200	e1400	1720	1840	697	1780	855	364	768
13	2030	e1500	e1100	e1200	e1400	1720	1820	643	1620	1040	371	743
14	2020	e1600	e1200	e1200	e1400	1770	1740	575	1460	1010	370	710
15	2020	e1700	e1200	e1100	e1400	1750	1640	560	1300	915	391	696
16	2030	e1900	e1200	e1000	e1400	1680	1650	593	1230	786	441	697
17	2020	e1900	e1200	e800	e1400	1700	1860	827	1170	730	517	695
18	2030	e2000	e1200	e900	e1400	1710	2130	1450	1110	1030	597	661
19	2010	e2000	e1200	e1000	e1400	1750	2320	1910	1060	1890	619	669
20	1990	e1900	e1200	e1000	e1300	1680	2360	2040	1100	2110	605	660
21	1990	e1900	e1200	e1100	e1300	1560	2160	2150	1150	1850	596	704
22	1980	1860	e1100	e1100	e1300	1490	1970	2480	1200	1780	603	711
23	1960	1850	e1200	e1200	e1300	1460	1930	2660	1200	1640	604	704
24	1950	1840	e1300	e1200	e1200	1450	2070	2530	1110	1490	660	657
25	1950	1840	e1300	e1200	e1200	1420	2280	2430	996	1340	791	644
26	1950	1820	e1300	e1300	e1100	1420	2450	2420	917	1190	964	631
27	1940	1770	e1200	e1300	e1100	1410	2560	2620	884	1090	1070	648
28	1940	1740	e1100	e1300	e1100	1410	2640	3080	767	950	1040	648
29	1940	1750	e1100	e1400	---	1320	2660	3530	671	809	1010	712
30	1950	1740	e1100	e1400	---	1320	2650	3180	588	728	1010	737
31	1950	---	e1100	e1400	---	1350	---	2790	---	671	996	---
TOTAL	63000	54290	39580	36500	37900	46440	61960	57724	42803	29724	18891	23029
MEAN	2032	1810	1277	1177	1354	1498	2065	1862	1427	959	609	768
MAX	2160	2000	1650	1400	1500	1770	2660	3530	2670	2110	1070	986
MIN	1940	1400	1100	800	1100	1200	1380	560	588	426	364	631
AC-FT	125000	107700	78510	72400	75170	92110	122900	114500	84900	58960	37470	45680

CAL YR 1986 TOTAL 780783 MEAN 2139 MAX 9310 MIN 504 AC-FT 1549000
WTR YR 1987 TOTAL 511841 MEAN 1402 MAX 3530 MIN 364 AC-FT 1015000

e Estimated

06036905 FIREHOLE RIVER NEAR WEST YELLOWSTONE, MT

LOCATION.--Lat 44°37'13", long 110°51'44", Yellowstone National Park, Hydrologic Unit 10020007, on right bank 1.6 mi south of Madison Junction, 12 mi east of West Yellowstone, and at mile 1.8.

DRAINAGE AREA.--282 mi^2.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Elevation of gage is 7,050 ft, from topographic map.

REMARKS.--Water-discharge records excellent. No regulation or diversions upstream from station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,520 ft^3/s, May 31, 1986, gage height, 5.48 ft; minimum, 255 ft^3/s, Feb. 8, 1986, gage height, 3.03 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 598 ft^3/s, Apr. 26, gage height, 3.96 ft; minimum, 236 ft^3/s, Sept. 26, gage height, 2.93 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	370	328	307	293	298	287	278	533	334	260	250	245
2	369	323	307	299	293	286	279	467	311	256	250	246
3	357	328	303	297	308	286	285	388	298	260	250	245
4	351	326	304	305	303	289	292	365	292	255	250	251
5	348	329	310	307	296	295	306	371	285	250	250	256
6	345	349	318	304	295	301	318	385	292	246	251	248
7	348	330	312	301	297	321	318	399	318	247	257	246
8	346	325	310	294	296	340	324	389	325	250	257	245
9	341	322	295	292	297	319	308	372	304	257	250	244
10	338	311	301	292	296	308	301	350	300	270	250	243
11	332	319	301	296	296	309	328	335	313	303	251	244
12	331	323	301	298	293	301	306	325	288	271	248	244
13	333	325	301	296	295	310	294	320	278	258	249	242
14	331	334	305	293	309	307	304	310	275	254	252	243
15	332	332	307	292	297	298	328	301	275	251	254	242
16	331	332	303	283	291	298	349	305	272	249	273	241
17	331	339	296	291	288	293	375	353	268	292	253	241
18	332	330	296	294	291	300	383	410	268	393	249	241
19	332	345	298	289	286	295	363	416	269	292	248	242
20	332	330	299	284	281	285	321	408	278	269	248	241
21	336	346	295	291	289	286	328	368	266	290	245	240
22	333	332	297	288	289	285	357	329	270	305	248	241
23	329	329	298	292	290	280	388	306	266	267	254	240
24	328	330	299	293	286	280	457	304	267	261	263	244
25	327	326	297	294	287	278	481	313	259	259	258	243
26	327	314	296	295	282	281	499	344	258	259	258	240
27	327	320	293	298	282	277	490	399	256	261	250	242
28	327	323	291	309	285	274	485	447	258	267	248	243
29	326	325	289	298	---	265	480	388	260	273	246	242
30	353	315	294	295	---	275	470	335	261	270	246	241
31	338	---	292	303	---	279	---	335	---	257	247	---
TOTAL	10481	9840	9315	9156	8196	9088	10795	11370	8464	8352	7803	7306
MEAN	338	328	300	295	293	293	360	367	282	269	252	244
MAX	370	349	318	309	309	340	499	533	334	393	273	256
MIN	326	311	289	283	281	265	278	301	256	246	245	240
AC-FT	20790	19520	18480	18160	16260	18030	21410	22550	16790	16570	15480	14490

CAL YR 1986 TOTAL 146750 MEAN 402 MAX 1240 MIN 277 AC-FT 291100
WTR YR 1987 TOTAL 110166 MEAN 302 MAX 533 MIN 240 AC-FT 218500

MADISON RIVER BASIN

06036905 FIREHOLE RIVER NEAR WEST YELLOWSTONE, MT--Continued

WATER QUALITY RECORDS

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

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

INSTRUMENTATION.--Water-quality monitor since Aug. 30, 1983.

REMARKS.--No temperature record Jan. 17 to Feb. 24, Sep. 9-12, 14, 18-30.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1983-86):. Maximum, 560 microsiemens, Nov. 16, Mar. 21, 1986; minimum, 140 microsiemens, Jun. 5, 1986.
WATER TEMPERATURE:. Maximum, 28.0°C, June 14, July 30, 31, 1987; minimum, 1.0°C, Dec. 24, 1983, Feb. 1, 1985.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE:. Maximum, 28.0°C, Jun. 14, July 30, 31; minimum observed, 3.0°C, Jan. 16.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT					
08...	1100	351	421	6.0	14.0
NOV					
18...	1030	--	460	-5.0	9.0
JAN					
06...	1145	312	474	-5.0	9.5
FEB					
18...	1050	--	494	-18.0	9.5
APR					
03...	0835	283	498	2.0	10.5
MAY					
19...	0930	--	368	--	--
JUN					
09...	1330	--	433	--	20.5
30...	1145	256	499	19.0	22.0
AUG					
18...	1230	250	531	22.0	19.0

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	15.5	13.5	14.5	14.0	10.5	12.0	10.0	7.5	8.5	9.5	6.5	8.0
2	14.0	13.0	13.5	14.0	10.0	12.0	10.0	7.0	8.5	11.0	9.0	10.0
3	16.5	12.0	14.0	15.0	11.0	12.5	10.0	7.0	8.5	10.5	8.5	9.5
4	14.5	12.5	13.5	14.0	11.0	12.5	10.5	7.5	9.0	11.5	10.5	11.0
5	18.0	14.0	15.5	13.0	11.5	12.5	12.5	10.0	11.5	11.5	9.5	10.5
6	18.5	13.0	16.0	12.0	9.0	10.5	12.5	10.5	12.0	10.5	9.0	9.5
7	18.0	13.5	16.0	11.5	8.5	9.5	11.5	9.5	10.5	9.5	8.0	9.0
8	17.5	13.5	15.5	10.0	8.5	9.0	10.5	8.0	9.5	8.5	6.5	7.5
9	17.0	13.0	15.0	9.5	7.5	8.5	8.0	5.5	6.5	8.0	6.0	7.0
10	15.0	10.5	13.0	8.5	5.5	7.0	8.5	5.5	7.0	8.0	5.0	6.5
11	13.5	9.0	11.5	8.0	7.5	8.0	8.0	6.0	7.0	10.0	6.5	8.0
12	15.0	9.5	12.0	9.5	7.0	8.0	8.5	6.0	7.5	11.0	8.0	9.5
13	15.5	10.5	13.0	11.5	7.5	9.5	9.5	6.5	8.0	10.0	8.0	9.0
14	15.5	11.0	13.5	12.0	11.0	11.5	10.5	8.5	9.5	8.0	5.5	7.0
15	16.5	11.0	14.0	11.5	10.0	10.5	11.5	9.5	10.5	7.5	5.0	6.0
16	16.0	11.5	14.0	10.5	8.5	9.5	10.5	8.0	9.0	7.0	3.0	5.0
17	15.5	11.5	14.0	10.0	9.0	9.5	9.0	7.0	8.0	---	---	---
18	15.0	13.0	14.0	12.0	8.0	10.0	8.5	6.0	7.5	---	---	---
19	16.5	13.0	14.5	11.5	10.0	10.5	9.0	6.5	7.5	---	---	---
20	16.5	13.0	15.0	12.0	9.5	11.0	11.0	9.0	10.0	---	---	---
21	18.0	15.0	16.0	12.0	10.5	11.5	9.0	7.0	8.5	---	---	---
22	16.5	13.0	15.0	11.0	8.5	10.0	10.0	7.5	9.0	---	---	---
23	16.5	11.5	14.0	10.0	9.0	9.5	11.0	9.5	10.0	---	---	---
24	16.5	12.5	14.5	11.5	10.0	10.5	11.0	8.5	9.5	---	---	---
25	16.5	12.5	14.5	11.5	9.0	10.5	10.5	8.5	10.0	---	---	---
26	16.0	12.5	14.5	10.0	7.0	9.0	9.0	7.5	8.5	---	---	---
27	15.5	13.0	14.0	11.5	8.5	10.0	8.5	7.0	8.0	---	---	---
28	15.0	12.0	13.5	11.0	10.0	10.5	8.5	6.0	7.5	---	---	---
29	15.0	12.0	13.5	12.5	10.5	11.5	9.0	6.0	7.5	---	---	---
30	14.0	11.0	13.0	10.5	8.5	9.5	9.5	7.0	8.5	---	---	---
31	14.0	10.5	12.0	---	---	---	9.0	6.5	7.5	---	---	---
MONTH	18.5	9.0	14.1	15.0	5.5	10.2	12.5	5.5	8.73	---	---	---

MADISON RIVER BASIN

06036905 FIREHOLE RIVER NEAR WEST YELLOWSTONE, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	10.5	8.0	9.0	16.5	11.0	13.5	15.5	11.0	13.5
2	---	---	---	13.5	9.0	11.0	18.0	9.0	13.5	14.0	11.5	13.0
3	---	---	---	14.0	9.5	12.0	18.5	10.0	14.0	18.5	10.0	14.0
4	---	---	---	16.0	10.0	13.0	19.5	11.0	15.5	20.5	12.5	16.5
5	---	---	---	15.0	10.5	13.0	20.0	12.0	16.0	21.0	13.5	17.5
6	---	---	---	14.0	12.0	13.0	17.5	13.0	15.5	21.0	13.5	17.5
7	---	---	---	15.5	13.5	14.0	18.0	12.0	15.0	20.5	14.0	17.5
8	---	---	---	13.0	9.5	11.0	14.5	11.0	13.0	21.0	14.5	18.0
9	---	---	---	14.5	10.5	12.0	14.5	9.0	11.5	19.5	15.5	18.0
10	---	---	---	15.5	11.0	13.0	17.0	10.5	13.5	21.0	15.5	18.0
11	---	---	---	14.5	12.0	13.0	14.5	11.5	13.0	21.0	15.5	18.5
12	---	---	---	14.0	11.5	13.0	16.5	9.0	12.5	21.5	15.5	19.0
13	---	---	---	15.5	12.0	13.5	18.5	10.0	14.0	21.5	17.0	19.0
14	---	---	---	14.0	11.0	12.5	18.5	11.5	15.0	23.5	16.0	20.0
15	---	---	---	15.5	9.5	12.5	17.5	12.0	15.0	23.5	16.5	20.5
16	---	---	---	14.5	12.0	13.5	17.0	12.0	14.5	20.0	19.0	19.5
17	---	---	---	16.0	11.0	13.5	17.5	11.5	14.5	18.5	16.5	17.5
18	---	---	---	14.5	12.0	13.0	16.5	11.0	14.5	17.0	15.5	16.5
19	---	---	---	13.0	10.0	11.5	15.5	10.0	12.0	17.0	14.5	16.0
20	---	---	---	14.0	8.0	11.0	17.5	8.5	12.5	16.0	14.5	15.5
21	---	---	---	13.5	9.5	11.5	19.0	10.5	15.0	18.5	13.0	15.5
22	---	---	---	14.0	8.5	11.0	19.0	11.5	15.5	20.5	14.5	17.5
23	---	---	---	14.0	8.0	11.0	17.5	11.5	15.0	21.0	14.5	18.0
24	10.5	7.5	8.5	14.0	9.5	11.5	17.5	9.5	14.5	18.5	15.0	17.0
25	10.5	7.0	8.5	16.0	7.5	11.5	18.0	9.5	14.0	20.5	15.0	17.5
26	11.5	6.5	9.0	12.0	9.0	11.0	18.0	9.5	14.0	19.0	16.0	17.0
27	11.5	6.0	9.0	14.0	8.5	10.5	18.5	10.0	14.5	16.0	14.5	15.0
28	12.0	8.0	10.0	12.5	6.5	10.0	18.0	11.5	15.5	17.5	13.0	15.0
29	---	---	---	13.0	4.5	9.0	18.5	12.5	16.0	19.5	14.5	16.5
30	---	---	---	16.0	7.0	11.5	16.5	12.5	15.0	19.5	15.0	17.5
31	---	---	---	18.0	10.0	14.0	---	---	---	17.5	15.5	16.5
MONTH	---	---	---	18.0	4.5	12.0	20.0	8.5	14.2	23.5	10.0	17.0
		JUNE			JULY			AUGUST			SEPTEMBER	
1	16.0	13.0	14.5	26.5	19.0	23.0	25.5	19.0	22.5	25.0	18.0	21.5
2	19.5	11.5	15.5	25.5	20.5	23.0	25.0	18.0	22.0	23.5	18.5	21.0
3	23.0	13.5	18.5	25.0	19.0	22.0	25.0	18.5	22.0	20.0	18.0	19.0
4	24.5	15.5	20.0	24.0	18.5	22.0	25.5	17.5	22.0	19.0	16.5	18.0
5	24.5	17.5	21.0	25.0	19.0	22.0	24.5	18.5	22.0	21.0	16.0	18.5
6	22.0	18.0	20.0	25.0	18.5	21.5	25.5	18.5	22.0	22.0	15.5	19.0
7	21.0	18.0	19.5	23.0	17.5	21.0	22.0	19.5	21.0	23.0	17.5	20.0
8	24.0	17.5	20.5	21.5	19.0	20.5	26.0	17.0	21.0	22.5	17.0	20.0
9	21.5	18.5	20.0	24.0	19.5	21.5	26.5	18.5	22.5	---	---	---
10	21.5	18.5	20.0	20.5	18.5	19.5	25.0	19.0	22.0	---	---	---
11	24.5	17.0	20.5	22.5	16.5	19.0	24.0	19.0	21.5	---	---	---
12	25.0	18.0	21.5	25.0	16.5	20.5	24.5	16.5	21.0	---	---	---
13	27.0	19.0	23.0	25.5	18.0	21.5	21.0	18.0	20.0	20.0	16.0	18.5
14	28.0	19.0	23.5	27.5	18.0	22.5	22.5	17.5	20.0	---	---	---
15	24.5	19.5	22.0	26.5	19.0	23.0	20.0	18.5	19.5	22.5	---	---
16	23.0	17.0	20.0	24.0	20.5	22.5	20.5	16.0	18.5	27.5	16.0	18.0
17	22.0	16.5	20.0	21.5	19.5	20.5	---	---	---	19.0	---	---
18	23.0	17.0	20.0	20.0	16.5	18.5	---	---	---	---	---	---
19	20.5	17.0	18.5	21.5	15.5	19.0	22.5	16.0	20.0	---	---	---
20	24.5	16.5	20.0	23.5	16.5	20.0	24.0	18.5	21.0	---	---	---
21	24.5	17.5	21.0	21.5	19.5	20.5	21.5	18.0	20.0	---	---	---
22	21.0	18.5	20.0	24.0	17.5	20.5	24.5	17.5	21.0	---	---	---
23	22.5	16.0	19.0	25.5	17.5	21.5	25.0	19.0	22.0	---	---	---
24	24.5	16.5	20.0	26.5	18.5	23.0	21.5	18.5	20.0	---	---	---
25	25.0	17.0	21.0	25.5	19.5	22.5	21.5	18.5	20.0	---	---	---
26	26.5	17.5	22.0	27.0	20.0	23.5	22.5	16.5	19.5	---	---	---
27	26.0	18.5	22.5	25.5	21.5	24.0	23.0	---	---	---	---	---
28	24.5	19.0	22.0	25.0	21.0	23.5	23.5	17.5	21.0	---	---	---
29	25.5	18.0	22.0	24.5	21.0	22.5	24.5	17.0	20.5	---	---	---
30	24.5	19.5	22.5	28.0	20.5	24.0	24.5	18.0	21.5	---	---	---
31	---	---	---	28.0	21.0	24.5	25.0	18.0	21.5	---	---	---
MONTH	28.0	11.5	20.3	28.0	15.5	21.7	---	---	---	---	---	---

06037000 GIBBON RIVER NEAR WEST YELLOWSTONE, MT

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

DRAINAGE AREA.--118 mi^2.

WATER-DISCHARGE RECORDS

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

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

REMARKS.--Estimated daily discharges: Nov. 10, Dec. 9-11, 18, 28, 29, Jan. 9, 10, 15-17, 20-22. Water-discharge records fair. No regulation or diversions upstream of station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 809 ft^3/s, May 30, 1986, gage height, 4.53 ft; minimum, 56 ft^3/s, Mar. 29, 1987.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 207 ft^3/s, July 18, gage height, 3.03 ft; minimum, 56 ft^3/s, Mar. 29.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	99	93	86	83	82	73	69	159	139	85	79	72
2	99	91	86	87	80	73	69	155	123	84	78	72
3	97	92	85	86	83	73	71	137	113	84	75	72
4	94	92	84	89	80	74	74	126	109	84	73	75
5	93	91	90	93	79	76	77	120	105	81	75	78
6	92	102	92	91	79	76	84	114	104	78	75	75
7	91	97	91	88	80	79	87	112	120	78	73	75
8	91	97	89	81	77	89	88	111	139	78	77	73
9	91	97	e79	e80	78	84	85	109	112	84	74	72
10	91	e90	e81	e81	78	82	80	106	112	95	73	73
11	89	99	e83	82	78	82	86	103	106	125	74	73
12	89	97	85	84	77	80	80	100	98	103	74	71
13	90	97	84	84	78	80	76	100	93	88	72	70
14	90	101	86	82	82	81	80	97	91	83	74	70
15	89	103	86	e80	77	78	91	93	89	81	75	70
16	90	99	86	e74	75	79	106	95	93	78	85	69
17	89	100	82	e76	76	76	119	119	91	95	78	69
18	90	98	e80	79	76	76	129	161	91	177	74	71
19	91	101	82	79	74	76	120	149	90	123	73	72
20	91	97	84	e78	71	71	101	142	104	99	73	71
21	96	99	84	e78	75	73	109	135	93	103	69	71
22	91	98	84	e78	75	71	127	118	91	115	70	71
23	89	97	84	79	75	70	131	107	94	94	72	71
24	90	97	84	80	73	71	145	104	92	86	80	71
25	90	96	84	79	72	70	150	103	84	82	80	71
26	90	89	84	79	71	71	152	113	83	80	80	71
27	91	95	81	80	71	70	148	146	79	81	75	70
28	93	94	e80	84	73	68	149	172	78	83	73	70
29	91	94	e82	80	---	62	145	156	80	83	73	69
30	95	91	83	78	---	68	146	135	85	84	72	70
31	95	---	84	84	---	70	---	129	---	81	72	---
TOTAL	2847	2884	2615	2536	2145	2322	3174	3826	2981	2855	2320	2148
MEAN	91.8	96.1	84.4	81.8	76.6	74.9	106	123	99.4	92.1	74.8	71.6
MAX	99	103	92	93	83	89	152	172	139	177	85	78
MIN	89	89	79	74	71	62	69	93	78	78	69	69
AC-FT	5650	5720	5190	5030	4250	4610	6300	7590	5910	5660	4600	4260

CAL YR 1986 TOTAL 49565 MEAN 136 MAX 673 MIN 66 AC-FT 98310
WTR YR 1987 TOTAL 32653 MEAN 89.5 MAX 177 MIN 62 AC-FT 64770

e Estimated

MADISON RIVER BASIN

06037000 GIBBON RIVER NEAR WEST YELLOWSTONE, MT--Continued

WATER QUALITY RECORDS

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

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

INSTRUMENTATION.--Water-quality monitor since Aug. 31, 1983.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1983-86): Maximum, 538 microsiemens, Sep. 9, 1985; minimum, 77 microsiemens, May 30, 1986.
WATER TEMPERATURE: Maximum, 24.5°C, July 30, 1987; minimum, 0.0°C on many days during winter periods.

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT					
08...	0900	92	332	1.0	9.0
NOV					
18...	0900	95	376	-3.5	3.5
JAN					
06...	1045	91	419	-5.0	4.0
FEB					
18...	0910	75	436	-18.0	3.5
APR					
02...	1530	69	447	12.0	13.0
MAY					
19...	0800	161	322	10.0	11.5
JUN					
09...	1140	--	293	--	16.5
30...	0920	82	384	12.0	15.0
AUG					
18...	1040	76	363	15.0	11.0

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	11.0	9.5	10.0	9.0	5.0	7.0	4.0	1.5	2.5	3.5	.0	2.0
2	11.0	8.5	9.5	8.5	5.0	6.5	4.0	.5	2.5	5.0	3.0	4.5
3	12.0	7.5	9.5	9.5	6.0	7.5	3.5	.0	1.5	5.0	3.0	4.0
4	10.0	8.5	9.5	9.0	5.5	7.5	4.0	1.0	2.5	6.0	5.0	5.5
5	13.5	9.5	11.0	8.0	6.5	7.5	7.0	4.0	5.5	6.0	4.5	5.0
6	14.0	9.0	11.5	6.5	4.0	4.5	7.5	5.0	6.5	5.0	3.5	4.5
7	14.0	9.0	11.5	5.5	2.5	4.0	5.5	4.0	5.0	3.5	1.5	3.0
8	13.0	9.0	11.0	4.5	3.0	4.0	5.0	2.0	4.0	2.5	1.0	1.5
9	13.0	8.0	10.5	4.0	1.5	3.0	1.5	.0	.5	1.5	.0	.5
10	10.5	6.5	8.5	2.0	.0	1.0	2.5	.0	1.0	1.5	.0	.5
11	9.0	4.5	6.5	3.0	2.0	2.5	2.0	.0	1.0	4.0	1.0	2.0
12	10.0	4.5	7.0	4.0	.5	2.0	2.5	.0	1.0	5.0	1.5	3.0
13	10.5	5.5	8.0	6.0	2.0	4.0	3.5	.5	2.0	4.5	2.5	4.0
14	10.5	6.0	8.5	7.0	6.0	6.5	4.5	2.5	4.0	2.5	.0	1.5
15	11.5	6.0	8.5	6.5	5.5	6.0	5.5	3.5	4.5	1.5	.0	.5
16	11.0	6.5	8.5	5.5	5.0	5.0	4.0	2.0	3.0	.0	.0	.0
17	11.0	6.5	8.5	5.5	3.5	5.0	2.5	.0	1.5	2.5	.0	.5
18	10.5	7.5	9.0	6.5	3.0	5.0	2.0	.0	1.0	3.5	2.0	2.5
19	11.0	7.5	9.5	6.5	5.0	5.5	3.5	.0	1.5	3.0	.5	1.5
20	11.5	8.0	9.5	6.5	4.0	5.5	5.5	3.0	4.5	1.0	.0	.0
21	13.0	10.5	11.5	7.0	6.0	6.5	4.0	2.0	3.0	2.5	.0	1.0
22	11.5	7.5	9.5	5.5	3.5	4.5	4.5	1.5	3.0	3.0	.0	1.5
23	11.5	7.0	9.0	4.5	4.0	4.5	5.5	4.0	4.5	5.0	1.0	3.0
24	11.5	7.0	9.0	6.5	4.5	5.5	5.5	4.5	5.0	4.5	3.0	4.0
25	11.5	7.5	9.5	6.0	3.5	5.0	5.0	3.0	4.5	5.0	3.0	4.5
26	11.0	7.0	9.5	4.5	1.0	3.0	4.0	2.0	3.0	5.5	5.0	5.5
27	11.0	8.0	9.5	5.5	3.0	4.5	3.0	.5	1.5	8.0	5.5	6.0
28	10.5	7.0	8.5	6.0	4.5	5.5	2.5	.0	1.0	6.5	4.0	5.5
29	10.5	7.0	8.5	7.0	5.5	6.0	3.5	.0	1.5	5.5	3.5	4.0
30	9.5	7.0	8.5	5.0	2.5	4.0	4.0	2.5	3.5	5.0	1.0	3.0
31	9.5	6.0	7.5	---	---	---	3.5	1.0	2.0	5.5	4.5	5.0
MONTH	14.0	4.5	10.0	9.5	.0	4.95	7.5	.0	2.84	8.0	.0	2.89

06037000 GIBBON RIVER NEAR WEST YELLOWSTONE, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	5.0	4.0	5.0	6.5	4.5	5.0	12.5	6.0	8.5	13.5	9.0	11.5
2	5.5	3.0	4.5	8.5	4.0	6.0	13.0	4.0	8.5	12.0	9.5	10.5
3	7.5	5.5	6.5	9.5	5.0	7.0	14.0	4.5	9.0	15.5	7.0	11.0
4	6.5	3.5	5.0	10.5	5.0	7.5	15.0	6.0	10.0	17.5	9.0	13.0
5	6.5	3.0	4.5	10.5	5.5	8.0	14.5	7.0	10.5	18.0	10.5	14.5
6	6.5	2.0	4.5	9.0	7.0	8.0	14.5	9.0	11.5	19.0	11.0	15.0
7	6.5	2.0	4.5	10.5	8.5	9.0	12.5	7.5	10.0	19.5	11.0	15.0
8	7.0	2.0	4.5	8.5	5.5	7.0	9.0	6.5	8.0	18.5	11.5	15.0
9	7.0	3.0	5.0	10.0	5.5	7.0	10.0	4.5	7.0	17.5	12.5	15.0
10	7.5	4.0	6.0	9.5	6.5	8.0	12.5	5.0	8.5	18.0	12.0	15.0
11	9.0	4.5	6.5	9.0	7.5	8.0	10.0	7.0	8.5	18.0	12.5	15.0
12	8.5	4.0	6.5	8.5	6.5	7.5	10.5	5.5	8.0	19.0	12.0	15.5
13	8.0	6.5	7.5	10.0	7.0	8.5	14.0	5.5	9.0	18.5	13.0	15.5
14	8.5	6.5	7.0	9.0	6.5	7.5	14.5	7.0	10.5	21.0	12.0	16.0
15	7.5	4.0	6.0	10.5	4.5	7.0	13.5	8.0	10.5	20.0	13.0	16.5
16	7.5	3.0	5.0	9.5	7.0	8.0	13.0	8.0	10.5	17.0	15.0	16.0
17	6.5	4.0	5.0	11.0	6.0	8.5	14.5	7.5	10.5	15.0	13.0	13.5
18	8.0	3.5	5.0	9.0	6.5	8.0	11.5	7.0	9.5	13.0	11.5	12.5
19	5.5	2.0	3.5	7.5	5.0	6.0	9.5	6.0	7.5	14.0	11.5	12.5
20	5.0	.0	2.5	9.0	2.5	5.5	13.5	4.5	8.0	12.5	11.0	12.0
21	7.0	2.5	4.5	8.0	4.0	6.0	15.0	6.5	10.5	12.5	9.0	10.5
22	5.5	3.5	4.5	8.0	3.0	5.5	15.0	7.5	11.0	16.0	10.0	12.5
23	6.0	3.5	4.5	9.5	3.0	6.0	13.5	7.5	11.0	16.0	10.0	13.0
24	4.5	2.0	3.0	9.0	4.0	6.5	14.5	7.5	11.0	14.0	10.5	12.5
25	5.0	1.0	3.0	11.0	3.0	6.5	14.5	7.5	11.0	16.5	11.0	13.5
26	6.0	.0	2.5	8.5	5.5	6.5	15.5	8.0	12.0	16.0	12.0	13.5
27	6.0	.0	3.0	9.0	3.5	6.0	16.0	8.5	12.0	12.5	10.5	11.0
28	7.0	3.0	4.5	7.5	1.5	5.0	15.5	9.0	12.0	13.0	10.0	11.0
29	---	---	---	8.5	.0	3.5	14.5	9.5	12.5	16.5	10.5	13.0
30	---	---	---	10.5	2.5	6.0	14.0	9.5	12.0	16.0	12.0	14.0
31	---	---	---	12.5	5.0	8.5	---	---	---	13.5	11.0	12.5
MONTH	9.0	.0	4.79	12.5	.0	6.87	16.0	4.0	9.97	21.0	7.0	13.5
		JUNE			JULY			AUGUST			SEPTEMBER	
1	12.0	9.0	10.5	22.0	14.5	18.5	22.5	14.5	18.0	21.5	13.0	17.0
2	16.5	8.0	11.5	21.0	16.0	18.5	22.0	13.5	17.5	19.0	14.0	16.5
3	19.0	9.5	14.0	21.0	15.0	17.5	22.0	13.5	17.5	16.0	14.0	15.0
4	20.5	11.5	16.0	20.5	13.5	17.0	22.5	13.0	17.5	15.5	12.0	13.5
5	20.5	13.5	17.0	22.0	14.0	17.5	21.5	14.0	17.5	18.0	11.5	14.0
6	18.0	14.0	16.0	20.5	14.5	17.0	22.5	13.5	17.5	18.5	10.5	14.5
7	16.5	14.0	15.5	19.0	13.0	16.0	19.5	14.5	16.5	19.5	12.5	15.5
8	20.5	13.5	16.5	17.5	14.0	16.0	22.5	13.5	17.5	19.0	12.0	15.0
9	17.5	14.5	16.0	20.5	15.0	17.0	22.5	14.0	18.0	18.0	11.0	14.5
10	18.0	14.5	16.0	16.0	13.5	15.0	21.5	14.0	17.5	18.0	11.5	14.5
11	20.0	13.0	16.5	16.5	12.5	14.0	21.0	14.5	17.5	19.0	10.5	14.0
12	21.0	13.5	17.5	20.0	12.0	15.5	21.5	13.5	17.0	18.5	10.5	14.0
13	23.5	14.5	19.0	21.0	13.0	17.0	17.5	14.0	15.5	16.0	11.0	13.5
14	23.5	15.0	19.0	23.5	13.5	18.0	19.0	13.5	16.0	18.5	10.5	14.0
15	21.0	15.5	18.0	24.0	14.5	19.0	15.5	14.0	15.0	17.5	11.0	14.0
16	21.0	14.0	17.0	21.0	16.0	18.5	16.5	12.0	14.0	15.0	11.0	13.0
17	19.0	12.5	16.0	17.5	14.5	16.5	19.0	11.0	14.5	14.5	8.0	11.0
18	19.5	12.5	15.5	15.5	13.0	14.0	20.0	11.0	15.0	15.5	8.0	11.5
19	17.0	12.5	14.5	17.0	11.0	14.0	18.5	11.5	15.0	16.5	10.0	13.0
20	20.5	12.0	16.0	19.0	11.5	15.5	22.0	15.0	17.5	17.5	9.5	13.0
21	21.0	13.5	17.0	16.5	15.0	16.0	18.5	13.5	16.5	17.5	10.0	13.5
22	18.0	14.5	16.0	20.0	13.0	16.5	21.5	13.5	17.0	18.5	10.0	14.0
23	18.0	12.0	15.0	21.0	13.5	17.0	19.5	14.5	17.0	18.5	10.5	14.5
24	21.5	13.0	16.5	23.0	14.0	18.5	17.0	14.5	16.0	19.0	11.0	14.5
25	22.5	12.5	17.5	21.5	14.5	18.0	17.5	14.5	15.5	18.0	12.0	15.0
26	23.5	13.5	18.0	23.0	15.5	19.0	18.5	12.5	15.0	15.0	11.0	13.0
27	23.0	15.0	18.5	22.5	16.5	19.0	19.5	10.5	14.5	13.5	9.5	11.5
28	21.5	15.0	18.0	22.0	16.5	19.5	19.5	13.0	16.0	15.0	8.0	11.0
29	22.0	14.0	18.0	20.0	16.5	18.0	20.5	12.0	16.0	16.0	8.5	12.0
30	21.5	15.0	18.0	24.5	16.0	19.5	21.0	13.0	17.0	15.5	8.5	12.0
31	---	---	---	23.5	16.5	20.0	21.5	13.0	17.0	---	---	---
MONTH	23.5	8.0	16.3	24.5	11.0	17.2	22.5	10.5	16.4	21.5	8.0	13.7

YEAR MAXIMUM 24.5 MINIMUM .0 MEAN 9.99

06038500 MADISON RIVER BELOW HEBGEN LAKE, NEAR GRAYLING, MT

LOCATION.--Lat 44°52'00", long 111°20'15", NE¼NE¼NE¼ sec.22, T.11 S., R.3 E., Gallatin County, Hydrologic Unit 10020007, Gallatin National Forest, on right bank 1,500 ft downstream from Hebgen Dam, 8 mi northwest of Grayling, 17 mi upstream from West Fork, and at mile 108.8.
DRAINAGE AREA.--905 mi^2.
PERIOD OF RECORD.--June 1909 to current year. Prior to October 1938 adjusted runoff only, published in WSP 1309. Prior to October 1949, published as "below Hebgen Reservoir".
REVISED RECORDS.--WSP 1509: 1948. WSP 1559: Drainage area. WSP 1629: 1943. WSP 1709: 1959. WSP 1729: 1943.
GAGE.--Water-stage recorder. Datum of gage is 6,448.47 ft above National Geodetic Vertical Datum of 1929 (after 1959 earthquake). Prior to July 13, 1943, nonrecording gage in stilling well.
REMARKS.--No estimated daily discharges this year. Records good. Flow completely regulated by Hebgen Lake (station number 06038000). 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 1,100 acres upstream from station.
AVERAGE DISCHARGE.--78 years, 1,008 ft^3/s, 15.13 in/yr, 730,300 acre-ft/yr, adjusted for storage.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,200 ft^3/s, Aug. 17, 1959, caused by wave over Hebgen Dam during earthquake, gage height, 5.3 ft, from floodmark, from rating curve extended above 3,500 ft^3/s on basis of slope-area measurement of peak flow; maximum observed unaffected by wave over dam, 5,980 ft^3/s, June 3, 1943, gage height, 3.69 ft; minimum daily, 5.0 ft^3/s, May 9-12, 1960.
EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,970 ft^3/s, Nov. 8, gage height, 2.46 ft; minimum daily, 178 ft^3/s, May 8.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1720	1720	1140	929	929	932	693	623	516	699	1070	1010
2	1850	1720	1140	929	929	929	694	628	584	699	1150	1010
3	1850	1710	1140	929	929	929	695	630	584	699	1150	1010
4	1840	1710	1140	929	929	929	697	631	585	699	1150	1010
5	1840	1700	1140	929	929	929	699	581	587	699	1150	1010
6	1830	1680	1140	929	929	930	699	399	589	700	1150	1010
7	1830	1780	1140	929	929	931	699	330	589	699	1150	1010
8	1830	1960	1080	929	929	930	699	178	718	696	1150	1000
9	1830	1960	939	929	929	902	699	198	843	690	1140	1000
10	1820	1950	939	929	929	794	699	252	889	755	1140	1000
11	1820	1560	938	929	929	681	699	253	940	781	1130	1030
12	1810	1150	938	929	929	681	699	322	966	781	1170	1120
13	1790	1150	939	929	929	682	700	464	965	824	1280	1120
14	1790	1150	936	929	929	682	658	464	965	912	1280	1120
15	1780	1150	932	929	929	682	567	464	962	913	1280	1120
16	1780	1150	930	929	929	684	567	464	962	914	1280	1120
17	1770	1150	932	929	929	686	580	464	963	984	1210	1110
18	1770	1150	930	929	929	689	606	400	970	1010	1040	1110
19	1770	1150	931	929	929	690	608	229	970	1010	1040	1110
20	1770	1150	929	929	929	690	607	232	968	1140	1040	1110
21	1760	1150	931	929	929	690	607	260	935	1470	1040	1110
22	1760	1150	931	929	929	690	610	317	819	1470	1040	1110
23	1760	1150	929	929	929	690	613	316	805	1470	1040	1110
24	1750	1150	929	929	930	690	614	318	699	1390	1040	1110
25	1750	1150	929	929	930	691	614	320	699	1140	1020	1100
26	1750	1140	929	929	929	690	614	321	699	975	816	1100
27	1740	1140	929	929	929	690	618	320	699	926	817	1100
28	1740	1140	929	929	930	692	621	321	699	906	862	1100
29	1730	1140	929	929	---	690	622	380	699	933	1010	1100
30	1730	1140	929	929	---	691	623	494	699	933	1010	1100
31	1730	---	929	929	---	692	---	481	---	932	1010	---
TOTAL	55290	41250	30496	28799	26015	23578	19420	12054	23567	28849	33855	32180
MEAN	1784	1375	984	929	929	761	647	389	786	931	1092	1073
MAX	1850	1960	1140	929	930	932	700	631	970	1470	1280	1120
MIN	1720	1140	929	929	929	681	567	178	516	690	816	1000
AC-FT	109700	81820	60490	57120	51600	46770	38520	23910	46750	57220	67150	63830
MEAN †	1059	1041	935	939	922	883	1093	1274	912	859	734	587
CFSM †	1.17	1.15	1.03	1.04	1.02	.98	1.21	1.41	1.01	.95	.81	.65
IN †	1.35	1.28	1.19	1.20	1.06	1.12	1.35	1.62	1.12	1.09	.94	.72
AC-FT †	65100	61920	57490	57720	51200	54270	65020	78310	54250	52820	45150	34930

OBSERVED

CAL YR 1986	TOTAL	476951	MEAN	1307	MAX	3280	MIN	762	AC-FT	946000
WTR YR 1987	TOTAL	355353	MEAN	974	MAX	1960	MIN	178	AC-FT	704800

ADJUSTED

CAL YR 1986	TOTAL	479355	MEAN	1313	CFSM	1.45	IN	19.70	AC-FT	950800
WTR YR 1987	TOTAL	341870	MEAN	937	CFSM	1.04	IN	14.05	AC-FT	678100

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

06038800 MADISON RIVER AT KIRBY RANCH, NEAR CAMERON, MT

LOCATION.--Lat 44°53'22", long 111°34'46", in NE¼NE¼SE¼ sec.10, T.11 S., R.1 E., Madison County, Hydrologic Unit 10020007, on upstream side of county bridge 0.2 mi upstream from West Fork Madison River, and 22 mi south of Cameron, and at mile 89.8.

DRAINAGE AREA.--1,065 mi^2.

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

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

REMARKS.--Seasonal records fair. Flow regulated by Hebgen Lake (station 06038000). Diversions for irrigation of about 1,500 acres upstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

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

EXTREMES FOR CURRENT SEASON.--Maximum discharge observed, 1,790 ft^3/s, July 23, gage height, 1.69 ft; minimum observed, 576 ft^3/s, May 9, 21.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1								1080	731	938		
2								1110	876	938		
3								1080	865	881		
4								1030	865	879		
5								1030	824	908		
6								883	823	894		
7								879	850	866		
8								721	922	865		
9								576	997	893		
10								598	1110	866		
11								598	1260	1110		
12								598	1350	1080		
13								740	1320	1020		
14								769	1270	1010		
15								809	1270	999		
16								878	1230	1080		
17								966	1250	1130		
18								893	1200	1380		
19								756	1200	1430		
20								647	1280	1440		
21								576	1230	1590		
22								587	1150	1710		
23								632	1100	1790		
24								610	1030	1680		
25								609	925	1570		
26								609	923	1390		
27								609	894	1170		
28								609	852	1250		
29								643	827	1160		
30								730	920	1160		
31								743	---	1110		
TOTAL								23598	31344	36187		
MEAN								761	1045	1167		
MAX								1110	1350	1790		
MIN								576	731	865		
AC-FT								46810	62170	71780		

06041000 MADISON RIVER BELOW ENNIS LAKE, NEAR MCALLISTER, MT

LOCATION.--Lat 45°29'25", long 111°38'00", in SW¼SE¼NW¼ sec.17, T.4 S., R.1 E., Madison County, Hydrologic Unit 10020007, on right bank 500 ft downstream from Madison powerplant, 1.5 mi downstream from Ennis Lake, 5.7 mi northeast of McAllister, and at mile 38.8.

DRAINAGE AREA.--2,186 mi^2.

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1559: Drainage area.

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

REMARKS.--No estimated daily discharges this year. Water-discharge records good. Flow regulated by Hebgen Lake (station number 06038000) and Ennis Lake (station number 06040500). Diversions for irrigation of about 23,000 acres upstream from station.

AVERAGE DISCHARGE.--49 years, 1,777 ft^3/s, 1,287,000 acre-ft/yr, unadjusted.

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

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,380 ft^3/s, Oct. 13, gage height, 3.81 ft; minimum daily, 753 ft^3/s, May 26.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2200	2220	1760	1460	1660	1370	1160	1710	967	1040	1480	1480
2	2310	2210	1740	1390	1650	1500	1160	1690	1120	1030	1480	1490
3	2310	2200	1680	1390	1650	1490	1160	1610	1160	1030	1480	1490
4	2320	2200	1640	1470	1650	1560	1160	1430	1160	1040	1470	1490
5	2320	2200	1650	1510	1630	1670	1160	1230	1060	1040	1480	1490
6	2210	2200	1700	1510	1620	1700	1160	1150	1000	1050	1480	1490
7	2340	2220	1720	1510	1610	1680	1160	1060	1000	1050	1490	1490
8	2330	2220	1730	1470	1610	1660	1150	977	1100	1050	1480	1490
9	2320	2260	1700	1390	1600	1640	1150	994	1170	1050	1480	1490
10	2300	2280	1620	1350	1590	1620	1150	993	1170	1050	1480	1490
11	2310	2280	1490	1260	1590	1590	1150	992	1260	1130	1480	1500
12	2300	2240	1390	1260	1590	1540	1150	961	1620	1260	1480	1520
13	2110	2150	1380	1310	1590	1480	1150	844	1510	1420	1490	1520
14	2350	2060	1380	1440	1600	1390	1110	766	1420	1320	1490	1510
15	2320	2020	1400	1380	1600	1300	1060	765	1450	1400	1490	1540
16	2300	1960	1490	1130	1590	1190	1070	785	1360	1360	1510	1540
17	2290	2030	1510	1070	1580	1180	1070	767	1230	1300	1520	1540
18	2270	2050	1510	1070	1580	1170	1050	767	1170	1450	1500	1540
19	2270	1970	1430	1170	1550	1200	1010	799	1170	1740	1500	1540
20	2270	1940	1390	1300	1510	1230	1050	795	1170	1970	1500	1540
21	2260	1970	1390	1510	1500	1230	1410	783	1170	2070	1500	1540
22	2260	1990	1400	1500	1500	1220	1750	771	1280	2120	1500	1540
23	2100	1960	1410	1430	1500	1220	1640	765	1370	2080	1510	1520
24	2310	1920	1490	1390	1420	1220	1500	764	1440	1950	1630	1540
25	2280	1900	1510	1430	1300	1200	1310	761	1300	1930	1780	1540
26	2270	1930	1510	1520	1210	1170	1160	753	1190	1790	1770	1510
27	2260	1890	1510	1540	1260	1170	1150	769	1170	1550	1690	1550
28	2240	1830	1510	1580	1210	1170	1360	773	1110	1470	1550	1550
29	2230	1780	1510	1710	---	1160	1580	829	1060	1480	1490	1550
30	2230	1780	1510	1730	---	1160	1730	918	1050	1470	1480	1530
31	2220	---	1510	1680	---	1160	---	923	---	1480	1480	---
TOTAL	70410	61860	47570	43860	42950	42240	37030	29894	36407	44170	47140	45550
MEAN	2271	2062	1535	1415	1534	1363	1234	964	1214	1425	1521	1518
MAX	2350	2280	1760	1730	1660	1700	1750	1710	1620	2120	1780	1550
MIN	2100	1780	1380	1070	1210	1160	1010	753	967	1030	1470	1480
AC-FT	139700	122700	94360	87000	85190	83780	73450	59290	72210	87610	93500	90350

CAL YR 1986 TOTAL 748100 MEAN 2050 MAX 6920 MIN 1110 AC-FT 1484000
WTR YR 1987 TOTAL 549081 MEAN 1504 MAX 2350 MIN 753 AC-FT 1089000

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

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1972-73, 1977 to current year.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: June 1977 to current year.

INSTRUMENTATION.--Temperature recorder since June 21, 1977.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum, 23.0°C, July 29, 1980; minimum, 0.0°C at times during winter months most years.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 21.5°C, July 31, Aug. 1, 2, 4-6; minimum, 0.0°C on several days in November.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT 06...	1345	2400	267	25.0	8.5
NOV 17...	1030	2120	288	6.0	1.5
JAN 05...	1115	1510	308	-5.0	1.0
FEB 17...	0945	1570	306	-1.0	2.0
AUG 17...	1330	1500	297	20.0	16.0

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	8.5	7.0	7.0	7.0	6.5	6.5	.5	.5	.5	1.0	1.0	1.0
2	8.5	7.5	7.5	6.5	6.5	6.5	1.0	.5	.5	1.0	1.0	1.0
3	7.5	6.5	6.5	6.5	6.0	6.0	1.0	1.0	1.0	1.0	1.0	1.0
4	7.5	7.0	7.0	6.0	5.5	5.5	1.5	1.0	1.0	1.5	1.0	1.0
5	8.5	7.0	7.0	6.0	5.5	5.5	2.0	1.5	1.5	1.0	1.0	1.0
6	9.0	7.5	7.5	6.0	4.5	4.5	2.0	1.5	1.5	1.0	1.0	1.0
7	10.5	9.0	9.0	4.5	3.0	3.0	1.5	1.5	1.5	1.0	1.0	1.0
8	10.5	10.0	10.0	3.0	2.0	2.0	1.5	1.0	1.0	1.0	1.0	1.0
9	11.0	9.0	9.0	2.0	.0	.0	1.0	1.0	1.0	1.0	1.0	1.0
10	11.0	8.5	8.5	.5	.0	.0	1.0	1.0	1.0	1.0	1.0	1.0
11	8.0	6.5	6.5	.5	.5	.5	1.0	1.0	1.0	1.5	1.0	1.0
12	7.5	6.5	6.5	1.0	.5	.5	1.0	1.0	1.0	1.5	1.0	1.0
13	7.0	6.5	6.5	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.0	1.0
14	6.5	6.0	6.0	1.5	1.0	1.0	1.0	1.0	1.0	1.5	1.0	1.0
15	7.0	6.0	6.0	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
16	8.0	7.0	7.0	1.5	1.5	1.5	1.0	1.0	1.0	1.0	.5	.5
17	8.5	7.0	7.0	1.5	1.5	1.5	1.0	1.0	1.0	1.0	1.0	1.0
18	8.5	7.0	7.0	2.0	1.5	1.5	1.0	1.0	1.0	1.0	1.0	1.0
19	8.0	6.5	6.5	2.0	1.5	1.5	1.0	1.0	1.0	1.0	1.0	1.0
20	8.5	7.0	7.0	2.5	2.0	2.0	1.0	.5	.5	1.0	1.0	1.0
21	8.0	6.5	6.5	2.5	1.5	1.5	1.0	.5	.5	1.5	1.0	1.0
22	8.0	6.5	6.5	1.5	1.0	1.0	1.0	.5	.5	1.5	1.0	1.0
23	8.5	6.5	6.5	1.0	1.0	1.0	1.0	.5	.5	1.5	1.0	1.0
24	8.0	6.5	6.5	1.0	.5	.5	1.0	1.0	1.0	1.0	1.0	1.0
25	8.5	6.5	6.5	1.0	.5	.5	1.0	.5	.5	1.0	1.0	1.0
26	8.0	7.5	7.5	.5	.0	.0	1.0	.5	.5	1.5	1.0	1.0
27	8.0	7.0	7.0	.0	.0	.0	1.0	1.0	1.0	1.5	1.0	1.0
28	7.5	7.0	7.0	.5	.0	.0	1.0	.5	.5	1.5	1.0	1.0
29	7.5	7.0	7.0	.5	.0	.0	1.0	.5	.5	1.5	1.0	1.0
30	7.5	7.0	7.0	.5	.0	.0	1.0	1.0	1.0	1.5	1.0	1.0
31	7.5	6.5	6.5	---	---	---	1.0	1.0	1.0	1.0	1.0	1.0
MONTH	11.0	6.0	7.08	7.0	.0	1.87	2.0	.5	.89	1.5	.5	.98

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

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	1.5	1.0	1.0	2.5	2.0	2.0	4.0	3.0	3.0	14.5	14.0	14.0
2	1.5	1.0	1.0	3.0	2.0	2.0	4.5	2.5	2.5	14.0	13.0	13.0
3	1.5	1.0	1.0	3.0	2.5	2.5	5.5	4.5	4.5	14.0	12.0	12.0
4	1.5	1.0	1.0	3.0	2.5	2.5	6.5	5.5	5.5	14.0	13.0	13.0
5	1.5	1.5	1.5	3.5	2.5	2.5	8.0	6.5	6.5	13.5	12.0	12.0
6	2.0	1.5	1.5	4.0	3.0	3.0	9.0	8.0	8.0	15.5	13.5	13.5
7	2.0	1.5	1.5	4.0	3.5	3.5	9.0	8.5	8.5	16.5	14.0	14.0
8	2.5	1.5	1.5	3.5	3.0	3.0	9.5	8.0	8.0	18.0	15.5	15.5
9	2.5	2.0	2.0	4.0	3.0	3.0	8.0	6.5	6.5	17.5	16.5	16.5
10	2.5	1.5	1.5	3.5	3.0	3.0	7.5	6.5	6.5	17.0	16.5	16.5
11	2.5	1.5	1.5	4.0	3.0	3.0	7.0	6.5	6.5	18.0	17.0	17.0
12	2.5	1.5	1.5	4.0	3.0	3.0	7.5	6.5	6.5	18.5	18.0	18.0
13	2.5	2.0	2.0	4.0	3.0	3.0	7.5	6.5	6.5	18.0	17.0	17.0
14	2.5	2.0	2.0	4.5	2.5	2.5	8.0	7.0	7.0	18.5	17.0	17.0
15	2.5	2.0	2.0	3.5	2.5	2.5	8.5	8.0	8.0	19.0	18.0	18.0
16	2.5	2.0	2.0	4.0	3.0	3.0	8.5	7.5	7.5	18.5	16.5	16.5
17	2.5	1.5	1.5	3.5	2.5	2.5	10.0	9.0	9.0	16.5	14.0	14.0
18	2.5	2.0	2.0	2.5	1.5	1.5	10.0	9.0	9.0	14.0	11.5	11.5
19	2.5	2.0	2.0	2.0	1.5	1.5	9.0	8.5	8.5	13.0	12.5	12.5
20	2.5	2.0	2.0	2.5	1.0	1.0	8.5	8.0	8.0	12.5	11.0	11.0
21	2.5	1.5	1.5	3.0	2.5	2.5	10.0	8.5	8.5	11.0	8.5	8.5
22	2.0	1.5	1.5	3.5	2.5	2.5	10.5	9.5	9.5	10.5	8.5	8.5
23	1.5	1.5	1.5	3.0	2.5	2.5	11.0	10.0	10.0	12.0	9.5	9.5
24	1.5	1.5	1.5	3.0	2.5	2.5	13.0	10.0	10.0	11.5	10.5	10.5
25	2.0	1.5	1.5	3.5	3.0	3.0	14.0	13.0	13.0	13.0	11.5	11.5
26	2.5	1.0	1.0	3.5	2.5	2.5	13.5	12.5	12.5	13.5	12.0	12.0
27	3.0	2.0	2.0	3.5	3.0	3.0	15.5	13.5	13.5	14.0	13.0	13.0
28	2.5	2.5	2.5	3.0	2.0	2.0	15.5	15.0	15.0	14.5	13.5	13.5
29	---	---	---	2.0	1.0	1.0	15.5	14.5	14.5	15.0	14.0	14.0
30	---	---	---	2.5	1.0	1.0	15.0	14.5	14.5	15.5	15.0	15.0
31	---	---	---	3.5	1.5	1.5	---	---	---	15.0	13.5	13.5
MONTH	3.0	1.0	1.61	4.5	1.0	2.40	15.5	2.5	8.57	19.0	8.5	13.6
		JUNE			JULY			AUGUST			SEPTEMBER	
1	13.5	13.0	13.0	20.5	20.0	20.0	21.5	20.5	20.5	18.5	16.5	16.5
2	13.0	12.0	12.0	20.0	19.0	19.0	21.5	21.0	21.0	19.0	17.5	17.5
3	13.5	11.5	11.5	20.5	20.0	20.0	21.0	19.5	19.5	18.0	17.0	17.0
4	15.0	13.5	13.5	21.0	20.0	20.0	21.5	19.5	19.5	17.5	16.0	16.0
5	15.5	14.5	14.5	21.0	20.0	20.0	21.5	21.0	21.0	16.5	16.0	16.0
6	16.0	14.5	14.5	20.0	19.0	19.0	21.5	20.5	20.5	17.0	16.5	16.5
7	16.0	15.5	15.5	20.0	19.5	19.5	20.5	19.0	19.0	16.5	16.0	16.0
8	17.5	15.5	15.5	20.0	19.5	19.5	19.5	18.5	18.5	16.5	15.5	15.5
9	18.0	16.5	16.5	19.5	19.0	19.0	20.5	19.0	19.0	16.5	15.0	15.0
10	18.0	17.0	17.0	19.5	18.0	18.0	20.5	20.0	20.0	16.5	15.5	15.5
11	18.5	18.0	18.0	18.0	15.5	15.5	20.0	19.0	19.0	16.5	15.5	15.5
12	19.0	18.0	18.0	16.5	15.0	15.0	19.0	18.0	18.0	17.0	15.5	15.5
13	20.0	18.5	18.5	18.0	16.0	16.0	17.5	16.5	16.5	17.0	16.5	16.5
14	21.0	20.0	20.0	19.0	15.5	15.5	18.0	17.5	17.5	17.0	16.5	16.5
15	21.0	20.0	20.0	19.5	18.0	18.0	17.0	16.0	16.0	17.0	16.0	16.0
16	20.5	19.0	19.0	20.0	19.0	19.0	16.0	15.5	15.5	17.0	15.5	15.5
17	18.5	18.0	18.0	18.5	17.0	17.0	16.5	15.5	15.5	15.5	15.0	15.0
18	18.0	17.5	17.5	17.0	15.0	15.0	16.5	16.0	16.0	15.0	14.5	14.5
19	18.0	17.5	17.5	15.0	14.5	14.5	17.5	15.5	15.5	14.5	13.5	13.5
20	17.5	17.0	17.0	16.5	15.0	15.0	18.0	17.0	17.0	14.0	13.0	13.0
21	18.0	17.5	17.5	16.5	15.0	15.0	18.5	18.0	18.0	14.0	13.0	13.0
22	18.0	18.0	18.0	16.5	16.0	16.0	18.0	17.0	17.0	14.5	13.5	13.5
23	18.0	18.0	18.0	17.0	16.0	16.0	18.0	17.5	17.5	15.0	14.0	14.0
24	18.5	17.5	17.5	19.0	15.5	15.5	18.0	17.5	17.5	15.0	14.0	14.0
25	19.0	17.5	17.5	19.5	18.0	18.0	17.5	16.5	16.5	15.5	14.0	14.0
26	19.0	18.0	18.0	20.0	18.5	18.5	17.0	16.0	16.0	15.0	14.5	14.5
27	20.0	18.5	18.5	20.0	19.5	19.5	17.5	15.5	15.5	14.5	13.5	13.5
28	19.0	18.0	18.0	21.0	19.5	19.5	17.5	16.5	16.5	13.5	13.5	13.5
29	20.0	18.5	18.5	21.0	20.5	20.5	17.5	17.0	17.0	13.5	13.0	13.0
30	20.0	19.0	19.0	21.0	20.5	20.5	17.0	16.0	16.0	13.5	12.5	12.5
31	---	---	---	21.5	20.0	20.0	17.0	17.0	17.0	---	---	---
MONTH	21.0	11.5	16.9	21.5	14.5	17.9	21.5	15.5	17.7	19.0	12.5	14.9

06043500 GALLATIN RIVER NEAR GALLATIN GATEWAY, MT

LOCATION.--Lat 45°29'51", long 111°25'12", in SE¼SE¼SE¼ sec.7, T.4 S., R.4 E., Gallatin County, Hydrologic Unit 10020008, on left bank 0.3 mi downstream from Spanish Creek, 7.3 mi south of Gallatin Gateway and at mile 47.7.

DRAINAGE AREA.--825 mi^2.

PERIOD OF RECORD.--August 1889 to September 1894, June 1930 to September 1969, annual maximum, water years 1970-71, October 1971 to September 1981, October 1984 to current year. Monthly discharge only for some periods, published in WSP 1309. Published as West Gallatin River near Bozeman 1889-94.

REVISED RECORDS.--WSP 1389: 1892(M), 1893-94. WSP 1559: Drainage area. WDR MT-85-1 (M).

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

REMARKS.--No estimated daily discharges this year. Records good. Diversions for irrigation of about 1,400 acres upstream 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.--57 years (1890-94, 1931-69, 1972-81, 1985-87); 811 ft^3/s, 587,600 acre-ft/yr.

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

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

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 17	0300	*2,390	*3.43	No peaks greater than base discharge.			

Minimum discharge, 241 ft^3/s, Dec. 11, 12, 19, Mar. 29.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	519	406	331	297	309	288	303	2000	1860	679	618	498
2	525	381	331	309	312	292	289	1670	1600	689	593	488
3	509	427	306	318	310	293	301	1320	1480	673	575	485
4	500	412	304	331	310	301	325	1210	1380	673	560	484
5	515	418	373	333	301	308	349	1280	1360	650	546	480
6	515	440	381	331	299	335	375	1430	1420	633	537	470
7	516	379	373	317	293	344	381	1560	1400	596	545	461
8	510	379	359	289	297	342	395	1640	1610	598	558	451
9	500	363	324	277	299	314	354	1640	1530	623	526	444
10	504	297	291	282	302	309	339	1680	1070	758	511	439
11	472	322	271	302	308	308	365	1620	561	1220	507	434
12	447	312	266	316	308	307	342	1540	497	1020	494	428
13	473	317	266	325	310	320	335	1560	447	893	491	424
14	472	375	307	320	322	324	350	1500	404	794	496	421
15	461	398	301	297	310	303	404	1490	370	737	586	412
16	459	392	300	293	302	312	471	1850	352	719	660	410
17	455	398	278	307	299	304	508	2120	516	811	566	415
18	460	368	257	318	302	312	667	1760	970	1400	519	410
19	453	423	259	316	294	306	632	1650	930	1200	495	403
20	447	398	286	307	277	291	506	1540	919	987	480	394
21	450	421	280	303	283	287	528	1420	857	929	467	392
22	439	392	299	305	297	299	632	1320	1010	955	476	391
23	432	387	313	312	299	288	823	1200	966	838	497	383
24	434	386	317	313	296	297	973	1130	893	790	669	381
25	432	383	320	312	286	283	1080	1150	822	742	785	380
26	428	343	314	311	276	296	1200	1280	773	710	712	381
27	438	362	306	315	279	292	1330	1430	744	686	620	420
28	447	376	289	318	282	283	1450	1970	720	683	577	408
29	427	381	281	309	---	255	1670	1960	706	693	549	396
30	450	357	295	302	---	285	1850	1790	687	706	530	385
31	443	---	296	302	---	298	---	1820	---	646	514	---
TOTAL	14532	11393	9474	9587	8362	9376	19527	48530	28854	24731	17259	12768
MEAN	469	380	306	309	299	302	651	1565	962	798	557	426
MAX	525	440	381	333	322	344	1850	2120	1860	1400	785	498
MIN	427	297	257	277	276	255	289	1130	352	596	467	380
AC-FT	28820	22600	18790	19020	16590	18600	38730	96260	57230	49050	34230	25330

CAL YR 1986 TOTAL 323058 MEAN 885 MAX 6230 MIN 257 AC-FT 640800
WTR YR 1987 TOTAL 214393 MEAN 587 MAX 2120 MIN 255 AC-FT 425200

06048500 BRIDGER CREEK NEAR BOZEMAN, MT

LOCATION.--Lat 45°42'20", long 110°57'40", in NE¼NE¼SE¼ sec.34, T.1 S., R.6 E., Gallatin County, Hydrologic Unit 10020008, on right bank, 3.5 mi northeast of Bozeman, and at mile 3.6.

DRAINAGE AREA.--62.5 mi^2.

PERIOD OF RECORD.--October 1945 to September, 1969, May 1971 to June 1972, March 1987 to August 1987 (discontinued). Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1309: 1948. WSP 1559: Drainage area.

GAGE.--Water-stage recorders. Elevation of gage is 4,960 ft, from topographic map. Prior to June 28, 1946, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Mar. 1-7, 28-30, and Aug. 19-31. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 1,200 acres upstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--24 years (1945-69), 36.6 ft^3/s, 7.95 in/yr, 26,520 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 902 ft^3/s, June 3, 1953, gage height, 4.90 ft, from reconstructed gage-height graph, from rating curve extended above 380 ft^3/s; minimum discharge, 0.9 ft^3/s, Mar. 23, 1953, Aug. 30, 1954.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 22, 1981 reached a discharge of 1,060 ft^3/s, gage height, 7.06 ft, from floodmarks.

EXTREMES FOR CURRENT SEASON.--Peak discharges greater than base discharge of 140 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 28	0045	*238	*1.89	No other peak greater than base discharge.			

Minimum discharge, 6.9 ft^3/s, Mar. 27, Aug. 11, gage height, 0.11 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1						e11	11	54	80	16	10	
2						e11	11	52	69	17	9.8	
3						e12	12	45	62	17	9.5	
4						e13	16	41	56	17	9.3	
5						e15	24	38	51	16	8.7	
6						e17	30	35	47	18	8.1	
7						e20	34	34	44	16	11	
8						19	37	31	44	15	10	
9						15	33	29	40	17	8.7	
10						12	29	27	41	21	8.6	
11						13	30	27	37	32	8.2	
12						15	27	26	34	23	8.2	
13						18	25	25	32	19	8.4	
14						22	26	23	30	17	8.7	
15						19	30	22	29	16	11	
16						18	42	26	30	15	15	
17						16	56	33	27	16	10	
18						17	62	30	27	23	9.0	
19						17	61	28	26	20	e8.0	
20						15	52	39	25	17	e7.5	
21						13	50	33	23	16	e7.0	
22						13	47	31	29	17	e7.0	
23						13	52	29	24	16	e8.0	
24						13	54	27	23	14	e10	
25						11	57	27	22	13	e20	
26						13	58	30	20	13	e18	
27						12	57	71	19	13	e16	
28						e10	57	192	19	12	e14	
29						e8.0	57	124	18	12	e12	
30						e9.0	55	93	17	12	e11	
31						10	---	85	---	11	e10	
TOTAL						440.0	1192	1407	1045	517	320.7	
MEAN						14.2	39.7	45.4	34.8	16.7	10.3	
MAX						22	62	192	80	32	20	
MIN						8.0	11	22	17	11	7.0	
AC-FT						873	2360	2790	2070	1030	636	

e Estimated

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

LOCATION.--Lat 45°33'42", long 111°04'12", in NW¼NW¼SE¼ sec.23, T.3 S., R.5 E., Gallatin County, Hydrologic Unit 10020008, Gallatin National Forest, on right bank 0.8 mi south of former Hyalite Ranger Station, 7.3 mi south of Bozeman, and at mile 20.8.
DRAINAGE AREA.--48.2 mi^2.
PERIOD OF RECORD.--August 1895 to October 1896, calendar year 1897 (discharge measurements only), April 1898 to October 1899, June to October 1900, May to September 1902, calendar year 1903 (discharge measurements only), September to December 1904, September 1934 to current year. Monthly discharge only for some periods, published in WSP 1309. Prior to 1934, published as Middle Creek near Bozeman.
REVISED RECORDS.--WSP 84: 1898-99. WSP 1509: 1902, 1939(M). WSP 1559: Drainage area. WSP 1709: 1953, 1956-57.
GAGE.--Water-stage recorder. Datum of gage is 5,539.6 ft above National Geodetic Vertical Datum of 1929. Prior to September 1934, nonrecording gages at two sites 0.5 mi upstream at different datums. Sept. 13, 1934, to May 13, 1948, water-stage recorder at site 0.3 mi downstream at different datum.
REMARKS.--Estimated daily discharges: Nov. 8-16, Nov. 24 to Apr. 6. Records good except those for estimated daily discharges, which are poor. Flow regulated by Middle Creek Reservoir (station 06049500) since March 1951. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.
AVERAGE DISCHARGE.--55 years (1895-96, 1898-99, 1934-87), 66.7 ft^3/s, 18.79 in/yr, 48,320 acre-ft/yr, adjusted for storage in Middle Creek Reservoir.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 956 ft^3/s, June 14, 1898, gage height, 2.10 ft, site and datum then in use; maximum gage height, 4.56 ft, Dec. 22, 1983 (backwater from ice); minimum daily discharge, 5.0 ft^3/s, Jan. 27, 1961.
EXTREMES FOR CURRENT YEAR.--Maximum discharge, 250 ft^3/s, May 28, gage height, 2.70 ft; maximum gage height, 5.02 ft, Nov. 12 (backwater from ice); minimum daily discharge, 9.0 ft^3/s, Feb. 26.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	33	20	e22	e17	e14	e12	e14	37	165	97	53	53
2	33	19	e21	e17	e14	e13	e15	37	139	93	52	53
3	33	19	e21	e18	e14	e14	e14	31	133	88	56	52
4	33	19	e20	e18	e13	e14	e14	58	105	84	67	52
5	33	20	e20	e17	e13	e15	e15	54	103	80	67	51
6	31	20	e19	e17	e13	e15	e16	52	129	80	67	51
7	28	e19	e19	e16	e13	e14	17	57	129	72	68	51
8	24	e18	e18	e16	e13	e13	17	77	129	72	69	51
9	24	e17	e18	e15	e12	e13	15	90	144	75	68	51
10	25	e16	e17	e15	e12	e13	15	90	156	78	68	51
11	25	e15	e17	e15	e12	e13	16	105	155	84	65	51
12	25	e17	e17	e16	e12	e14	14	111	147	64	65	51
13	25	e19	e18	e16	e12	e14	14	103	124	56	64	51
14	25	e20	e18	e14	e12	e14	17	106	98	46	64	51
15	24	e21	e19	e12	e11	e13	23	116	94	41	67	51
16	23	e22	e19	e11	e11	e13	30	118	98	39	66	52
17	23	e21	e18	e12	e11	e13	38	142	92	42	59	52
18	23	e21	e18	e13	e11	e14	39	127	90	48	58	53
19	23	e22	e17	e14	e11	e14	33	109	92	60	57	52
20	23	e23	e17	e14	e11	e13	27	106	95	48	57	51
21	23	e22	e17	e14	e11	e13	32	104	93	48	56	51
22	23	e21	e17	e14	e10	e13	40	82	92	47	56	50
23	22	e22	e18	e14	e9.5	e12	47	65	69	51	57	44
24	23	e23	e18	e14	e9.5	e12	47	71	68	58	65	45
25	23	e22	e18	e15	e9.5	e12	48	68	72	62	68	45
26	22	e22	e18	e15	e9.0	e13	49	75	74	60	62	47
27	23	e22	e18	e15	e9.5	e13	48	121	85	59	58	48
28	23	e22	e17	e15	e11	e12	46	187	91	59	56	47
29	22	e23	e17	e14	---	e12	44	195	92	57	54	47
30	24	e23	e17	e14	---	e10	41	137	96	55	53	46
31	22	---	e16	e14	---	e13	---	157	---	53	53	---
TOTAL	786	610	564	461	324.0	406	845	2988	3249	1956	1895	1501
MEAN	25.4	20.3	18.2	14.9	11.6	13.1	28.2	96.4	108	63.1	61.1	50.0
MAX	33	23	22	18	14	15	49	195	165	97	69	53
MIN	22	15	16	11	9.0	10	14	31	68	39	52	44
AC-FT	1560	1210	1120	914	643	805	1680	5930	6440	3880	3760	2980
MEAN †	31.4	22.7	19.5	15.5	14.5	18.9	59.7	118	102	67.5	42.6	30.1
CFSM †	.65	.47	.40	.32	.30	.39	1.24	2.45	212	1.40	.88	.62
IN †	.75	.53	.47	.37	.31	.45	1.38	2.82	2.36	1.61	1.02	.70
AC-FT †	1,930	1,350	1,200	954	803	1,165	3,550	7,240	6,060	4,150	2,620	1,790

OBSERVED

CAL YR 1986	TOTAL	22,696	MEAN	62.2	MAX	385	MIN	9.0	AC-FT	45,020
WTR YR 1987	TOTAL	15,585	MEAN	42.7	MAX	195	MIN	9.0	AC-FT	30,910

ADJUSTED

CAL YR 1986	TOTAL	22,128	MEAN	60.6	CFSM	1.26	IN	17.08	AC-FT	43,890
WTR YR 1987	TOTAL	16,541	MEAN	45.3	CFSM	.94	IN	12.77	AC-FT	32,800

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

GALLATIN RIVER BASIN

06052500 GALLATIN RIVER AT LOGAN, MT

LOCATION.--Lat 45°53'07", long 111°26'15", in SE¼NW¼NE¼ sec.35, T.2 N., R.2 E., Gallatin County, Hydrologic Unit 10020008, on right bank at former county road bridge site, 0.2 mi upstream from present county bridge, 0.5 mi west of Logan, and at mile 6.3.

DRAINAGE AREA.--1,795 mi^2.

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

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

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

REMARKS.--Estimated daily discharges: Dec. 9-13, 16-23, 27-31, Jan. 1, 7-24, Feb. 1, 2, 14, 15, 26, 27. Water-discharge records good except those for estimated daily discharges, which are fair. Some regulation by Middle Creek Reservoir (station number 06049500). Diversions for irrigation of about 110,000 acres upstream from station.

AVERAGE DISCHARGE.--71 years (1894-1905, 1929-87), 1,074 ft^3/s, 778,100 acre-ft/yr.

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

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,100 ft^3/s, May 29, June 1, gage height, 5.59 ft; minimum, 312 ft^3/s, May 15, gage height, 3.52 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	959	908	860	e710	e680	678	649	1410	1940	410	675	704
2	987	880	861	731	e680	675	635	1300	1770	368	640	689
3	996	888	846	725	709	682	631	1010	1540	380	609	679
4	973	904	790	752	701	713	639	827	1360	413	594	662
5	973	892	841	760	703	733	656	711	1160	417	579	682
6	971	984	903	755	702	756	673	634	1120	461	552	668
7	967	961	873	e750	698	782	705	547	1110	439	522	662
8	959	899	861	e740	701	760	725	494	1230	396	539	648
9	943	847	e820	e720	704	715	754	445	1180	416	533	621
10	940	815	e820	e700	699	698	697	452	1180	500	511	608
11	940	810	e800	e700	698	699	671	399	1140	816	497	595
12	916	843	e800	e700	704	704	673	361	1030	1270	491	588
13	912	854	e780	e700	708	712	647	339	907	1050	477	585
14	934	842	777	e710	e700	745	622	319	788	885	493	582
15	919	887	768	e680	e700	728	631	364	718	782	502	575
16	911	887	e760	e600	706	706	687	848	638	710	563	575
17	906	904	e720	e660	695	708	745	990	601	674	713	569
18	900	894	e710	e700	701	703	807	753	553	888	673	588
19	891	918	e720	e700	693	713	930	711	534	1350	608	582
20	884	935	e730	e680	669	689	914	763	540	1150	582	575
21	882	1000	e740	e660	674	664	831	759	513	950	569	569
22	874	1040	e740	e680	683	660	803	712	551	923	565	535
23	865	958	e750	e700	689	662	841	633	634	945	583	501
24	862	952	740	e700	667	659	992	574	588	889	664	501
25	856	980	743	728	652	646	1070	557	575	835	909	495
26	846	914	741	700	e640	644	1120	589	556	794	1000	525
27	848	904	e730	717	e660	655	1200	655	496	748	894	634
28	855	922	e710	712	669	638	1250	1300	467	705	815	608
29	857	919	e710	707	---	601	1220	2040	470	677	762	582
30	877	900	e710	693	---	615	1320	1830	438	676	747	550
31	925	---	e710	703	---	658	---	1620	---	697	732	---
TOTAL	28328	27241	24064	21873	19285	21401	24738	24946	26327	22614	19593	17937
MEAN	914	908	776	706	689	690	825	805	878	729	632	598
MAX	996	1040	903	760	709	782	1320	2040	1940	1350	1000	704
MIN	846	810	710	600	640	601	622	319	438	368	477	495
AC-FT	56190	54030	47730	43390	38250	42450	49070	49480	52220	44850	38860	35580

CAL YR 1986 TOTAL 427591 MEAN 1171 MAX 6700 MIN 383 AC-FT 848100
WTR YR 1987 TOTAL 278347 MEAN 763 MAX 2040 MIN 319 AC-FT 552100

e Estimated

06054500 MISSOURI RIVER AT TOSTON, MT

LOCATION.--Lat 46°08'46", long 111°25'11", in NW¼SE¼NW¼ sec.36, T.5 N., R.2 E., Broadwater County, Hydrologic Unit 10030101, on left bank 2.2 mi southeast of Toston, 4.8 mi upstream from Crow Creek, 7.8 mi downstream from Sixteenmile Creek, and at mile 2,296.1.

DRAINAGE AREA.--14,669 mi^2.

WATER-DISCHARGE RECORDS

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

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

REMARKS.--Estimated daily discharges: Dec. 5 to Feb. 2. Water-discharge records good except those for Dec. 5 to Feb. 2, which are fair. Some regulation by six reservoirs on tributaries and Clark Canyon Reservoir (station 06015300). Diversions for irrigation of about 555,400 acres of which 12,000 acres lies downstream from station.

AVERAGE DISCHARGE.--52 years (1911-16, 1942-87), 5,400 ft^3/s, 3,912,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,000 ft^3/s, June 6, 1948, gage height, 11.77 ft; minimum, 562 ft^3/s, Apr. 30, 1941, gage height, 1.68 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,580 ft^3/s, May 28, gage height, 5.86 ft; minimum, 990 ft^3/s, May 15, gage height, 2.53 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5120	5220	4530	e3200	e3700	3310	3180	5350	5350	1440	2520	2930
2	5400	5190	4440	e3200	e3800	3450	3140	5490	5210	1360	2450	2890
3	5530	5150	4350	e3300	3880	3550	3230	5290	4950	1320	2440	2840
4	5520	5150	4060	e3400	3940	3580	3300	4650	4620	1350	2360	2830
5	5510	5130	e4000	e3500	3920	3700	3480	3830	4200	1540	2270	2870
6	5500	5280	e4000	e3500	3840	3880	3770	3180	3720	1700	2170	2870
7	5410	5290	e4000	e3300	3880	4020	4100	2570	3510	1610	2170	2850
8	5450	5220	e4000	e3000	3820	3990	4220	2080	3460	1480	2190	2820
9	5370	5060	e3800	e2800	3830	3890	4180	1900	3660	1450	2120	2780
10	5320	3940	e3500	e2900	3820	3830	4020	1740	3800	1540	2060	2690
11	5320	3710	e3200	e2900	3830	3880	3770	1580	3930	2050	2020	2620
12	5290	3780	e3100	e3000	3860	4000	3590	1620	3870	3000	2010	2620
13	5370	3590	e3100	e3200	3780	3970	3610	1440	3920	3000	2040	2590
14	5110	4130	e3400	e3300	3890	4000	3480	1260	3430	2980	2070	2550
15	5320	5200	e3400	e3200	3810	3900	3250	1090	3010	2640	2100	2520
16	5270	5710	e3400	e2500	3730	3500	3170	1130	2880	2560	2380	2540
17	5220	5520	e3300	e2100	3680	3600	3360	1790	2650	2370	2490	2580
18	5230	5390	e3200	e2200	3670	3610	3630	2650	2420	2830	2460	2580
19	5260	5530	e3100	e2500	3620	3680	4090	3140	2330	4190	2460	2610
20	5170	5430	e3100	e2700	3500	3650	4160	3270	2340	4820	2430	2600
21	5170	5380	e3100	e2800	3440	3540	4010	3430	2290	4580	2370	2620
22	5160	5350	e3000	e2900	3460	3430	4220	3590	2430	4620	2380	2630
23	5160	5140	e3200	e3100	3470	3380	4320	3770	2650	4510	2410	2570
24	5110	5030	e3500	e3200	3370	3350	4410	3610	2620	4230	2540	2480
25	5200	4970	e3500	e3300	3370	3320	4510	3450	2540	3850	3040	2490
26	5170	4950	e3500	e3300	3030	3270	4530	3450	2180	3630	3530	2490
27	5160	4860	e3300	e3500	3060	3240	4550	3720	2040	3300	3530	2690
28	5180	4770	e3100	e3600	3250	3250	4660	4680	1950	2860	3330	2730
29	5230	4700	e3100	e3700	---	3110	4840	6040	1780	2660	3070	2760
30	5340	4650	e3100	e3700	---	3080	5170	5770	1520	2580	3010	2770
31	5220	---	e3200	e3700	---	3150	---	5200	---	2550	2980	---
TOTAL	163790	148420	108580	96500	102250	111110	117950	101760	95260	84600	77400	80410
MEAN	5284	4947	3503	3113	3652	3584	3932	3283	3175	2729	2497	2680
MAX	5530	5710	4530	3700	3940	4020	5170	6040	5350	4820	3530	2930
MIN	5110	3590	3000	2100	3030	3080	3140	1090	1520	1320	2010	2480
AC-FT	324900	294400	215400	191400	202800	220400	234000	201800	188900	167800	153500	159500

CAL YR 1986 TOTAL 1910170 MEAN 5233 MAX 22200 MIN 1870 AC-FT 3789000
WTR YR 1987 TOTAL 1288030 MEAN 3529 MAX 6040 MIN 1090 AC-FT 2555000

e Estimated

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

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1949-53, 1965, 1972 to current year. Sampling location moved in October 1978, from old bridge on U. S. Highway 287 at Toston, to cableway 2.4 miles upstream.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: April 1973 to September 1981.
WATER TEMPERATURE: May 1949 to June 1953, April 1973 to current year.
SUSPENDED-SEDIMENT DISCHARGE: March 1949 to June 1953.

INSTRUMENTATION.--Temperature recorder since July 6, 1977.

REMARKS.--No record October 1-10, July 2-8 (erratic values).

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1973-81): Maximum daily, 524 microsiemens, Mar. 4, 1978; mimimum daily, 159 microsiemens, May 28, 1979.
WATER TEMPERATURE: Maximum, 26.0°C July 10, 21, 27, 1985; minimum, 0.0°C on many days during winter.
SEDIMENT CONCENTRATION (water years 1949-53): Maximum daily mean, 670 mg/L, Mar. 22, 25, 1951; minimum daily mean, 5 mg/L, Jul. 12, 1951.
SEDIMENT LOAD (water years 1949-53): Maximum daily, 16,100 tons, May 5, 1952; minimum daily, 51 tons Feb. 1, 1951.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum recorded, 23.5°C July 1, but may have been higher during periods of instrument malfunction; minimum, 0.5°C on many days during winter period.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)
OCT								
10...	0900	5320	--	--	371	5.0	11.5	--
NOV								
13...	0945	3960	90	2	380	-8.0	0.0	663
JAN								
08...	0900	3040	--	--	410	-5.0	0.5	--
FEB								
19...	1410	3640	--	--	395	2.0	1.5	--
MAR								
09...	1400	3870	70	1	367	9.0	4.5	662
MAY								
12...	1300	1760	80	1	322	27.0	18.0	656
JUL								
02...	0900	1350	--	--	383	--	15.5	--
AUG								
20...	1000	2430	--	--	375	14.0	17.0	--
27...	0900	3560	5	1	382	14.0	16.0	668

DATE	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BICAR-BONATE WATER WHOLE IT-FLD (MG/L) (00450)	CAR-BONATE WATER WHOLE IT-FLD (MG/L) (00447)	ALKA-LINITY WH WAT TOTAL FIELD MG/L AS CACO3 (00410)
OCT							
10...	--	--	--	--	--	--	--
NOV							
13...	12.5	98	K6	52	166	0	135
JAN							
08...	--	--	--	--	--	--	--
FEB							
19...	--	--	--	--	--	--	--
MAR							
09...	12.6	112	K8	34	163	0	133
MAY							
12...	10.4	128	K8	K11	158	0	128
JUL							
02...	--	--	--	--	--	--	--
AUG							
20...	--	--	--	--	--	--	--
27...	9.5	110	69	52	170	0	136

06054500 MISSOURI RIVER AT TOSTON, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV 13...	0945	7.80	2.4	140	10	38	12	24	0.9
MAR 09...	1400	8.00	6.4	150	14	39	12	23	0.9
MAY 12...	1300	8.30	2.5	130	1	35	10	19	0.8
AUG 27...	0900	7.90	3.3	150	11	39	12	23	0.9

DATE	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
NOV 13...	4.0	140	39	12	1.4	30	235	240	0.32
MAR 09...	4.0	140	39	21	1.4	27	243	250	0.33
MAY 12...	3.1	127	32	11	1.0	22	213	210	0.29
AUG 27...	7.8	146	46	12	1.3	26	232	250	0.32

DATE	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	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 13...	2510	<0.010	0.170	0.020	0.050	0.40	0.040	0.010	0.030
MAR 09...	2540	<0.010	0.220	0.020	0.020	1.2	0.050	0.020	0.020
MAY 12...	1010	<0.010	<0.100	<0.010	<0.010	0.70	0.030	0.030	0.010
AUG 27...	2230	<0.010	<0.100	0.010	<0.010	1.1	0.010	0.010	<0.010

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)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)
NOV 13...	0945	<10	36	42	<0.5	<1	<1	<3	5	18	6	100
MAR 09...	1400	<10	22	40	<0.5	<1	<1	<3	5	16	<5	87
MAY 12...	1300	<10	34	41	<0.5	<1	<1	<3	5	14	<5	76
AUG 27...	0900	20	21	50	<0.5	3	<1	<3	4	25	<5	81

DATE	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)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 13...	20	<0.1	<10	3	<1	<1	210	<6	9	12	128	69
MAR 09...	7	<0.1	<10	4	<1	<1	220	<6	8	55	575	44
MAY 12...	12	<0.1	<10	<1	<1	<1	200	<6	7	10	48	77
AUG 27...	10	<0.1	<10	<1	<1	<1	220	<6	4	23	221	60

06054500 MISSOURI RIVER AT TOSTON, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	7.0	6.5	7.0	1.5	1.5	1.5	.5	.5	.5
2	---	---	---	6.5	6.0	6.5	2.0	1.5	1.5	1.0	.5	.5
3	---	---	---	7.0	6.0	6.5	2.0	1.5	1.5	1.0	.5	.5
4	---	---	---	7.0	6.5	7.0	1.0	1.0	1.0	1.0	.5	.5
5	---	---	---	7.5	6.5	7.0	1.5	1.0	1.0	1.0	.5	.5
6	---	---	---	7.5	5.0	6.5	1.5	1.0	1.0	1.0	.5	.5
7	---	---	---	5.0	4.0	5.0	1.5	1.0	1.0	1.0	.5	.5
8	---	---	---	4.0	1.5	2.5	1.5	1.0	1.0	.5	.5	.5
9	---	---	---	1.5	1.0	1.0	1.0	1.0	1.0	.5	.5	.5
10	---	---	---	1.5	1.0	1.0	1.0	1.0	1.0	.5	.5	.5
11	9.5	8.0	8.5	1.0	1.0	1.0	1.0	1.0	1.0	.5	.5	.5
12	8.5	7.5	8.0	1.5	1.0	1.0	1.0	1.0	1.0	1.0	.5	.5
13	7.5	7.5	7.5	1.5	1.0	1.0	1.0	1.0	1.0	1.0	.5	.5
14	8.5	8.0	8.0	1.5	1.0	1.0	1.0	1.0	1.0	.5	.5	.5
15	8.0	8.0	8.0	1.5	1.0	1.0	1.0	1.0	1.0	.5	.5	.5
16	8.5	8.0	8.5	1.5	1.0	1.0	1.0	1.0	1.0	.5	.5	.5
17	9.0	8.5	8.5	1.5	1.0	1.0	1.0	1.0	1.0	.5	.5	.5
18	9.0	8.5	9.0	1.5	1.0	1.0	1.0	1.0	1.0	.5	.5	.5
19	9.5	9.0	9.0	1.5	1.0	1.5	1.0	1.0	1.0	.5	.5	.5
20	9.5	9.0	9.0	1.5	1.0	1.5	1.0	.5	1.0	.5	.5	.5
21	9.5	9.0	9.5	3.0	1.5	2.5	1.0	.5	1.0	.5	.5	.5
22	9.0	8.5	9.0	3.0	2.5	3.0	1.0	1.0	1.0	.5	.5	.5
23	8.5	8.5	8.5	3.0	3.0	3.0	1.0	.5	1.0	.5	.5	.5
24	8.5	8.5	8.5	4.0	3.0	3.5	1.0	1.0	1.0	.5	.5	.5
25	9.0	8.5	9.0	4.0	3.0	3.5	1.0	.5	1.0	1.0	.5	.5
26	9.0	8.5	9.0	3.0	2.0	2.5	1.0	.5	1.0	.5	.5	.5
27	9.0	9.0	9.0	3.0	2.0	2.5	1.0	.5	1.0	.5	.5	.5
28	9.0	8.5	8.5	3.0	2.5	3.0	1.0	.5	.5	1.0	.5	.5
29	8.5	8.0	8.0	3.0	2.5	3.0	1.0	.5	.5	1.0	.5	.5
30	9.0	8.0	8.5	2.5	1.5	2.0	1.0	.5	1.0	.5	.5	.5
31	8.5	7.0	8.0	---	---	---	1.0	.5	.5	.5	.5	.5
MONTH	---	---	---	7.5	1.0	2.98	2.0	.5	1.00	1.0	.5	.50
		FEBRUARY			MARCH			APRIL			MAY	
1	1.0	.5	.5	2.0	.5	1.0	8.0	7.0	7.5	17.0	15.5	16.0
2	.5	.5	.5	3.0	1.5	2.0	8.0	7.0	7.5	16.5	14.0	15.0
3	1.0	.5	.5	3.5	2.5	3.0	9.5	7.5	8.5	13.5	12.5	13.0
4	1.0	.5	.5	5.0	3.5	4.0	10.5	8.5	9.5	15.0	13.5	14.0
5	1.0	.5	.5	6.0	5.0	5.5	11.5	10.0	10.5	17.0	15.0	16.0
6	1.0	.5	.5	6.5	5.5	6.5	11.5	11.0	11.5	18.0	16.5	17.0
7	1.0	.5	.5	7.0	6.0	6.5	11.5	11.0	11.5	19.0	17.5	18.0
8	1.0	.5	.5	6.0	5.0	5.5	11.5	9.0	10.5	20.5	18.0	19.0
9	1.0	.5	.5	5.0	4.5	4.5	8.5	6.5	7.5	19.5	18.0	18.5
10	1.0	.5	.5	5.0	4.5	5.0	8.0	6.5	7.0	20.0	17.5	18.5
11	1.0	.5	.5	6.0	5.0	5.5	9.5	8.0	9.0	20.5	17.0	18.5
12	1.0	.5	.5	7.0	6.0	6.5	9.5	8.0	8.5	19.5	17.0	18.0
13	1.5	.5	1.0	8.0	7.0	7.5	9.5	7.5	8.5	20.0	16.5	18.0
14	2.0	1.0	1.5	7.5	6.5	7.0	11.0	9.5	10.0	21.5	16.0	18.0
15	2.0	1.0	1.5	6.5	5.5	6.0	11.0	10.0	10.5	22.5	16.0	18.5
16	2.0	1.5	2.0	7.0	6.0	6.5	12.0	10.5	11.5	17.5	16.0	17.0
17	2.5	1.5	2.0	7.0	5.5	6.0	13.0	12.0	12.5	16.5	13.5	15.5
18	2.5	2.0	2.5	8.5	7.0	8.0	13.0	12.0	12.5	13.0	11.5	12.5
19	2.0	1.5	1.5	7.0	5.0	6.5	12.0	9.5	10.5	13.5	12.0	13.0
20	1.5	1.0	1.0	6.0	5.0	5.5	10.5	8.5	9.5	13.5	9.5	12.0
21	2.5	1.0	1.5	6.0	5.0	5.5	12.0	10.0	11.0	10.5	9.0	9.5
22	2.5	2.0	2.0	4.5	4.0	4.0	13.5	12.0	12.5	11.5	9.5	10.5
23	2.0	1.0	1.5	6.0	3.5	4.5	14.0	13.0	13.5	14.5	11.5	13.0
24	1.0	.5	.5	6.5	5.5	6.0	14.5	14.0	14.5	16.0	14.5	15.0
25	.5	.5	.5	6.5	5.5	6.0	15.5	14.5	15.0	16.5	15.5	16.0
26	1.0	.5	.5	7.0	6.0	6.5	16.5	15.0	15.5	17.0	15.0	16.0
27	1.0	.5	.5	5.5	5.0	5.0	17.0	16.0	16.5	17.0	15.0	16.5
28	1.0	.5	.5	4.5	2.0	3.5	17.0	16.5	16.5	16.0	15.0	15.5
29	---	---	---	2.0	1.0	1.5	18.0	17.0	17.0	16.5	15.0	15.5
30	---	---	---	4.5	2.0	3.0	17.5	16.5	17.0	16.5	16.0	16.0
31	---	---	---	7.5	4.5	5.5	---	---	---	16.0	12.5	15.0
MONTH	2.5	.5	.95	8.5	.5	5.15	18.0	6.5	11.4	22.5	9.0	15.6

06054500 MISSOURI RIVER AT TOSTON, MT--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	12.5	10.0	11.0	23.5	20.0	21.5	21.0	19.0	20.5	19.0	17.5	18.5
2	11.0	10.0	10.5	---	---	---	21.0	19.5	20.0	19.0	17.5	18.5
3	13.5	11.0	12.0	---	---	---	20.5	19.0	20.0	17.5	15.5	16.5
4	16.5	14.0	15.0	---	---	---	21.5	19.5	20.5	16.0	15.0	15.5
5	18.5	16.5	17.5	---	---	---	22.0	20.0	21.0	16.5	15.5	15.5
6	18.5	17.5	18.0	---	---	---	21.0	19.5	20.0	16.5	15.5	16.0
7	20.0	17.5	18.5	---	---	---	21.0	19.5	20.0	16.0	15.0	15.5
8	21.0	19.5	20.5	---	---	---	21.0	19.5	20.0	17.0	15.5	16.0
9	21.0	20.0	20.5	22.0	18.0	19.5	22.0	20.0	21.0	16.5	15.5	15.5
10	21.0	19.5	20.0	21.0	19.0	20.0	22.0	20.0	21.0	16.5	15.0	15.5
11	19.5	19.0	19.5	19.0	13.5	17.5	20.5	18.0	19.5	17.5	15.5	16.5
12	19.5	19.0	19.5	17.0	14.0	15.5	18.5	16.0	17.5	17.0	16.0	16.5
13	20.0	19.5	19.5	18.5	16.0	17.0	17.5	16.0	17.0	17.0	15.5	16.0
14	21.5	20.0	21.0	19.5	18.0	18.5	18.0	16.5	17.0	17.0	16.0	16.5
15	22.0	20.5	21.5	20.5	19.0	19.5	17.5	16.0	16.5	17.5	16.0	17.0
16	20.0	17.5	19.0	19.5	17.5	18.5	15.5	14.5	15.5	16.5	14.5	15.5
17	18.5	17.0	17.5	21.0	17.5	19.5	15.5	14.0	14.5	14.5	13.0	14.0
18	19.0	17.5	18.0	18.0	14.5	16.5	16.0	14.5	15.5	14.0	12.5	13.0
19	18.0	16.5	17.5	16.0	14.5	15.0	17.5	15.5	16.5	14.0	12.5	13.0
20	17.5	16.0	16.5	15.0	14.0	14.5	18.5	16.5	17.0	15.0	13.5	14.0
21	19.5	16.5	18.0	20.5	15.0	17.0	18.0	17.0	17.5	15.5	14.0	14.5
22	21.5	17.5	19.5	20.0	15.5	16.5	18.0	16.5	17.0	15.5	14.0	15.0
23	18.0	17.0	17.5	20.0	18.5	19.5	19.0	17.0	18.0	16.0	14.5	15.0
24	18.0	16.5	17.0	20.0	18.5	19.5	18.0	16.5	17.5	16.0	15.0	15.5
25	19.0	17.5	18.0	21.5	20.0	21.0	16.5	14.0	15.0	16.5	15.0	15.5
26	21.0	19.0	20.0	22.0	20.5	21.0	14.5	13.5	14.0	16.0	15.0	15.5
27	23.0	20.0	21.5	22.5	21.0	21.5	16.5	14.5	15.5	15.0	13.0	14.0
28	22.5	20.0	21.5	22.5	21.0	22.0	17.0	15.5	16.0	13.5	12.5	13.0
29	22.0	19.0	20.5	23.0	21.5	22.0	17.5	16.5	16.5	14.0	12.5	13.0
30	23.0	19.0	21.0	22.5	21.0	21.5	16.5	15.0	16.0	14.0	13.0	13.5
31	---	---	---	23.0	21.0	22.0	18.0	16.5	17.0	---	---	---
MONTH	23.0	10.0	18.2	---	---	---	22.0	13.5	17.8	19.0	12.5	15.3

06058500 CANYON FERRY LAKE NEAR HELENA, MT

LOCATION.--Lat 46°38'57", long 111°43'39", in SE¼SE¼ sec.4, T.10 N., R.1 W., Lewis and Clark County, Hydrologic Unit 10030101, in block 17 of Canyon Ferry Dam, 15 mi east of Helena, and at mile 2,252.8.

DRAINAGE AREA.--15,904 mi^2.

PERIOD OF RECORD.--April 1953 to current year (monthend contents only). Prior to October 1981, published as Canyon Ferry Reservoir near Helena. Records of monthend contents in Lake Sewell, submerged by present reservoir Apr. 8, 1953, available January 1936 to March 1953. Scattered daily elevations and contents for April to July 1953, published in WSP 1320-B. Daily elevations and contents for May to June 1964, published in WSP 1840-B. Daily elevations and contents on file in Helena district office.

REVISED RECORDS.--WSP 1559: Drainage area.

GAGE.--Water-stage recorder in powerhouse control room. Datum of gage is referenced to National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

REMARKS.--Reservoir is formed by concrete dam; construction began in 1949, completed in 1953. Storage began in March 1953. Usable capacity, 2,043,000 acre-ft between elevation 3,650.00 ft, invert of outlet works, and 3,800.00 ft, controlled spillway elevation. Dead storage, 7,470 acre-ft, below elevation 3,650.00 ft. Minimum operating level, 426,500 acre-ft at elevation 3,728.00 ft for on-site power generation. Figures given herein represent usable contents. Water is used for power production, flood control, irrigation, recreation, and supplemental water supply for city of Helena.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 2,043,000 acre-ft, July 15-29, 31, 1955, July 2, 5, 6, 8, 1956, July 16, 17, 1962, June 23, 1964, elevation, 3,800.0 ft; minimum since first filling, 1,017,000 acre-ft, Apr. 11, 1967, elevation, 3,764.70 ft.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents at 2400, 1,810,000 acre-ft, Nov. 2-7, elevation, 3,792.85 ft; minimum, 1,545,000 acre-ft, Feb. 6,7, elevation, 3,784.42 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	3,790.48	1,734,000	---
Oct. 31	3,792.84	1,810,000	+ 76,000
Nov. 30	3,791.90	1,780,000	- 30,000
Dec. 31	3,788.82	1,682,000	- 98,000
CAL YR 1986			+126,000
Jan. 31	3,784.62	1,551,000	-131,000
Feb. 28	3,784.51	1,548,000	-3,000
Mar. 31	3,785.09	1,566,000	+18,000
Apr. 30	3,785.33	1,573,000	+7,000
May 31	3,786.46	1,608,000	+35,000
June 30	3,787.45	1,639,000	+31,000
July 31	3,787.15	1,630,000	-9,000
Aug. 31	3,785.52	1,579,000	-51,000
Sept. 30	3,784.63	1,552,000	-27,000
WTR YR 1987			+182,000

06058502 MISSOURI RIVER BELOW CANYON FERRY DAM, NEAR HELENA, MT

LOCATION.--Lat 46°38'57", long 111°43'39", in SE¼SE¼ sec.4, T.10 N., R.1 W., Lewis and Clark County, Hydrologic Unit 10030101, at penstock of No. 1 generator at Canyon Ferry Dam, 15 mi east of Helena, and at mile 2,242.8.

DRAINAGE AREA.--15,904 mi2.

PERIOD OF RECORD.--Water years 1968 to current year (discontinued). Prior to October 1971 samples and water temperature were obtained about 200 ft downstream from dam in tailrace pond.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1967 to current year (discontinued).
WATER TEMPERATURE: October 1967 to September 1979.

REMARKS.--Flow completely regulated. Many diversions for irrigation upstream from station. Unpublished records of once-daily water temperature are available in files of District office.

COOPERATION.--Records of discharge furnished by Canyon Ferry Project Office, Bureau of Reclamation, Helena, MT.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 442 microsiemens, Mar. 31, Apr. 13, 1978; minimum daily, 241 microsiemens, Dec. 16, 1968.
WATER TEMPERATURE (water years 1968-79): Maximum daily, 20.0°C, Aug.27, 1969; minimum daily, (water years 1968-71) 0.0°C on several days during winter, (water years 1972-79) 1.5°C, Jan. 3, 1972.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum daily, 417 microsiemens, Mar. 16; minimum daily, 332 microsiemens, Nov. 2.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS (MG/L AS CACO3) (00900)
OCT 10...	1300	3760	90	2	343	6.0	13.0	7.90	130
NOV 20...	1115	5500	80	1	338	11.0	8.0	8.10	98
JAN 08...	1300	5370	5	1	346	-7.0	4.5	8.08	130
FEB 20...	0830	3800	70	3	391	-5.0	4.0	8.01	160
APR 03...	1045	3160	0	0	328	10.0	4.0	8.80	150
MAY 18...	1645	2320	95	2	372	16.0	7.0	8.20	150
JUN 29...	1445	3600	0	0	377	31.0	10.0	8.30	150
AUG 20...	1130	3990	5	1	379	22.0	14.0	7.90	150

DATE	HARD-NESS NONCARB WH WAT TOT FLD 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)
OCT 10...	6	35	10	18	0.7	3.2	123	30
NOV 20...	0	26	8.0	14	0.6	2.7	124	22
JAN 08...	4	36	10	18	0.7	3.7	127	32
FEB 20...	12	41	13	21	0.8	3.7	144	46
APR 03...	10	41	12	21	0.8	3.6	142	35
MAY 18...	7	39	12	20	0.7	3.4	140	36
JUN 29...	6	39	12	20	0.7	3.5	141	38
AUG 20...	13	42	12	19	0.7	4.1	141	35

06058502 MISSOURI RIVER BELOW CANYON FERRY DAM, NEAR HELENA, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	PHOSPHORUS, DISSOLVED (MG/L AS P) (00666)
OCT 10...	14	0.90	22	210	0.28	2100	0.220	--
NOV 20...	10	0.90	16	170	0.24	2580	0.200	--
JAN 08...	11	1.0	21	210	0.28	3030	0.200	0.010
FEB 20...	14	1.1	24	250	0.34	2570	0.300	<0.010
APR 03...	11	1.1	24	230	0.32	2000	0.170	0.020
MAY 18...	11	1.0	22	230	0.31	1430	0.100	0.020
JUN 29...	12	1.0	20	230	0.31	2240	0.210	0.050
AUG 20...	11	0.10	20	230	0.31	2450	0.210	0.030

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
ONCE DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	339	337	348	344	382	395	393	375	378	382	386	393
2	337	332	344	355	389	397	389	377	381	381	388	389
3	342	341	340	353	378	399	386	380	380	382	386	386
4	338	334	346	354	380	398	385	380	379	383	383	383
5	337	333	340	348	363	400	390	382	382	383	391	384
6	338	335	340	352	370	398	396	379	386	385	394	383
7	337	337	339	346	392	401	390	381	384	382	385	391
8	341	339	348	350	384	395	391	377	380	381	386	387
9	339	344	340	347	391	402	386	379	383	387	387	385
10	343	336	341	352	389	401	395	382	387	386	388	386
11	340	340	343	350	386	398	390	379	387	365	381	381
12	336	342	348	350	400	404	389	379	394	383	382	380
13	339	338	342	349	398	405	387	380	386	385	387	386
14	335	341	341	350	387	386	383	378	388	382	385	385
15	335	338	340	353	394	403	384	377	382	381	389	385
16	343	337	344	358	---	417	393	380	379	382	387	382
17	334	335	347	352	397	400	383	381	377	370	384	380
18	339	339	342	359	395	407	388	379	381	381	392	380
19	341	337	342	358	396	411	388	378	383	384	387	383
20	339	337	344	351	401	389	384	377	380	379	383	383
21	339	336	342	350	396	400	381	378	387	383	381	381
22	340	335	343	353	396	399	382	377	381	381	382	381
23	339	335	342	358	397	405	395	378	384	381	385	380
24	339	333	341	364	395	405	385	378	378	376	384	382
25	338	334	340	353	416	389	382	377	384	382	380	384
26	338	336	343	351	399	407	383	376	380	380	381	382
27	340	334	351	354	398	396	382	371	386	375	381	383
28	341	334	340	353	394	391	381	375	381	380	384	381
29	339	335	342	378	---	382	380	374	380	381	381	381
30	340	334	343	380	---	393	382	375	380	380	380	381
31	341	---	345	374	---	391	---	376	---	381	381	---
MEAN	339	337	343	355	---	399	387	378	383	381	385	384

06061500 PRICKLY PEAR CREEK NEAR CLANCY, MT

LOCATION.--Lat 46°31'09", long 111°56'45", in NE¼SE¼SW¼ sec.23, T.9 N., R.3 W., Jefferson County, Hydrologic Unit 10030101, on right bank 3.5 mi downstream from Lump Gulch Creek, 4 mi northeast of Clancy, 7 mi southeast of Helena, and at mile 24.4.

DRAINAGE AREA.--192 mi^2.

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

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

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

REMARKS.--Estimated daily discharges: Nov. 6-16, Dec. 4 to Jan. 30, Feb. 20-28. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 700 acres upstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--51 years (water years, 1909-16, 1922-33, 1946-53, 1955-69, 1979-87), 49.8 ft^3/s, 36,080 acre-ft/yr.

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

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

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

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan. 23	2000	ice jam	*2.80	May 28	0300	*226	2.46

Minimum discharge, 12 ft^3/s, Mar. 29, result of freezeup.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	27	26	e20	20	22	37	72	108	24	40	24
2	34	28	26	e21	21	22	33	68	93	24	37	23
3	34	27	22	e22	20	24	35	56	83	26	35	23
4	33	26	e21	e22	20	28	39	50	76	25	33	22
5	34	26	e23	e21	21	33	43	50	69	25	32	22
6	34	e25	e22	e21	21	39	45	49	67	24	31	22
7	33	e25	e21	e20	20	43	44	47	63	23	32	23
8	32	e24	e21	e19	22	36	42	44	62	25	30	22
9	32	e24	e20	e19	22	29	37	39	61	29	28	22
10	32	e24	e20	e19	21	28	34	37	62	71	28	21
11	33	e25	e20	e19	21	28	35	35	54	120	27	21
12	32	e25	e20	e19	22	28	34	34	48	64	30	21
13	32	e26	e21	e20	22	32	31	34	43	46	28	20
14	32	e26	e22	e20	23	33	32	34	40	39	29	19
15	32	e25	e22	e20	26	29	36	33	37	35	29	19
16	31	e25	e21	e19	22	29	42	39	39	33	28	32
17	31	27	e20	e18	22	28	49	51	37	56	28	29
18	31	30	e20	e18	22	30	46	57	46	174	26	25
19	30	28	e19	e19	22	29	43	56	53	126	25	23
20	30	29	e20	e20	e25	28	37	79	46	86	24	22
21	30	33	e21	e20	e23	27	40	68	40	73	23	21
22	30	31	e22	e20	e21	27	47	64	38	69	23	21
23	30	29	e23	e20	e20	26	50	83	37	75	23	21
24	29	29	e24	e20	e20	27	51	78	35	65	26	20
25	29	30	e25	e21	e19	27	55	80	31	55	34	20
26	29	27	e24	e21	e19	28	56	94	28	49	39	21
27	29	29	e23	e21	e19	26	54	119	26	45	32	20
28	29	28	e22	e21	e20	22	60	199	26	43	29	20
29	29	27	e21	e21	---	26	68	138	26	44	27	20
30	27	24	e20	e20	---	30	72	114	25	43	26	20
31	27	---	e20	20	---	30	---	113	---	43	25	---
TOTAL	965	809	672	621	596	894	1327	2114	1499	1679	907	659
MEAN	31.1	27.0	21.7	20.0	21.3	28.8	44.2	68.2	50.0	54.2	29.3	22.0
MAX	35	33	26	22	26	43	72	199	108	174	40	32
MIN	27	24	19	18	19	22	31	33	25	23	23	19
AC-FT	1910	1600	1330	1230	1180	1770	2630	4190	2970	3330	1800	1310

CAL YR 1986 TOTAL 17576 MEAN 48.2 MAX 203 MIN 19 AC-FT 34860
WTR YR 1987 TOTAL 12742 MEAN 34.9 MAX 199 MIN 18 AC-FT 25270

e Estimated

06062500 TENMILE CREEK NEAR RIMINI, MT

LOCATION.--Lat 46°31'27", long 112°15'22", in NW¼SW¼NE¼ sec.20, T.9 N., R.5 W., Lewis and Clark County, Hydrologic Unit 10030101, Helena National Forest, on left bank at U.S. Forest Service Moose Creek picnic grounds, 500 ft upstream from Moose Creek, 2.5 mi north of Rimini, and at mile 20.4.

DRAINAGE AREA.--32.7 mi^2.

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

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

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

REMARKS.--No estimated daily discharges this year. Records good. Flow regulated by Chessman and Scott Reservoirs on tributaries upstream from station, combined capacity, 2,340 acre-ft. Small diversions upstream from station for water supply for city of Helena. Several observations of water temperature and specific conducance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--73 years, 17.8 ft^3/s, 12,900 acre-ft/yr.

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

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

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 27	1915	*145	*2.96	May 31	1015	109	2.76

Minimum discharge, 0.50 ft^3/s, Feb. 20, gage height, 1.18 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.2	1.9	2.8	1.6	2.2	1.1	3.9	67	85	3.8	14	2.5
2	4.5	1.8	2.2	2.0	2.1	1.1	3.4	60	70	3.2	12	2.7
3	4.2	1.8	1.4	2.2	2.1	1.2	5.0	50	60	11	12	2.4
4	4.0	1.6	1.7	2.2	2.0	1.5	9.5	45	53	7.5	11	2.6
5	4.3	1.8	2.4	2.0	1.9	2.8	12	40	47	7.0	9.4	2.6
6	3.9	2.3	2.2	1.9	1.9	6.2	14	36	43	6.4	8.0	2.7
7	4.0	1.7	2.1	1.8	2.0	6.8	14	34	39	5.9	7.8	2.8
8	4.4	1.0	1.9	1.7	2.0	4.9	15	33	38	4.6	7.4	2.6
9	3.6	1.3	1.9	1.6	2.0	4.2	12	29	52	4.3	7.1	5.5
10	4.0	1.8	1.9	1.7	2.0	3.7	11	25	39	30	7.0	4.4
11	3.6	2.5	1.8	1.9	2.0	3.2	12	23	34	32	6.3	3.4
12	3.1	1.9	1.9	1.9	1.4	3.4	10	21	30	17	6.1	3.2
13	3.6	1.8	1.9	1.8	1.3	5.3	9.1	25	26	12	5.8	3.1
14	3.5	2.4	1.9	1.6	1.2	5.4	10	21	22	9.9	9.2	3.0
15	3.3	2.3	1.7	1.6	1.1	4.6	14	20	20	8.2	8.8	2.9
16	3.2	2.2	1.7	1.6	1.1	4.5	21	24	20	7.0	9.6	4.1
17	3.1	2.3	1.6	1.6	1.1	4.4	26	29	19	40	6.8	4.9
18	3.0	2.3	1.7	1.8	1.0	4.7	24	25	27	85	5.7	3.5
19	2.7	2.6	1.8	1.9	.98	3.4	20	27	26	57	5.0	3.2
20	2.8	2.6	2.1	1.8	.95	4.3	19	29	21	41	4.4	2.9
21	2.8	4.1	2.4	2.2	1.1	3.7	22	25	19	35	4.1	2.5
22	2.6	3.1	2.4	2.4	1.1	3.9	27	31	17	34	3.9	2.4
23	2.5	2.8	2.5	2.3	1.0	3.8	31	38	16	51	3.9	2.3
24	2.3	3.5	2.3	2.3	1.1	3.6	41	39	14	34	4.2	2.3
25	1.9	2.9	2.2	2.3	1.1	2.9	47	43	12	29	5.2	2.2
26	1.7	2.8	2.1	2.3	1.1	3.0	52	63	10	24	5.2	2.4
27	1.8	2.7	2.0	2.3	1.1	2.7	56	89	7.2	20	3.4	2.9
28	1.8	2.6	2.0	2.3	1.1	2.5	62	128	6.6	19	2.6	2.7
29	2.7	2.4	1.9	2.1	---	3.2	69	102	6.2	18	2.6	2.5
30	2.7	1.9	2.2	2.1	---	3.1	71	87	5.2	17	2.9	1.9
31	2.2	---	1.9	2.0	---	3.5	---	97	---	15	2.7	---
TOTAL	99.0	68.7	62.5	60.8	41.03	112.6	742.9	1405	884.2	688.8	204.1	89.1
MEAN	3.19	2.29	2.02	1.96	1.47	3.63	24.8	45.3	29.5	22.2	6.58	2.97
MAX	5.2	4.1	2.8	2.4	2.2	6.8	71	128	85	85	14	5.5
MIN	1.7	1.0	1.4	1.6	.95	1.1	3.4	20	5.2	3.2	2.6	1.9
AC-FT	196	136	124	121	81	223	1470	2790	1750	1370	405	177

CAL YR 1986 TOTAL 6623.47 MEAN 18.1 MAX 183 MIN .75 AC-FT 13140
WTR YR 1987 TOTAL 4458.70 MEAN 12.2 MAX 128 MIN .95 AC-FT 8840

MISSOURI RIVER MAIN STEM

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

LOCATION.--Lat 46°59'41", long 112°00'37", in NE¼SW¼SE¼ sec.5, T.14 N., R.3 W., Lewis and Clark County, Hydrologic Unit 10030102, on left bank 0.4 mi downstream from Holter Dam, 2.8 mi southeast of Wolf Creek, and at mile 2,210.7.

DRAINAGE AREA.--17,149 mi^2.

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

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

REMARKS.--No estimated daily discharges this year. Records good. Flow regulated by nine smaller irrigation reservoirs and powerplants, Clark Canyon Reservoir (station number 06015300), and Canyon Ferry Lake (station number 06058500). Diversions for irrigation of about 594,400 acres. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--42 years, 5,678 ft^3/s, 4,114,000 acre-ft/yr.

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

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,340 ft^3/s, Jan. 16, gage height, 3.75 ft; maximum gage height, 3.90 ft, Nov. 10; minimum daily discharge, 2,140 ft^3/s, July 16.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3930	5450	5710	5280	5060	3680	3850	4130	2570	2990	2730	3570
2	3920	5640	5790	5270	5140	3630	3840	4170	2540	3090	2770	3550
3	3910	5620	5750	5290	4890	3680	3840	4130	2540	3160	2930	3590
4	3940	5620	5790	5230	4550	3770	3840	4050	2550	3220	3070	3600
5	3900	5580	5700	5140	4520	3860	3850	4030	2550	3290	3140	3560
6	3900	5480	5620	5130	4350	3950	3870	3910	2550	3360	3310	3600
7	3940	5540	5530	5150	4370	3970	3870	3530	2560	3360	3320	3570
8	3960	5670	5510	5310	4100	3940	3870	3270	2600	3400	3360	3580
9	3950	5690	5510	5640	3620	3820	3890	3270	2770	3490	3410	3560
10	4020	5980	5500	5680	3580	3900	3900	3270	2860	3510	3380	3520
11	4020	6130	5510	5470	3570	4170	3900	3280	2800	3480	3330	3500
12	4000	6160	5450	5570	3580	3700	3910	3210	2770	3470	3290	3500
13	4010	6000	5430	5910	3890	3920	3930	2970	2780	3450	3330	3500
14	4050	5830	5420	5980	3870	3950	3950	2720	2790	3380	3490	3510
15	4050	5860	5430	6120	3890	3980	3950	2670	2790	3180	3500	3490
16	4060	5890	5430	6270	3800	3920	3970	2310	2810	3120	3370	3570
17	4030	5800	5470	6310	3760	3890	4150	2160	3030	3410	3440	3660
18	4080	5800	5300	6290	3720	3900	4470	2150	3200	3810	3450	3610
19	4120	5750	5270	5920	3810	3990	4580	2140	3500	3970	3470	3600
20	4130	5910	5310	5240	3920	4070	4610	2160	3430	3660	3440	3600
21	4120	5930	5300	5030	3960	4070	4430	2270	3280	3400	3370	3560
22	4120	5980	5380	4980	3920	4070	4280	2400	3340	3790	3410	3530
23	4150	6030	5390	4980	3890	4060	4290	2570	3310	3490	3450	3440
24	4170	6010	5050	5000	3880	4060	4320	2640	3240	3420	3480	3410
25	4510	6020	4910	5030	3860	4030	4310	2590	3230	3450	3540	3380
26	5070	5930	4930	5190	3830	4040	4310	2600	3090	3400	3600	3380
27	5240	5680	4930	5450	3830	3960	4280	2890	3070	3320	3690	3440
28	5250	5710	4960	5540	3780	3860	4160	2970	3090	3230	3700	3450
29	5280	5860	5060	5260	---	3860	4060	2640	3030	2980	3590	3400
30	5280	5790	5140	5100	---	3840	4090	2630	2990	2850	3520	3290
31	5300	---	5090	5060	---	3830	---	2610	---	2790	3510	---
TOTAL	132410	174340	166570	168820	112940	121370	122570	92340	87660	103920	104390	105520
MEAN	4271	5811	5373	5446	4034	3915	4086	2979	2922	3352	3367	3517
MAX	5300	6160	5790	6310	5140	4170	4610	4170	3500	3970	3700	3660
MIN	3900	5450	4910	4980	3570	3630	3840	2140	2540	2790	2730	3290
AC-FT	262600	345800	330400	334900	224000	240700	243100	183200	173900	206100	207100	209300

CAL YR 1986 TOTAL 2017180 MEAN 5527 MAX 14500 MIN 3900 AC-FT 4001000
WTR YR 1987 TOTAL 1492850 MEAN 4090 MAX 6310 MIN 2140 AC-FT 2961000

SMITH RIVER BASIN

06076690 SMITH RIVER NEAR FORT LOGAN, MT

LOCATION.--Lat 46°47'45", long 111°10'41", in NE¼SW¼SW¼ sec.13, T.12 N., R.4 E., Meagher County, Hydrologic Unit 10030103, on left bank, 15 ft downstream from ranch bridge, 1.0 mi upstream from Sheep Creek, 9.0 mi north of Fort Logan, and at mile 83.7.

DRAINAGE AREA.--846 mi^2.

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

GAGE.--Water-stage recorder. Elevation of gage is 4,400 ft, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 8-23, Nov. 25 to Dec. 4, Dec. 6 to Mar. 1, Mar. 3, 9, 10, 23-30. Records good except those for estimated daily discharges, which are poor. Flow slightly regulated by Smith River Reservoir (station number 06075000). Diversion for irrigation of about 19,300 acres upstream of station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--10 years, 173 ft^3/s, 125,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,600 ft^3/s, May 22, 1981, gage height, 7.80 ft; minimum, 28 ft^3/s, July 2, 1985, gage height, 2.36 ft; minimum gage height, 2.12 ft, Nov. 11, 1978.

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

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 27	1200	ice jam	*3.62	May 28	1230	*231	3.18

Minimum discharge, 42 ft^3/s, July 1, gage height, 2.51 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	161	133	e130	e110	e100	e95	137	138	162	52	84	72
2	164	127	e120	e115	e105	104	126	168	145	57	82	65
3	158	129	e105	e125	e110	e100	120	153	120	105	71	65
4	156	131	e105	e130	e115	127	122	126	110	123	70	61
5	159	131	107	e115	e120	151	122	113	101	107	66	62
6	157	133	e100	e100	e130	166	125	104	94	99	64	65
7	152	137	e90	e95	e140	173	123	94	86	94	61	72
8	149	e100	e90	e90	e130	146	114	88	84	89	62	72
9	147	e80	e85	e85	e120	e120	108	90	88	91	63	71
10	146	e62	e90	e100	e115	e105	103	89	88	102	60	70
11	146	e80	e100	e115	e110	116	100	86	83	156	59	68
12	145	e70	e110	e130	e105	113	97	75	77	185	60	67
13	146	e80	e120	e120	e105	119	95	53	70	145	62	67
14	147	e95	e125	e100	e100	122	95	53	64	123	61	64
15	147	e110	e120	e80	e100	115	97	49	62	112	68	61
16	148	e120	e110	e60	e95	108	100	47	61	101	71	70
17	149	e110	e100	e65	e95	107	100	82	51	104	69	73
18	148	e100	e95	e75	e90	109	103	149	47	170	68	70
19	146	e120	e95	e90	e95	113	111	123	49	166	68	71
20	146	e140	e100	e80	e100	104	116	168	55	141	67	70
21	144	e135	e110	e80	e100	103	130	187	60	125	64	68
22	143	e130	e120	e85	e95	96	136	168	64	120	62	67
23	141	e140	e130	e90	e90	e80	125	145	72	119	62	64
24	141	154	e130	e100	e75	e80	119	127	69	116	68	62
25	138	e140	e125	e120	e70	e85	119	119	68	105	69	62
26	138	e140	e125	e130	e65	e80	120	120	66	97	76	62
27	138	e135	e130	e125	e70	e75	117	143	61	86	78	73
28	137	e130	e135	e115	e80	e70	118	210	54	82	75	75
29	135	e130	e140	e110	---	e70	118	188	59	78	72	73
30	135	e120	e140	e105	---	e90	130	167	56	89	69	72
31	134	---	e125	e100	---	127	---	155	---	90	72	---
TOTAL	4541	3542	3507	3140	2825	3369	3446	3777	2326	3429	2103	2034
MEAN	146	118	113	101	101	109	115	122	77.5	111	67.8	67.8
MAX	164	154	140	130	140	173	137	210	162	185	84	75
MIN	134	62	85	60	65	70	95	47	47	52	59	61
AC-FT	9010	7030	6960	6230	5600	6680	6840	7490	4610	6800	4170	4030

CAL YR 1986 TOTAL 66544 MEAN 182 MAX 833 MIN 62 AC-FT 132000
WTR YR 1987 TOTAL 38039 MEAN 104 MAX 210 MIN 47 AC-FT 75450

e Estimated

MISSOURI RIVER MAIN STEM

06078200 MISSOURI RIVER NEAR ULM, MT

LOCATION.--Lat 47°26'06", long 111°23'07", in NE¼NW¼NW¼ sec.5, T.19 N., R.3 E., Cascade County, Hydrologic Unit 10030102, on left bank 5.6 mi east of Ulm, 9.1 mi downstream from Smith River, and at mile 2,140.4.

DRAINAGE AREA.--20,941 mi^2.

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

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

REMARKS.--Estimated daily discharges: Dec. 20-21, Jan. 7-12, Jan. 15 to Feb. 1, Feb. 26. Records good. Flow regulated by 10 smaller irrigation reservoirs and power plants, Clark Canyon Reservoir (station number 06015300), and Canyon Ferry Lake (station number 06058500). Diversions for irrigation of about 630,400 acres upstream from station. Several observations of water temperatures and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--30 years, 6,822 ft^3/s, 4,943,000 acre-ft/yr.

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

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

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 6,600 ft^3/s, Jan. 17, 18; maximum gage height, 10.23 ft, Jan. 20 (backwater from ice); minimum daily discharge, 2,720 ft^3/s, May 19.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4620	5460	6160	5470	e5600	4030	4190	5570	4420	3070	3280	3630
2	4510	5590	6000	5950	5880	3940	4280	5680	4170	3050	3120	3650
3	4560	5730	6030	6060	5690	3950	4340	5720	3970	3100	3100	3590
4	4520	5740	6010	5720	5500	3910	4420	5540	3800	3170	3230	3570
5	4520	5720	6050	5600	5090	4010	4500	5330	3690	3250	3320	3610
6	4460	5730	6010	5330	5030	4170	4580	5170	3580	3320	3420	3550
7	4410	5660	5930	e5400	4790	4290	4610	5020	3470	3360	3630	3590
8	4430	5650	5820	e5500	4790	4320	4710	4610	3380	3360	3660	3610
9	4450	5720	5800	e5800	4590	4320	4700	4200	3410	3360	3640	3570
10	4420	5730	5800	e6100	4160	4250	4710	4080	3560	3500	3670	3540
11	4480	5830	5900	e6200	3970	4100	4650	4050	3660	3740	3620	3510
12	4530	6050	5800	e6300	3940	4540	4570	4010	3560	3820	3630	3470
13	4510	6090	5760	6360	3960	4010	4600	3900	3410	3790	3580	3460
14	4490	6000	5770	6250	4140	4190	4570	3650	3310	3710	3670	3450
15	4500	5930	5770	e6400	4250	4240	4550	3300	3260	3590	3780	3460
16	4500	5900	5760	e6500	4200	4280	4570	3190	3230	3300	3910	3560
17	4470	5960	5750	e6600	4180	4240	4570	2940	3180	3340	3670	3590
18	4450	5910	5740	e6600	4100	4190	4760	2730	3340	3900	3700	3690
19	4450	5980	5650	e6500	4020	4290	5300	2720	3540	5430	3700	3680
20	4490	5970	e5600	e6200	4040	4390	5580	2790	3910	6320	3680	3660
21	4500	6080	e5600	e5500	4120	4390	5540	2830	3870	5670	3600	3640
22	4480	6140	5670	e5500	4220	4380	5350	2960	3700	4930	3520	3620
23	4460	6360	5720	e5500	4210	4380	5210	3080	3650	4970	3520	3600
24	4470	6330	5760	e5400	4170	4330	5290	3160	3620	4760	3570	3500
25	4480	6260	5530	e5400	4190	4310	5330	3290	3510	4430	3740	3470
26	4640	6310	5360	e5600	e4100	4320	5420	3310	3460	4330	3900	3450
27	5160	6240	5320	e5700	4080	4320	5490	3470	3320	4190	3920	3460
28	5360	6030	5270	e5900	4020	4340	5500	4540	3210	4020	3940	3510
29	5370	6040	5310	e6000	---	4180	5440	5730	3200	3900	3880	3530
30	5440	6140	5380	e5700	---	4080	5420	5130	3140	3660	3780	3530
31	5400	---	5470	e5500	---	4110	---	4690	---	3430	3690	---
TOTAL	143530	178280	177500	182540	125030	130800	146750	126390	106530	121770	112070	106750
MEAN	4630	5943	5726	5888	4465	4219	4892	4077	3551	3928	3615	3558
MAX	5440	6360	6160	6600	5880	4540	5580	5730	4420	6320	3940	3690
MIN	4410	5460	5270	5330	3940	3910	4190	2720	3140	3050	3100	3450
AC-FT	284700	353600	352100	362100	248000	259400	291100	250700	211300	241500	222300	211700

CAL YR 1986	TOTAL	2250220	MEAN	6165	MAX	15200	MIN	4260	AC-FT	4463000
WTR YR 1987	TOTAL	1657940	MEAN	4542	MAX	6600	MIN	2720	AC-FT	3289000

e Estimated

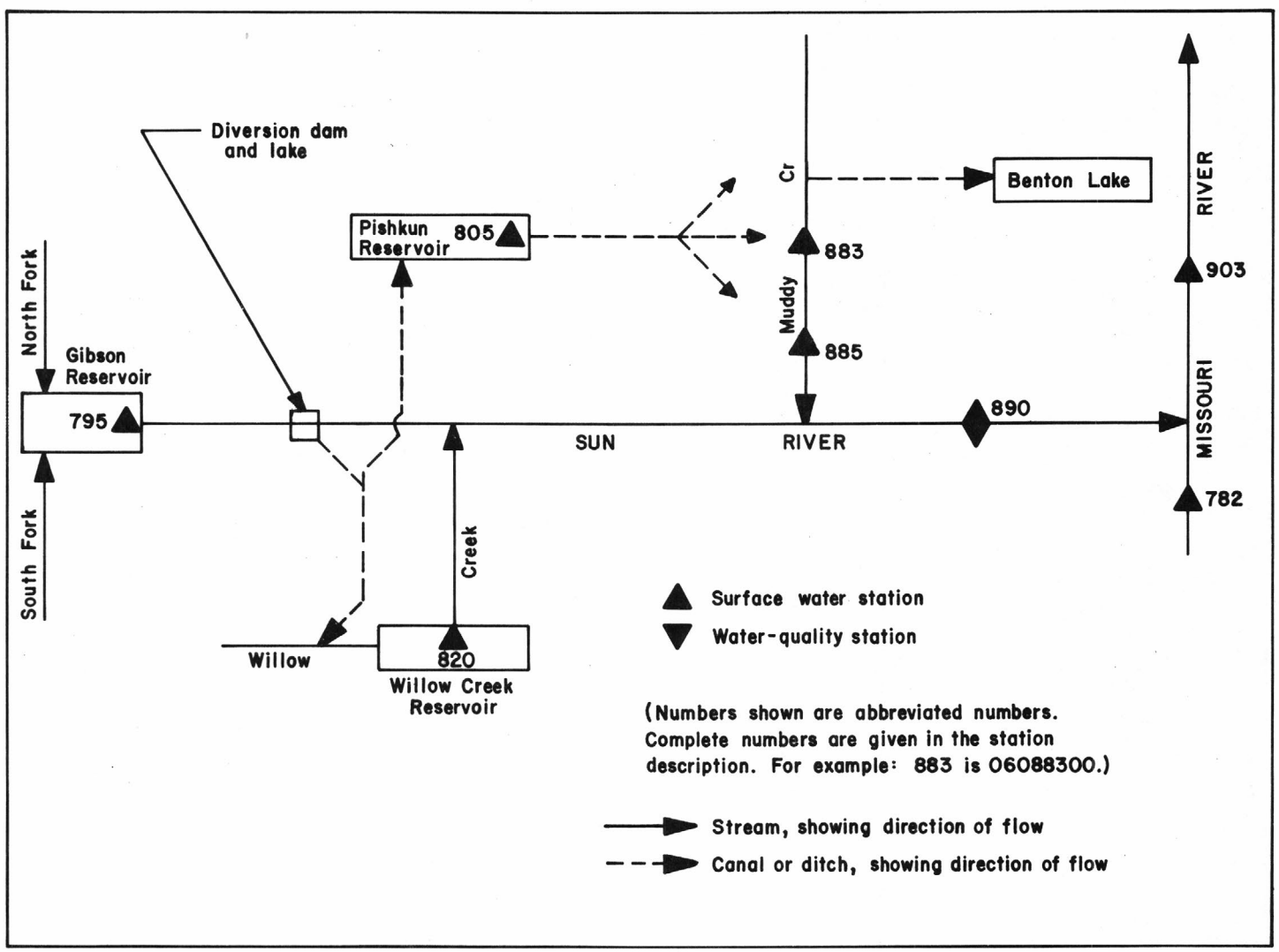


Figure 9.--Schematic diagram showing diversions and storage in Sun River basin.

06088300 MUDDY CREEK NEAR VAUGHN, MT

LOCATION.--Lat 47°37'30", long 111°38'05", in NE¼NE¼NW¼ sec.32, T.22 N., R.1 E., Cascade County, Hydrologic Unit 10030104, on left bank 200 ft downstream from bridge on county road 6.2 mi northwest of Vaughn and at mile 14.6.

DRAINAGE AREA.--282 mi^2.

PERIOD OF RECORD.--July 1968 to September 1987 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 3,441.79 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--Estimated daily discharges: Nov. 8 to Feb. 10, Feb. 13, 17-18, Feb. 21 to Mar. 4, May 23 to June 10. Records good except those for estimated daily discharges, 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. Natural flow increased by wastage from Greenfields Irrigation Project. Diversions for irrigation of about 400 acres upstream from station. Pumped diversions from Muddy Creek upstream from station in SW¼ sec.2, T.22 N., R.1 W., to supplement water supply for Benton Lake Wildlife Refuge are listed below.

AVERAGE DISCHARGE.--19 years, 113 ft^3/s, 81,870 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,560 ft^3/s, May 22, 1981, gage height, 14.72 ft; minimum daily, 8.0 ft^3/s, Dec. 8, 1972.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 760 ft^3/s, July 18, gage height, 5.86 ft; minimum daily, 18 ft^3/s, Jan. 15.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	87	58	e43	e25	e29	e26	48	26	e100	179	131	127
2	84	58	e40	e25	e26	e28	40	28	e140	179	129	104
3	77	57	e36	e25	e25	e30	41	24	e150	190	158	91
4	74	56	e38	e24	e27	e32	41	40	e140	182	154	89
5	73	55	e37	e22	e30	34	40	98	e120	225	172	86
6	72	56	e35	e21	e35	33	37	63	e100	241	205	86
7	69	53	e37	e21	e40	31	34	53	e80	211	184	85
8	72	e31	e34	e23	e43	28	33	31	e90	240	191	82
9	70	e29	e31	e25	e45	27	31	34	e80	220	199	76
10	70	e27	e33	e27	e47	30	30	52	e90	180	200	67
11	68	e30	e35	e30	43	28	29	206	71	206	195	66
12	68	e26	e36	e32	40	28	28	207	72	207	214	67
13	67	e32	e36	e28	e38	31	29	130	82	163	226	66
14	64	e40	e35	e23	37	31	28	157	97	144	259	64
15	64	e46	e35	e18	34	28	27	155	122	153	235	59
16	64	e48	e34	e19	33	29	27	154	152	152	208	55
17	65	e50	e33	e21	e31	30	27	133	183	266	185	55
18	67	e55	e33	e23	e30	32	28	149	231	597	179	54
19	65	e62	e31	e21	29	29	29	145	291	611	168	56
20	64	e72	e32	e22	28	29	27	175	248	384	162	57
21	64	e67	e32	e24	e27	36	26	263	225	305	159	63
22	62	e62	e33	e26	e26	28	26	221	218	266	153	66
23	62	e65	e32	e25	e25	33	27	e140	196	236	149	57
24	62	e58	e30	e23	e23	31	28	e110	168	209	157	56
25	61	e48	e28	e24	e21	33	26	e120	169	215	221	54
26	60	e40	e28	e26	e19	37	25	e180	167	206	201	52
27	60	e45	e28	e27	e21	30	25	e280	184	190	164	57
28	59	e42	e27	e27	e24	24	24	e260	162	175	158	55
29	59	e40	e27	e28	---	27	24	e150	193	165	156	52
30	59	e38	e26	e28	---	36	25	e90	159	157	158	51
31	58	---	e24	e27	---	44	---	e80	---	148	159	---
TOTAL	2070	1446	1019	760	876	953	910	3954	4480	7202	5589	2055
MEAN	66.8	48.2	32.9	24.5	31.3	30.7	30.3	128	149	232	180	68.5
MAX	87	72	43	32	47	44	48	280	291	611	259	127
MIN	58	26	24	18	19	24	24	24	71	144	129	51
AC-FT	4110	2870	2020	1510	1740	1890	1800	7840	8890	14290	11090	4080
(†)	0	0	0	0	0	0	0	1330	2660	2340	980	670

CAL YR 1986 TOTAL 33265 MEAN 91.1 MAX 356 MIN 23 AC-FT 65980
WTR YR 1987 TOTAL 31314 MEAN 85.8 MAX 611 MIN 18 AC-FT 62110

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

SUN RIVER BASIN

06088500 MUDDY CREEK AT VAUGHN, MT

LOCATION.--Lat 47°33'42", long 111°32'33", in SE¼SW¼NE¼ sec.24, T.21 N., R.1 E., Cascade County, Hydrologic Unit 10030104, on right bank at Vaughn, and at mile 1.3.

DRAINAGE AREA.--314 mi^2.

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

REVISED RECORDS.--WSP 856: 1937. WSP 1509: 1934-35, 1941(M). WSP 1559: 1956. WSP 1629: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,337.64 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). May 21, 1925, to Feb. 8, 1926, nonrecording gage at site 500 ft downstream at different datum. Apr. 19, 1925, to Sept. 30, 1955, at present site at datum 1.00 ft higher. May 18, 1955, to Apr. 25, 1960, and Sept. 24, 1962, to Sept. 30, 1968, auxiliary crest-stage gage. Oct. 1, 1955, to Sept. 30, 1968, nonrecording gage at bridge 30 ft downstream at present datum.

REMARKS.--Estimated daily discharges: Nov. 7 to Mar. 5, Mar. 29. Records good except those for July 22 to Aug. 31, which are fair, and those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in back of this report. Natural flow increased by wastage from Sun River Canal and by return flow from irrigation. Diversions for irrigation of about 700 acres upstream from station. Pumped diversions from Muddy Creek upstream from station in SW¼ sec. 2, T.22 N., R.1 W., to supplement water supply for Benton Lake Wildlife Refuge are listed below.

AVERAGE DISCHARGE.--50 years (1934-68, 1971-87), 127 ft^3/s, 92,010 acre-ft/yr.

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

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

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 832 ft^3/s, July 18, gage height, 6.01 ft; minimum daily, 20 ft^3/s, Jan. 15.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	145	56	e45	e27	e31	e31	54	25	156	235	170	198
2	157	58	e42	e27	e28	e34	41	26	190	229	154	160
3	141	56	e38	e27	e27	e37	41	24	200	240	201	138
4	134	55	e40	e26	e29	e40	40	38	189	236	193	132
5	130	54	e39	e24	e32	e42	40	114	171	272	205	129
6	127	54	e37	e23	e37	39	38	102	138	308	239	130
7	123	e48	e39	e23	e42	37	35	96	116	273	235	133
8	120	e33	e36	e25	e46	33	33	62	130	295	230	131
9	85	e31	e33	e27	e48	28	32	55	113	304	259	129
10	76	e29	e35	e30	e50	37	31	78	133	257	276	112
11	73	e32	e37	e33	e46	32	31	220	115	285	264	104
12	71	e28	e38	e35	e43	32	29	271	110	294	293	104
13	71	e34	e38	e30	e40	34	30	183	111	240	320	109
14	67	e42	e37	e25	e38	36	30	182	110	202	356	106
15	65	e48	e37	e20	e35	33	28	196	156	198	350	107
16	65	e50	e36	e21	e34	33	28	224	191	203	310	100
17	65	e52	e35	e23	e33	32	28	195	227	286	267	104
18	66	e58	e35	e25	e32	33	29	210	290	636	262	103
19	65	e65	e33	e23	e31	37	31	211	375	739	256	105
20	64	e75	e34	e24	e30	27	29	237	355	517	246	108
21	63	e70	e34	e26	e29	40	28	346	324	423	231	104
22	61	e65	e35	e28	e28	32	28	321	318	372	222	116
23	60	e68	e34	e27	e27	35	28	210	278	349	215	111
24	60	e60	e32	e25	e25	33	29	170	250	298	229	107
25	60	e50	e30	e26	e23	34	27	170	226	319	312	109
26	60	e42	e30	e28	e21	40	26	236	220	302	311	109
27	59	e48	e30	e29	e24	33	25	317	236	277	248	114
28	58	e44	e29	e29	e28	26	24	297	211	240	236	113
29	58	e42	e29	e30	---	e30	24	214	242	225	235	109
30	58	e40	e28	e30	---	37	24	134	205	199	232	110
31	57	---	e26	e29	---	51	---	128	---	188	239	---
TOTAL	2564	1487	1081	825	937	1078	941	5292	6086	9441	7796	3544
MEAN	82.7	49.6	34.9	26.6	33.5	34.8	31.4	171	203	305	251	118
MAX	157	75	45	35	50	51	54	346	375	739	356	198
MIN	57	28	26	20	21	26	24	24	110	188	154	100
AC-FT	5090	2950	2140	1640	1860	2140	1870	10500	12070	18730	15460	7030

CAL YR 1986 TOTAL 43737 MEAN 120 MAX 455 MIN 26 AC-FT 86750
WTR YR 1987 TOTAL 41072 MEAN 113 MAX 739 MIN 20 AC-FT 81470

e Estimated

SUN RIVER BASIN

06089000 SUN RIVER NEAR VAUGHN, MT

LOCATION.--Lat 47°31'37", long 111°29'05", in NW¼SE¼SW¼ sec.33, T.21 N., R.2 E., Cascade County, Hydrologic Unit 10030104, on right bank 3.7 mi downstream from Muddy Creek, 3.6 mi southeast of Vaughn, and at mile 13.6.

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

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 786: 1934. WSP 1729: Drainage area.

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

REMARKS.--Estimated daily discharges: Nov. 8-24, Nov. 27 to Feb. 17, Feb. 20 to Mar. 4, Mar. 19-22, 28-31. Water-discharge records good except those for estimated daily discharges, which are poor. Flow regulated by Gibson, Pishkun, Willow Creek, and Nilan Reservoir Diversion for irrigation of about 110,000 acres upstream from station.

AVERAGE DISCHARGE.--53 years, 707 ft^3/s, 512,200 acre-ft/yr.

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

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1964 exceeded the stage of the June 1908 flood by about 3 ft and is the highest since 1908, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,480 ft^3/s, May 2, gage height, 5.57 ft; minimum daily, 90 ft^3/s Jan. 16.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	424	299	e250	e140	e160	e160	315	2190	1080	371	402	432
2	574	306	e240	e140	e150	e180	297	3340	1160	378	350	376
3	503	301	e220	e140	e150	e200	293	3220	789	366	367	349
4	451	298	e230	e130	e160	e230	290	2500	590	366	360	344
5	423	298	e220	e120	e180	256	297	1840	424	379	338	343
6	415	286	e200	e110	e210	274	308	1330	321	433	341	333
7	394	282	e210	e100	e250	262	305	642	266	402	330	336
8	393	e270	e200	e110	e280	255	291	449	257	393	320	334
9	399	e240	e180	e120	e300	235	282	344	237	394	349	308
10	386	e200	e180	e130	e290	236	275	285	258	362	396	281
11	386	e210	e190	e150	e280	226	269	408	231	428	384	269
12	381	e190	e200	e160	e270	221	265	1360	207	454	408	262
13	373	e220	e200	e130	e260	225	264	1300	195	416	450	255
14	364	e240	e190	e110	e250	243	258	808	175	358	527	245
15	357	e250	e190	e95	e230	243	246	829	205	326	588	243
16	352	e260	e180	e90	e220	235	244	633	282	322	542	230
17	345	e270	e170	e100	e220	234	250	482	381	393	473	238
18	345	e280	e170	e110	221	235	274	515	455	1050	436	253
19	343	e300	e150	e110	208	e230	302	515	934	2000	444	250
20	337	e340	e160	e120	e190	e220	294	493	763	1750	434	251
21	335	e400	e160	e130	e180	e220	292	541	700	1250	417	242
22	330	e380	e170	e140	e170	e230	357	539	658	1020	407	289
23	325	e350	e170	e140	e170	236	436	428	562	1060	402	296
24	322	e370	e160	e130	e160	243	463	446	481	885	427	285
25	320	311	e150	e140	e150	245	483	494	425	874	568	284
26	315	265	e150	e140	e140	267	764	549	416	808	719	281
27	309	e260	e160	e150	e150	262	1130	692	408	748	588	286
28	305	e250	e160	e150	e150	e230	1280	1140	367	641	542	285
29	304	e250	e150	e150	---	e220	1320	2010	383	566	509	274
30	303	e240	e150	e160	---	e240	1470	1720	355	482	483	269
31	304	---	e130	e160	---	e270	---	1210	---	475	482	---
TOTAL	11417	8416	5640	4005	5749	7263	13614	33252	13965	20150	13783	8723
MEAN	368	281	182	129	205	234	454	1073	465	650	445	291
MAX	574	400	250	160	300	274	1470	3340	1160	2000	719	432
MIN	303	190	130	90	140	160	244	285	175	322	320	230
AC-FT	22650	16690	11190	7940	11400	14410	27000	65960	27700	39970	27340	17300

CAL YR 1986 TOTAL 240857 MEAN 660 MAX 4700 MIN 130 AC-FT 477700
WTR YR 1987 TOTAL 145977 MEAN 400 MAX 3340 MIN 90 AC-FT 289500

e Estimated

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

WATER-QUALITY RECORDS

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

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

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

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

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE:. Maximum daily, 2,610 microsiemens, Apr. 8, 1977; minimum daily, 214 microsiemens, June 8, 1970.

WATER TEMPERATURE (water years 1969-79):. Maximum daily, 28.0°C, Aug. 11, 27, 1969, Aug. 16, 1977; minimum daily, 0.0°C on many days during winter.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE:. Maximum daily, 1,450 microsiemens, Apr. 4; minimum daily, 266 microsiemens, May 2.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT								
03...	0845	--	506	0	0	840	1.5	5.0
NOV								
05...	1200	--	300	90	3	790	6.5	7.0
18...	0845	--	283	--	--	915	-4.0	0.0
JAN								
09...	1030	--	122	--	--	923	1.0	0.0
21...	1300	E130	--	20	1	808	3.0	0.0
FEB								
12...	0945	--	276	--	--	820	5.0	0.0
MAR								
12...	0950	--	227	98	2	840	6.0	1.5
APR								
27...	1215	--	1170	0	0	452	25.0	14.0
MAY								
01...	1415	--	2470	--	--	395	20.0	13.5
12...	0930	--	1370	5	1	432	22.0	16.5
18...	1130	--	508	--	--	576	--	--
JUN								
11...	0915	--	222	--	--	728	20.5	18.5
JUL								
14...	1000	--	350	--	0	810	26.0	23.0
24...	0920	--	883	--	--	652	18.0	19.0
AUG								
05...	0930	--	343	5	1	680	18.0	18.5
31...	1100	--	494	0	0	691	21.0	18.5

06089000 SUN RIVER NEAR VAUGHN, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BICAR-BONATE WATER WHOLE IT-FLD (MG/L) (00450)	CAR-BONATE WATER WHOLE IT-FLD (MG/L) (00447)	ALKA-LINITY WH WAT TOTAL FIELD MG/L AS CACO3 (00410)
OCT								
03...	--	--	--	--	--	--	--	--
NOV								
05...	672	11.2	105	K9	22	313	0	251
18...	--	--	--	--	--	--	--	--
JAN								
09...	--	--	--	--	--	--	--	--
21...	698	12.6	94	<1	K11	327	0	265
FEB								
12...	--	--	--	--	--	--	--	--
MAR								
12...	685	12.3	98	K1	K7	286	0	231
APR								
27...	--	--	--	--	--	--	--	--
MAY								
01...	--	--	--	--	--	--	--	--
12...	667	7.4	87	K780	K1700	181	3	152
18...	--	--	--	--	--	--	--	--
JUN								
11...	--	--	--	--	--	--	--	--
JUL								
14...	678	7.7	102	200	170	283	8	238
24...	--	--	--	--	--	--	--	--
AUG								
05...	--	--	--	--	--	--	--	--
31...	683	10.3	123	65	450	287	1	237

DATE	TIME	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
OCT										
03...	0845	--	--	360	98	67	46	53	1	3.1
NOV										
05...	1200	8.30	1.6	360	110	67	46	47	1	1.8
JAN										
21...	1300	7.70	2.2	360	98	76	42	40	0.9	1.8
MAR										
12...	0950	7.90	3.0	370	140	72	46	52	1	2.0
APR										
27...	1215	--	--	210	42	53	20	13	0.4	1.6
MAY										
12...	0930	8.40	170	160	6	37	16	11	0.4	1.1
JUL										
14...	1000	8.50	30	360	120	64	48	58	1	2.9
AUG										
05...	0930	--	--	300	86	54	40	37	1	1.9
31...	1100	8.60	24	330	92	59	44	43	1	2.1

SUN RIVER BASIN

06089000 SUN RIVER NEAR VAUGHN, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)
OCT 03...	259	180	6.5	0.40	6.8	--	520	0.70	708	--
NOV 05...	252	180	4.8	0.40	5.7	517	500	0.70	419	<0.010
JAN 21...	269	180	4.4	0.40	7.5	516	510	0.70	E181	<0.010
MAR 12...	243	220	5.9	0.40	5.9	550	540	0.75	337	<0.010
APR 27...	173	74	1.8	0.20	5.9	--	270	0.37	863	--
MAY 12...	161	69	1.5	0.20	4.6	259	230	0.35	958	0.010
JUL 14...	234	220	18	0.50	5.5	568	560	0.77	537	<0.010
AUG 05...	214	140	3.9	0.50	4.0	--	410	0.56	379	--
31...	185	160	4.1	0.50	5.5	448	460	0.61	598	<0.010

DATE	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHORUS, TOTAL (MG/L AS P) (00665)	PHOSPHORUS, DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P) (00671)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 03...	0.840	--	--	--	--	0.030	--	--	--	--
NOV 05...	1.10	0.060	0.010	2.1	0.040	0.020	0.020	17	14	86
JAN 21...	1.10	0.050	0.010	0.40	0.010	0.010	<0.010	12	E4.2	88
MAR 12...	1.10	0.040	0.030	0.70	0.020	0.030	<0.010	17	10	91
APR 27...	2.00	--	--	--	--	0.010	--	--	--	--
MAY 12...	0.140	0.070	0.070	2.1	0.640	0.020	0.010	910	3370	93
JUL 14...	0.510	0.050	0.030	0.90	0.060	0.040	0.010	216	204	77
AUG 05...	0.540	--	--	--	--	--	--	--	--	--
31...	0.610	0.050	0.030	<0.20	<0.010	0.020	0.010	90	120	97

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)
NOV 05...	1200	<10	1	97	1	<1	<1	<3	2	4	<5
MAR 12...	0950	<10	<1	87	<0.5	<1	<1	<3	2	3	<5
JUL 14...	1000	<10	2	84	<0.5	<1	2	<3	7	<3	<5
AUG 31...	1100	<10	1	88	<0.5	<1	<1	<3	2	5	<5

06089000 SUN RIVER NEAR VAUGHN, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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										
05...	44	9	<0.1	<10	2	1	<1	700	<6	14
MAR										
12...	40	10	<0.1	<10	2	2	<1	670	<6	10
JUL										
14...	47	12	<0.1	<10	<1	1	<1	680	<6	6
AUG										
31...	36	8	<0.1	<10	<1	<1	<1	640	<6	5

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
ONCE DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	774	778	864	831	---	789	1200	381	482	696	---	725
2	775	791	833	854	744	782	---	266	495	696	759	784
3	843	793	837	855	780	881	1280	354	477	707	720	769
4	844	795	864	824	780	---	1450	---	529	724	683	801
5	816	806	900	839	781	---	1310	464	550	736	719	778
6	793	803	---	827	786	852	1170	410	602	572	658	793
7	796	826	---	856	---	811	1150	508	621	698	645	777
8	776	872	---	931	790	835	---	552	657	673	695	783
9	769	921	---	921	800	818	920	570	660	659	738	792
10	779	1060	---	958	774	868	860	622	709	772	741	792
11	786	---	---	912	794	864	821	655	738	647	731	794
12	795	---	---	758	805	879	805	413	752	711	---	817
13	778	---	---	744	802	877	---	---	740	702	681	842
14	784	---	826	765	877	890	765	453	735	728	769	816
15	790	---	809	863	860	1010	759	422	718	---	774	842
16	784	---	820	---	884	962	749	473	747	---	728	891
17	792	---	845	---	869	923	727	614	720	734	713	764
18	791	---	867	971	905	959	718	---	667	---	741	858
19	794	---	857	886	852	---	---	552	718	848	729	811
20	804	---	873	---	884	960	704	540	674	---	694	873
21	797	---	877	826	909	---	696	532	628	---	727	836
22	793	953	823	---	897	1200	639	572	632	690	732	844
23	796	923	784	---	851	1040	603	644	---	---	718	783
24	797	812	777	---	842	1020	593	596	617	---	710	767
25	806	841	785	---	---	1200	584	558	673	---	706	802
26	804	849	804	---	919	1260	525	567	658	660	990	796
27	800	974	794	---	930	---	449	549	---	663	803	802
28	811	842	811	---	894	---	439	571	664	649	753	805
29	798	832	794	757	---	1120	424	542	672	700	731	812
30	805	795	804	748	---	1070	416	422	700	---	748	810
31	809	---	851	771	---	1080	---	455	---	659	723	---

MISSOURI RIVER MAIN STEM

06090300 MISSOURI RIVER NEAR GREAT FALLS, MT

LOCATION (REVISED).--Lat 47°35'04", long 111°03'35", in SW¼SE¼SW¼ sec.11, T.21 N., R.5 E., Cascade County, Hydrologic Unit 10030102, on left bank 700 ft downstream from Morony Dam, 12.6 mi northeast of Great Falls, and at mile 2,105.4.

DRAINAGE AREA.--23,292 mi^2.

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

GAGE.--Water-stage recorder. Datum of gage is 2,807.21 ft National Geodetic Vertical Datum of 1929. Prior to July 27, 1977, nonrecording gage at same site at 2.00 ft lower datum. July 27, 1977 to May 26, 1987, at site 600 ft upstream at datum 2.00 ft lower. October 1971 to July 27, 1977, discharges were obtained from the Montana Power Company at Rainbow Dam 7.05 mi upstream. Prior to October 1971, Foxboro meters were used for determining discharge through powerplant. Water-stage recorder on Morony Reservoir was used for determining head on taintor gates with datum of gage at National Geodetic Vertical Datum of 1929 (level by Montana Power Company).

REMARKS.--Estimated daily discharges: May 26-28. Records fair. 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 regulated by 18 smaller irrigation reservoirs and powerplants upstream, Clark Canyon Reservoir (station number 06015300), and Canyon Ferry Lake (station number 06058500). Diversion for irrigation of about 750,400 acres upstream from station.

AVERAGE DISCHARGE.--31 years, 7,952 ft^3/s, 5,761,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 72,000 ft^3/s, June 10, 1964 (from hydrographic comparison with nearby stations); minimum, about 1.0 ft^3/s, Apr. 16, 1962, powerplant shutdown; minimum daily, 1,760 ft^3/s, Apr. 16, 1961. Flood of June 10, 1964, is the highest since 1908.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 13,300 ft^3/s, Jan. 11, gage height, 6.01 ft; minimum daily, 3,690 ft^3/s, July 3.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5020	6580	7670	5920	7210	5610	5440	7910	6380	4310	4050	4760
2	5830	6620	7450	6340	7330	5710	5580	10400	6130	3950	4020	4600
3	5870	6880	7650	6770	7170	5780	5610	10200	5800	3690	4000	4580
4	5880	6890	7100	7300	7040	5390	5750	9460	5210	3920	3990	4320
5	5750	6910	7280	6930	6520	5200	5740	8240	5030	4250	4360	4490
6	5680	6900	7560	6480	6250	5230	5700	7440	4350	4700	4150	4520
7	5480	6840	7370	5800	6110	5740	5860	6680	4630	4400	4490	4410
8	5210	6880	7260	4540	5690	5950	5920	6120	4420	4650	4620	6370
9	5410	6780	7100	4700	6040	5720	5860	5480	4180	4830	4590	5750
10	5550	6890	6770	4730	5460	5840	5790	5080	4330	4380	4680	4880
11	5600	6910	6460	8140	5020	5490	5750	5120	4650	4860	4420	4220
12	5540	6940	7090	10200	5460	6130	5810	5310	4230	5040	4620	4710
13	5510	7580	7140	8670	5260	5980	5680	6290	4380	5040	4610	4700
14	5600	7480	7200	8070	5480	4780	5660	5770	4050	4950	4650	5030
15	5460	7320	6910	4840	5700	5500	5710	5040	3940	4690	4970	4690
16	5260	7190	7110	4420	5540	5590	5530	4650	4060	4590	5080	4870
17	5030	7260	6910	4320	5700	5730	5510	4140	4480	4440	4760	4740
18	5480	7380	7050	5560	5430	5320	5570	4140	4190	5260	4530	4480
19	5580	7260	6710	7070	5780	5590	6000	4070	4880	7070	4740	4580
20	5320	7580	6860	8150	5310	5690	7300	4020	5590	8770	4820	4810
21	5550	7510	7130	8300	5530	5600	6260	4030	5450	8140	4760	5140
22	5560	7870	7620	7610	5610	5680	6430	4280	5260	6830	4600	4490
23	5610	7860	7470	6960	5370	5690	6500	4270	4780	6670	4450	4510
24	5520	8140	7160	7130	5630	5570	6360	4190	5070	6280	4770	4350
25	5480	8070	6890	7400	5280	5650	6500	4410	4640	6200	5140	4400
26	5560	7870	6520	7560	5210	5600	6730	e4690	4460	5710	5110	4280
27	6110	7780	6500	7420	4840	5710	7250	e4830	4710	5550	4920	4220
28	6470	7620	6450	7910	5800	5610	7740	e5290	4240	5360	5460	4250
29	6390	7610	6320	8000	---	5340	7490	8380	5230	5290	4670	4400
30	6610	7570	6500	7940	---	5230	7750	7960	4410	4990	4880	4110
31	6380	---	6620	7370	---	5280	---	7190	---	4030	4860	---
TOTAL	175300	218970	217830	212550	162770	172930	184780	185080	143160	162840	143770	139660
MEAN	5655	7299	7027	6856	5813	5578	6159	5970	4772	5253	4638	4655
MAX	6610	8140	7670	10200	7330	6130	7750	10400	6380	8770	5460	6370
MIN	5020	6580	6320	4320	4840	4780	5440	4020	3940	3690	3990	4110
AC-FT	347700	434300	432100	421600	322900	343000	366500	367100	284000	323000	285200	277000

CAL YR 1986 TOTAL 2807210 MEAN 7691 MAX 16000 MIN 4930 AC-FT 5568000
WTR YR 1987 TOTAL 2119640 MEAN 5807 MAX 10400 MIN 3690 AC-FT 4204000

e Estimated

MISSOURI RIVER MAIN STEM

06090800 MISSOURI RIVER AT FORT BENTON, MT

LOCATION.--Lat 47°49'03", long 110°39'59", in NW¼SE¼SE¼ sec.23, T.24 N., R.8 E., Chouteau County, Hydrologic Unit 10030102, on left bank at downstream side of Old Fort Benton Bridge at Fort Benton, 3.8 mi upstream from Shonkin Creek, and at mile 2,073.2.

DRAINAGE AREA.--24,749 mi^2.

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

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

GAGE.--Water-stage recorder. Datum of gage is 2,614.05 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 11, 1920, nonrecording gages, and Oct. 11, 1920, to Apr. 25, 1924, water-stage recorder, all at present site at datum 1.00 ft higher.

REMARKS.--No estimated daily discharges this year. Records good. Flow regulated by 18 smaller irrigation reservoirs and powerplants, Clark Canyon Reservoir (station number 06015300), and Canyon Ferry Lake (station number 06058500). Diversions for irrigation of about 751,000 acres upstream from station. Extreme diurnal fluctuation caused by powerplant at Morony Dam.

AVERAGE DISCHARGE.--97 years, 5,259 ft^3/s, 5,656,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, about 140,000 ft^3/s, June 6, 1908, gage height, 18.5 ft present datum, from rating curve extended above 63,000 ft^3/s; minimum, 320 ft^3/s, July 5, 1936, gage height, -0.50 ft; minimum daily, 627 ft^3/s, July 5, 1936.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 11,900 ft^3/s, Jan. 12, gage height, 4.25 ft; minimum daily, 3,260 ft^3/s, July 4.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4140	6230	6780	5810	6460	4780	4840	7390	5860	3760	3670	4430
2	5060	6270	6790	5580	6440	4740	4940	8910	5640	3770	3580	4370
3	5230	6450	6960	6080	6480	4820	4900	9560	5310	3290	3690	4230
4	5190	6550	6380	6520	6420	4910	5130	8780	4650	3260	3550	4210
5	4990	6630	6470	6450	6070	4470	5070	8100	4290	3780	3790	4260
6	4980	6550	6860	6340	5550	4490	5320	6980	3870	4050	4000	4330
7	4830	6450	6700	5890	5660	4770	5450	6430	3800	3940	3950	4290
8	4860	6540	6450	5530	5110	4900	5530	5710	3610	3950	4420	4880
9	4350	6370	6540	5030	5400	5030	5310	5180	3470	4170	4420	6740
10	5040	6330	6630	4360	5080	5040	5480	4590	3580	4120	4300	4180
11	5170	6300	5870	5720	4620	4790	5230	4640	3570	3900	4080	4260
12	5160	6500	6040	9460	4170	4850	5320	4260	3750	4250	4500	3710
13	5160	7100	6730	7700	4750	5520	5100	5480	3650	4410	4290	4170
14	5050	6570	6310	7740	4740	4290	5080	5250	3510	4190	4470	4470
15	5110	6700	6300	5640	4620	4570	5150	4870	3420	3980	4610	4160
16	5220	6190	6440	5050	4890	4800	5030	4220	3420	3860	4600	4290
17	4780	6090	6240	4390	4890	5080	4870	3670	3600	3680	4740	4230
18	4940	6390	6360	5110	4970	5070	4960	3710	3670	4060	4360	4100
19	5190	6220	6280	6290	4760	4670	5390	3590	3770	5490	4390	3920
20	5140	6380	5980	7670	4550	5080	6130	3700	4960	7670	4440	4320
21	4990	6550	5620	7750	4630	5030	5880	3520	4920	7730	4440	4700
22	5350	6770	6680	7440	4710	5050	5980	3820	4790	6200	4290	4310
23	5310	6830	6260	6650	4720	5040	5830	3830	4480	5860	4160	4330
24	5350	6990	6380	6410	5100	4930	5830	3710	4420	5800	4410	4260
25	5250	6980	6250	6720	4500	4970	6000	3930	4110	5250	4800	4170
26	5350	6870	6000	6650	4410	4910	6200	4080	4060	5060	4810	4140
27	5510	6900	5850	6650	4040	5120	6530	4260	4060	5080	4890	4040
28	6100	6750	5860	6800	4810	4980	7110	5040	3780	4530	5220	4140
29	6280	6750	5770	7020	---	4850	7000	6940	4480	4580	4510	4120
30	6280	6680	5860	7160	---	4540	7260	7590	4260	4480	4560	4010
31	6270	---	5930	6770	---	4610	---	7050	---	3710	4790	---
TOTAL	161630	196880	195570	198380	142550	150700	167850	168790	124760	141860	134730	129770
MEAN	5214	6563	6309	6399	5091	4861	5595	5445	4159	4576	4346	4326
MAX	6280	7100	6960	9460	6480	5520	7260	9560	5860	7730	5220	6740
MIN	4140	6090	5620	4360	4040	4290	4840	3520	3420	3260	3550	3710
AC-FT	320600	390500	387900	393500	282700	298900	332900	334800	247500	281400	267200	257400

CAL YR 1986 TOTAL 2748510 MEAN 7530 MAX 16600 MIN 4140 AC-FT 5452000
WTR YR 1987 TOTAL 1913470 MEAN 5242 MAX 9560 MIN 3260 AC-FT 3795000

06091700 TWO MEDICINE RIVER BELOW SOUTH FORK, NEAR BROWNING, MT

LOCATION.--Lat 48°25'36", long 112°59'20", in SE¼SE¼SE¼ sec. 23, T.31 N., R.11 W., Glacier County, Hydrologic Unit 10030201, Blackfeet Indian Reservation, on right bank 93 ft downstream from bridge on Blackfeet Secondary Highway No. 1, 9.7 mi south of Browning, and 12.3 mi northwest of Heart Butte.

DRAINAGE AREA.--250 mi^2.

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

GAGE.--Water-stage recorder. Elevation of gage is 4,180 ft, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 8-25, 28, Dec. 2, 4-31, Jan. 1 to Mar. 5, 7, 28, 29. Records good except those for estimated daily discharges, which are poor. Flow regulated by Lower Two Medicine Lake (station number 06090900). Diversions for irrigation of about 64.0 acres upstream 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.--10 years, 315 ft^3/s, 228,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,900 ft^3/s, May 26, 1980, gage height, 6.69 ft; minimum daily, 10 ft^3/s, Jan. 29, 1980, and Jan. 6, 1982.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 100,000 ft^3/s, June 8, 1964, as determined at Two Medicine River near Browning (station number 06092000) located about 10 mi downstream. Discharge not determined at this site.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,620 ft^3/s, July 22, gage height, 5.16 ft; minimum daily, 45 ft^3/s, Nov. 10.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	139	88	177	e75	e74	e68	212	2220	902	223	353	133
2	133	91	e160	e85	e72	e65	243	1810	760	209	326	128
3	116	91	133	e90	e68	e80	291	1380	658	229	304	126
4	114	91	e120	e85	e72	e120	341	1040	592	196	187	124
5	121	110	e110	e80	e75	e200	411	968	564	190	173	120
6	128	127	e110	e75	e80	330	493	975	569	187	169	121
7	142	117	e120	e72	e75	e360	511	984	571	172	167	122
8	165	e60	e110	e70	e70	290	576	1010	587	184	158	118
9	153	e50	e90	e75	e72	242	563	1150	641	203	151	116
10	154	e45	e100	e85	e74	224	499	1260	596	209	145	114
11	140	e55	e110	e95	e74	215	509	1220	556	207	143	112
12	131	e50	e120	e90	e74	212	465	1120	513	199	146	111
13	128	e70	e110	e80	e72	249	426	1100	478	201	142	108
14	122	e65	e105	e70	e72	247	446	993	452	213	205	108
15	117	e65	e100	e65	e70	219	589	984	438	217	186	105
16	110	e80	e100	e70	e70	211	832	992	465	236	170	106
17	106	e75	e105	e75	e70	195	1190	836	431	273	176	108
18	102	e70	e95	e80	e68	193	1230	705	398	598	161	106
19	97	e90	e90	e80	e68	190	971	623	466	698	154	104
20	94	e150	e95	e78	e68	192	789	544	413	521	155	103
21	92	e400	e95	e75	e66	181	734	531	392	454	143	102
22	89	e320	e95	e78	e66	172	872	487	365	1920	134	64
23	86	e280	e90	e80	e64	161	828	449	326	1960	134	55
24	85	e350	e90	e80	e62	158	957	410	295	1640	219	53
25	82	e300	e85	e78	e60	166	1020	419	266	1170	204	52
26	79	274	e85	e76	e50	175	1050	609	246	858	185	51
27	80	248	e85	e74	e60	169	1100	1720	229	679	173	55
28	85	e220	e88	e72	e70	e145	1260	1770	218	557	161	52
29	84	191	e90	e72	---	e150	1670	1330	217	483	151	51
30	86	160	e85	e74	---	174	2060	1050	215	441	143	49
31	91	---	e80	e76	---	177	---	992	---	388	138	---
TOTAL	3451	4383	3228	2410	1936	5930	23138	31681	13819	15915	5556	2877
MEAN	111	146	104	77.7	69.1	191	771	1022	461	513	179	95.9
MAX	165	400	177	95	80	360	2060	2220	902	1960	353	133
MIN	79	45	80	65	50	65	212	410	215	172	134	49
AC-FT	6850	8690	6400	4780	3840	11760	45890	62840	27410	31570	11020	5710
(†)	0	0	0	0	0	0	0	5800	7470	8700	2430	1580

CAL YR 1986 TOTAL 116399 MEAN 319 MAX 3000 MIN 45 AC-FT 230900
WTR YR 1987 TOTAL 114324 MEAN 313 MAX 2220 MIN 45 AC-FT 226800

e Estimated
† Flows, in acre-ft, in Two Medicine Canal.

06093200 BADGER CREEK BELOW FOUR HORNS CANAL, NEAR BROWNING, MT

LOCATION.--Lat 48°22'12", long 112°48'07", in NW¼SW¼SE¼ sec.8, T.30 N., R.9 W., Glacier County, Hydrologic Unit 10030201, on left bank, 3.4 mi downstream from point of diversion to Four Horns Canal, 15.5 mi southeast of Browning, and at mile 11.6.

DRAINAGE AREA.--152 mi^2.

PERIOD OF RECORD.--October 1951 to current year. Records since October 1973 equivalent to those published as Badger Creek near Browning (station number 06092500) if diversion to Four Horns Canal is added to flow past station.

GAGE.--Water-stage recorder. Elevation of gage is 4,140 ft, from topographic map. May 1951 to September 1973, water-stage recorder at site 3.4 mi upstream at datum 4,179.26 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Nov. 10-21, Dec. 9, 19, Jan. 14-16, 25, Feb. 2-3, 25-27, Mar. 28-29. Records good except those for estimated daily discharges, which are fair. Four Horns Canal diverts water from right bank in NE¼ sec.24, T.30 N., R.10 W., at diversion dam 3.4 mi upstream for irrigation of about 6,000 acres downstream from station. Recorded diversions from Badger Creek upstream from station for the current year are listed in daily table 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.--36 years, 222 ft^3/s, 19.82 in/yr, 160,800 acre-ft/yr, adjusted for diversion.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 49,700 ft^3/s, June 8, 1964, gage height, 10.37 ft, from rating curve extended above 2,000 ft^3/s on basis of slope-area measurement of peak flow (site and datum then in use); minimum daily, 6.5 ft^3/s, Sept. 17, 1984.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,240 ft^3/s, May 1, 27, gage height, 6.74 ft; maximum gage height, 8.60 ft, Nov. 10 (backwater from ice); minimum daily discharge, 38 ft^3/s, July 16.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	172	135	149	104	98	92	149	1150	352	78	122	97
2	161	138	146	114	e100	90	134	932	308	70	115	95
3	153	136	134	112	e98	114	140	625	275	67	111	94
4	148	135	134	109	96	140	147	494	258	63	105	95
5	148	141	141	104	93	119	161	495	251	69	100	94
6	148	147	136	99	91	117	185	540	244	63	99	94
7	149	141	137	89	92	122	195	580	241	59	97	93
8	152	121	137	87	91	123	206	610	238	56	91	89
9	150	116	e125	94	91	116	203	705	263	54	81	86
10	157	e115	116	104	92	114	193	777	235	62	79	85
11	151	e125	121	122	92	111	190	675	214	58	82	79
12	148	e120	134	109	94	111	180	596	198	53	80	57
13	147	e140	132	104	92	117	173	580	186	52	92	56
14	146	e135	129	e96	92	117	171	445	167	50	139	55
15	144	e140	127	e86	91	112	179	441	137	43	128	54
16	144	e160	123	e88	91	115	217	449	136	38	119	58
17	142	e155	122	97	90	112	265	356	128	61	121	67
18	141	e150	117	103	89	114	326	296	118	172	112	65
19	139	e160	e115	112	89	119	287	261	161	196	106	63
20	138	e200	119	106	90	114	255	228	133	154	101	62
21	137	e190	122	109	88	113	245	212	129	134	99	61
22	137	173	119	109	90	111	276	179	107	327	98	61
23	136	165	116	107	89	109	299	161	93	462	99	60
24	135	190	114	103	83	108	367	150	92	353	119	60
25	133	191	114	e102	e80	112	438	149	87	286	118	61
26	132	173	113	101	e76	116	459	188	82	242	109	60
27	133	168	112	101	e84	111	464	473	79	204	102	63
28	137	161	111	98	92	e98	568	924	78	156	98	60
29	135	155	110	95	---	e94	803	592	75	153	95	57
30	136	146	109	94	---	110	1020	458	72	151	96	39
31	140	---	108	95	---	130	---	409	---	136	98	---
TOTAL	4469	4522	3842	3153	2534	3501	8895	15130	5137	4122	3211	2120
MEAN	144	151	124	102	90.5	113	296	488	171	133	104	70.7
MAX	172	200	149	122	100	140	1020	1150	352	462	139	97
MIN	132	115	108	86	76	90	134	149	72	38	79	39
AC-FT	8860	8970	7620	6250	5030	6940	17640	30010	10190	8180	6370	4210
(†)	0	0	0	0	0	0	243	3940	5520	6130	4760	4070

CAL YR 1986 TOTAL 65601 MEAN 180 MAX 1130 MIN 16 AC-FT 130100
WTR YR 1987 TOTAL 60636 MEAN 166 MAX 1150 MIN 38 AC-FT 120300

e Estimated

† Diversions, in acre-feet, by Four Horns Canal.

06099000 CUT BANK CREEK AT CUT BANK, MT

LOCATION.--Lat 48°38'00", long 112°20'46", in SW¼SE¼NE¼ sec.11, T.33 N., R.6 W., Glacier County, Hydrologic Unit 10030202, Blackfeet Indian Reservation, on right bank, 0.1 mi downstream from bridge on U.S. Highway 2, 0.7 mi west of Cut Bank, 0.8 mi downstream from Old Maids Coulee, and at mile 17.7.

DRAINAGE AREA.--1,065 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1905 to October 1919, May to July 1920, May 1922 to October 1924, May 1951 to September 1973, October 1981 to current year. Monthly discharge only for some periods, published in WSP 1309.

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

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

REMARKS.--Estimated daily discharges: Nov. 7 to Mar. 15. Water-discharge records good except those for estimated daily discharges, which are poor. Few minor diversions for irrigation and municipal water supply for city of Cut Bank upstream from station. Natural flow of stream may be affected by return flow from Two Medicine Canal which irrigates lands upstream from station.

AVERAGE DISCHARGE.--44 years (1906-19, 1923-24, 1952-73, 1982-87), 187 ft^3/s, 135,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,600 ft^3/s, June 9, 1964, gage height, 13.93 ft, 14.2 ft, from floodmarks, from rating curve extended above 12,000 ft^3/s, on basis of slope-area measurement of peak flow; minimum daily, 1.0 ft^3/s, Jan. 22-26, 1982.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 750 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 28	2030	757	3.75	July 24	1800	*1,670	*5.06

Minimum discharge, 4.5 ft^3/s, July 16, gage height, 0.95 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	113	83	e80	e45	e50	e52	189	597	372	40	157	111
2	176	91	e78	e46	e49	e60	260	637	334	43	129	102
3	157	88	e74	e48	e48	e75	304	568	285	49	115	92
4	133	86	e76	e44	e46	e100	357	443	240	43	104	89
5	117	86	e72	e41	e50	e150	322	356	213	45	93	90
6	108	86	e68	e39	e54	e180	292	324	213	41	96	86
7	106	e72	e64	e38	e58	e160	238	340	212	34	92	84
8	149	e52	e60	e38	e56	e140	208	371	224	29	88	84
9	204	e48	e54	e39	e54	e130	194	398	256	25	71	79
10	211	e45	e56	e42	e53	e125	190	445	265	24	62	74
11	204	e47	e58	e45	e53	e120	170	518	247	29	58	70
12	188	e46	e60	e50	e52	e120	155	494	236	35	72	66
13	171	e54	e60	e52	e52	e120	145	457	220	31	75	60
14	157	e56	e60	e45	e51	e125	134	493	189	23	95	61
15	145	e60	e59	e40	e50	e130	126	434	179	15	108	61
16	135	e66	e58	e37	e49	127	123	401	182	7.7	127	54
17	128	e70	e57	e38	e48	123	140	412	189	8.2	108	56
18	120	e68	e55	e40	e47	120	247	364	183	44	103	59
19	113	e66	e52	e39	e46	115	312	300	208	175	114	56
20	105	e72	e52	e38	e45	102	274	275	210	267	115	51
21	101	e74	e53	e40	e44	104	238	265	181	260	104	48
22	96	e76	e54	e42	e43	90	214	251	157	306	99	45
23	92	e74	e55	e44	e42	93	209	207	139	721	97	41
24	90	e80	e56	e45	e40	87	224	185	123	1420	148	39
25	86	e90	e55	e44	e38	89	236	164	100	1120	190	37
26	85	e88	e54	e43	e35	102	255	178	82	610	180	38
27	81	e86	e54	e42	e40	109	280	314	74	439	163	46
28	76	e84	e54	e42	e50	77	292	643	56	344	147	47
29	75	e80	e54	e43	---	84	338	691	41	292	135	46
30	84	e76	e52	e45	---	111	447	494	41	237	127	44
31	85	---	e50	e48	---	120	---	394	---	188	120	---
TOTAL	3891	2150	1844	1322	1343	3440	7113	12413	5651	6944.9	3492	1916
MEAN	126	71.7	59.5	42.6	48.0	111	237	400	188	224	113	63.9
MAX	211	91	80	52	58	180	447	691	372	1420	190	111
MIN	75	45	50	37	35	52	123	164	41	7.7	58	37
AC-FT	7720	4260	3660	2620	2660	6820	14110	24620	11210	13780	6930	3800

CAL YR 1986 TOTAL 61654.1 MEAN 169 MAX 5000 MIN 2.7 AC-FT 122300
WTR YR 1987 TOTAL 51519.9 MEAN 141 MAX 1420 MIN 7.7 AC-FT 102200

e Estimated

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1982 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT							
01...	0830	91	--	--	532	3.5	7.0
NOV							
20...	1445	72	--	--	647	8.5	0.0
JAN							
06...	0915	39	--	--	756	-14.0	0.0
FEB							
10...	0915	53	--	--	692	7.0	0.0
MAR							
18...	1415	114	--	--	1050	5.5	4.5
APR							
08...	1615	203	50	1	915	9.0	9.5
29...	1000	331	20	1	341	21.0	14.5
JUN							
09...	0930	248	--	--	276	18.0	16.0
JUL							
21...	1800	257	--	2	349	18.0	18.5
SEP							
03...	0940	91	10	1	468	19.0	14.5

DATE	TIME	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
APR									
08...	1615	8.80	250	36	49	31	110	3	3.4
29...	1000	8.19	140	5	31	14	17	0.7	1.1
JUL									
21...	1800	8.40	120	0	27	13	22	0.9	1.2
SEP									
03...	0940	8.50	160	0	35	17	30	1	1.2

DATE	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)
APR									
08...	214	250	11	0.20	5.5	590	0.80	323	0.130
29...	130	45	3.7	0.10	3.1	190	0.26	172	<0.100
JUL									
21...	127	45	2.8	0.10	3.3	190	0.26	132	<0.100
SEP									
03...	163	71	4.5	0.20	1.8	260	0.35	64	<0.100

DATE	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)
APR									
08...	2	70	<1	<10	39	<5	23	<0.1	1
29...	--	20	--	--	20	--	--	--	--
JUL									
21...	--	20	--	--	21	--	--	--	--
SEP									
03...	--	40	--	--	60	--	--	--	--

06099500 MARIAS RIVER NEAR SHELBY, MT

LOCATION.--Lat 48°25'38", long 111°53'20", in SE¼NW¼SE¼ sec.20, T.31 N., R.2 W., Toole County, Hydrologic Unit 10030203, on left bank 20 ft downstream from bridge on old U.S. Highway 91, 5.1 mi south of Shelby, 24 mi downstream from Cut Bank Creek, and at mile 140.6.

DRAINAGE AREA.--3,242 mi^2, of which 518 mi^2 is probably noncontributing.

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

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

GAGE.--Water-stage recorder. Datum of gage is 3,087.72 ft National Geodetic Vertical Datum of 1929. Prior to Dec. 23, 1947, nonrecording gage or water-stage recorder at several sites within 1,000 ft of present site at approximately the same datum. Dec. 23, 1947, to Apr. 6, 1976, water-stage recorder at site 150 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Nov. 6 to Mar 13, Mar. 19-20, 28-29. Records good except those for the estimated daily discharges, 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 Lower Two Medicine Lake (station number 06090900), Four Horns Reservoir (station number 06093000) Swift Reservoir (station number 06094000), and Lake Frances (station number 06095500), having a combined capacity of 172,630 acre-ft. Diversions for irrigation of about 50,000 acres upstream from station and about 15,000 acres downstream from station.

AVERAGE DISCHARGE.--79 years, (1902-4, 1905-6, 1911-87), 926 ft^3/s, 670,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 241,000 ft^3/s, June 9, 1964, largely due to failure of Swift Dam, gage height, 23.64 ft, from floodmark, from rating curve extended above 34,000 ft^3/s on basis of slope-area measurement of peak flow; maximum unaffected by dam failure, 75,700 ft^3/s, June 20, 1975, gage height, 18.21 ft; minimum observed, 10 ft^3/s, Aug. 20, 1919.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,760 ft^3/s, July 25, gage height, 6.23 ft; minimum, 184 ft^3/s, July 17, gage height, 3.05 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	495	424	e440	e360	e400	e320	755	3200	2050	280	857	432
2	649	424	e430	e380	e400	e350	1050	3380	1960	262	748	399
3	684	439	e410	e400	e390	e400	1130	2980	1730	290	685	368
4	617	431	e420	e390	e380	e500	1300	2460	1450	269	649	367
5	564	418	e400	e370	e410	e800	1300	2090	1220	272	545	375
6	525	e380	e390	e350	e430	e1000	1230	1940	1120	278	467	363
7	508	e360	e390	e330	e450	e900	1250	1930	1080	265	475	361
8	528	e340	e380	e320	e440	e800	1200	2010	1070	245	443	366
9	615	e330	e350	e330	e430	e750	1200	2080	1120	235	415	355
10	672	e320	e360	e350	e420	e720	1170	2250	1200	228	369	344
11	683	e330	e380	e380	e420	e700	1070	2400	1110	244	344	338
12	662	e310	e390	e420	e420	e690	1040	2310	1040	269	341	330
13	625	e340	e400	e450	e410	e710	967	2180	976	266	360	309
14	595	e330	e400	e400	e400	729	895	2120	891	255	428	292
15	569	e350	e400	e330	e380	747	873	1950	806	224	563	287
16	546	e380	e390	e280	e380	706	1000	1830	742	200	615	284
17	529	e370	e390	e300	e370	684	1310	1810	790	196	533	288
18	515	e360	e380	e330	e370	656	1710	1650	783	307	497	312
19	506	e370	e360	e340	e360	e640	1900	1390	770	965	471	318
20	491	e390	e370	e330	e350	e630	1670	1200	853	1360	443	314
21	479	e420	e380	e330	e340	622	1460	1100	762	1080	423	303
22	466	e430	e400	e340	e330	606	1350	1110	674	959	416	293
23	454	e420	e410	e350	e320	576	1460	1020	604	2580	399	290
24	443	e450	e410	e360	e300	558	1470	892	529	3420	440	276
25	436	e500	e400	e370	e280	568	1650	805	484	3390	654	261
26	424	e480	e400	e370	e250	600	1750	783	430	2360	697	251
27	421	e470	e410	e360	e240	623	1810	1110	373	1830	631	281
28	412	e460	e410	e360	e280	e520	1890	2960	351	1460	563	285
29	406	e450	e420	e370	---	e450	2180	3510	319	1240	503	279
30	410	e420	e410	e380	---	508	2740	2780	292	1130	475	271
31	418	---	e390	e390	---	628	---	2180	---	1010	452	---
TOTAL	16347	11896	12270	11120	10350	19691	41780	61410	27579	27369	15901	9592
MEAN	527	397	396	359	370	635	1393	1981	919	883	513	320
MAX	684	500	440	450	450	1000	2740	3510	2050	3420	857	432
MIN	406	310	350	280	240	320	755	783	292	196	341	251
AC-FT	32420	23600	24340	22060	20530	39060	82870	121800	54700	54290	31540	19030

CAL YR 1986 TOTAL 282685 MEAN 774 MAX 14200 MIN 119 AC-FT 560700
WTR YR 1987 TOTAL 265305 MEAN 727 MAX 3510 MIN 196 AC-FT 526200

e Estimated

06101300 LAKE ELWELL NEAR CHESTER, MT

LOCATION.--Lat 48°19'06", long 111°05'27", in NW¼ sec.33, T.30 N., R.5 E., Liberty County, Hydrologic Unit 10030203, in control house of river outlet tunnel at Tiber Dam on Marias River, 15 mi southwest of Chester, and at mile 80.4.

DRAINAGE AREA.--4,923 mi^2, of which 518 mi^2 is probably noncontributing.

PERIOD OF RECORD.--October 1955 to current year (monthend contents only). Daily elevations and contents May to June 1964, published in WSP 1840-B. Prior to October 1975, published as Tiber Reservoir near Chester.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is referenced to National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation). Records of daily elevations on file in Helena district office.

REMARKS.--Reservoir is formed by rolled earthfill dam with concrete spillway chute; construction began in September 1952; completed in March 1956. Storage began Oct. 28, 1955. Usable capacity, 1,347,000 acre-ft between elevation 2,870.00 ft, trashrack sill, and 3,012.50 ft, top of flood control. Dead storage, 21,580 acre-ft below elevation, 2,870.00 ft. Prior to Oct. 1, 1963, usable capacity was 1,313,000 acre-ft and dead storage was 24,000 acre-ft at same elevations. Figures given herein represent usable contents. Water is presently used for recreation and flood control.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 1,193,000 acre-ft, July 12, 13, 1965, elevation, 3,005.59 ft; minimum observed since normal operation began, 442,100 acre-ft, Apr. 1, 1968, elevation, 2,953.81 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 868,200 acre-ft, July 31, elevation, 2,988.50 ft; minimum, 682,700 acre-ft, Mar. 4, elevation, 2,976.36 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	2,984.79	807,800	---
Oct. 31	2,981.03	749,900	-57,900
Nov. 30	2,980.20	737,600	-12,300
Dec. 31	2,979.50	727,400	-10,200
CAL YR 1986			-13,500
Jan. 31	2,977.87	703,900	-23,500
Feb. 28	2,976.60	686,100	-17,800
Mar. 31	2,977.35	696,600	+10,500
Apr. 30	2,980.93	748,400	+51,800
May 31	2,986.78	839,800	+91,400
June 30	2,988.09	861,300	+21,500
July 31	2,988.50	868,200	+ 6,900
Aug. 31	2,987.46	851,000	-17,200
Sept. 30	2,984.99	811,000	-40,000
WTR YR 1987			+3,200

MARIAS RIVER BASIN

06101500 MARIAS RIVER NEAR CHESTER, MT

LOCATION.--Lat 48°18'23", long 111°04'47", in SW¼SW¼SW¼ sec.34, T.30 N., R.5 E., Liberty County, Hydrologic Unit 10030203, on left bank 2.0 mi downstream from Tiber Dam, 4.4 mi upstream from Pondera Coulee, 15 mi southwest of Chester, and at mile 78.3.

DRAINAGE AREA.--4,927 mi^2, of which 518 mi^2 is probably noncontributing.

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

REVISED RECORDS.--WSP 1629: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,814.03 ft above National Geodetic Vertical Datum of 1929 (U.S. Bureau of Reclamation bench mark). Prior to Oct. 1, 1921, nonrecording gage at bridge 2.5 mi downstream at different datum. Oct. 4, 1945, to Sept. 30, 1946, nonrecording gage at site 3 mi downstream at different datum.

REMARKS.--No estimated daily discharges. Records good. Flow completely regulated by Lake Elwell since Oct. 28, 1955 (see preceding page).

AVERAGE DISCHARGE.--34 years (1945-47, 1955-87), 852 ft^3/s, 617,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge not determined, occurred about Mar. 20, 1947; maximum discharge since dam completion, 10,400 ft^3/s, June 16, 1964, gage height, 10.63 ft; minimum probably less than 0.2 ft^3/s during period of no gage-height record Oct. 29 to Nov. 10, 1955, when gates at dam were closed.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1948 reached a stage of 16 ft, present datum.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,280 ft^3/s, Oct. 3, gage height, 5.46 ft; minimum daily, 490 ft^3/s, July 19.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	894	819	603	613	692	691	502	517	531	522	672	501
2	1010	813	604	610	692	692	506	517	536	523	672	597
3	1660	796	604	614	692	693	506	517	534	519	644	1030
4	2280	758	604	610	692	692	506	514	534	526	645	1040
5	2270	725	604	610	692	692	506	513	535	526	718	1030
6	2110	657	604	611	692	692	506	517	534	521	702	1030
7	1940	657	605	610	692	691	506	516	537	524	717	1030
8	2010	660	608	610	692	695	506	513	543	521	743	1030
9	2010	660	609	610	692	648	506	512	540	512	748	1030
10	2000	660	610	610	692	563	506	523	536	498	747	1030
11	2000	659	610	610	695	527	507	519	534	501	745	1030
12	2000	660	609	622	698	513	506	518	534	501	750	1030
13	2000	660	604	682	698	507	510	519	534	499	748	1030
14	2000	657	604	698	696	506	508	523	535	496	744	1030
15	2000	657	604	698	698	506	508	529	531	496	747	1030
16	2000	654	604	698	698	506	511	527	530	495	751	1030
17	1790	654	604	698	696	506	511	529	532	498	745	1030
18	1610	656	604	698	697	506	512	530	536	495	745	1030
19	1610	656	604	698	696	506	510	527	534	490	742	1030
20	1370	660	610	697	695	506	513	526	535	491	741	1030
21	1000	626	610	698	693	504	512	530	534	495	745	1030
22	885	598	610	698	693	506	512	529	534	495	748	1030
23	886	599	610	698	693	506	515	529	529	493	753	1020
24	884	598	610	698	692	504	512	530	529	495	752	1020
25	884	601	610	696	692	506	512	533	529	508	751	1020
26	884	605	610	693	693	504	515	529	523	494	751	1020
27	884	604	610	697	692	500	516	529	528	494	751	1020
28	884	604	610	694	692	506	517	529	528	494	674	1020
29	884	604	610	692	---	504	517	529	525	496	497	1020
30	882	604	607	692	---	501	518	531	523	495	501	922
31	849	---	610	692	---	501	---	533	---	544	501	---
TOTAL	46370	19821	18819	20555	19427	17380	15298	16237	15977	15657	21890	29770
MEAN	1496	661	607	663	694	561	510	524	533	505	706	992
MAX	2280	819	610	698	698	695	518	533	543	544	753	1040
MIN	849	598	603	610	692	500	502	512	523	490	497	501
AC-FT	91970	39310	37330	40770	38530	34470	30340	32210	31690	31060	43420	59050

CAL YR 1986 TOTAL 332068 MEAN 910 MAX 2280 MIN 598 AC-FT 658700
WTR YR 1987 TOTAL 257201 MEAN 705 MAX 2280 MIN 490 AC-FT 510200

MARIAS RIVER BASIN

06108000 TETON RIVER NEAR DUTTON, MT

LOCATION.--Lat 47°55'49", long 111°33'07", in SE¼SW¼SW¼ sec.12, T.25 N., R.1 E., Teton County, Hydrologic Unit 10030205, on right bank 150 ft upstream from Kerr Bridge, 0.9 mi downstream from Hunt Coulee, 9.5 mi northeast of Dutton, and at mile 100.9.

DRAINAGE AREA.--1,307 mi^2. Area at site used prior to July 17, 1965, 1,308 mi^2.

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

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

REMARKS.--Estimated daily discharges: Nov. 7 to Mar. 4, Mar. 19-23, 28-31. Records good except those for estimated daily discharges, which are poor. Water is diverted on left bank in sec.34, T.25 N., R.7 W., for storage in Bynum Reservoir (usable capacity, 75,000 acre-ft). Diversions for irrigation of about 44,000 acres upstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--33 years, 149 ft^3/s, 108,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 71,300 ft^3/s, June 9, 1964, gage height, 20.48 ft, present site and datum, from floodmark, from slope-area measurement of peak flow; no flow July 21 to Aug. 1, 1984, and July 18 to Aug. 4, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 379 ft^3/s, May 30, gage height, 3.02 ft; minimum, 15 ft^3/s, July 16, 17.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	88	71	e75	e46	e56	e70	187	54	153	34	148	103
2	98	75	e72	e48	e52	e80	307	60	119	32	136	92
3	140	76	e68	e50	e50	e95	261	64	93	28	121	85
4	119	76	e70	e47	e55	e110	222	69	81	31	104	81
5	112	79	e66	e45	e60	131	200	64	62	29	86	84
6	101	81	e62	e42	e70	171	188	60	50	28	75	82
7	93	e75	e64	e40	e80	184	180	53	44	28	71	79
8	89	e70	e60	e41	e90	159	157	51	40	26	72	74
9	85	e62	e58	e43	e100	118	136	48	41	23	70	72
10	83	e52	e58	e46	e92	113	118	43	46	21	68	69
11	83	e55	e60	e50	e85	100	109	41	38	22	64	65
12	83	e50	e62	e55	e80	96	98	38	33	25	63	63
13	85	e55	e64	e44	e78	108	92	37	32	24	64	64
14	86	e60	e62	e36	e75	105	85	35	30	21	69	61
15	84	e64	e60	e30	e72	109	82	32	28	17	83	65
16	82	e68	e58	e32	e70	116	81	28	26	16	92	64
17	81	e72	e56	e36	e70	113	75	29	23	18	100	61
18	80	e77	e54	e38	e68	117	70	30	28	31	105	63
19	78	e85	e50	e38	e66	e115	64	34	34	58	105	63
20	78	e100	e52	e40	e63	e110	59	32	51	243	99	65
21	79	e110	e52	e44	e60	e105	58	30	75	201	93	66
22	80	e100	e54	e48	e58	e100	60	35	70	134	88	60
23	77	e95	e56	e47	e56	e103	60	38	68	107	86	58
24	75	e100	e54	e45	e54	106	62	43	89	240	91	57
25	74	e90	e50	e46	e50	112	61	43	86	250	120	56
26	73	e80	e50	e48	e45	128	62	51	68	186	126	57
27	75	e76	e52	e50	e52	157	59	73	52	147	125	59
28	77	e74	e52	e52	e60	e130	58	121	48	126	125	59
29	77	e72	e50	e52	---	e100	56	295	40	147	116	60
30	74	e70	e48	e54	---	e120	55	311	31	220	111	61
31	72	---	e45	e54	---	e140	---	205	---	183	110	---
TOTAL	2661	2270	1794	1387	1867	3621	3362	2147	1679	2696	2986	2048
MEAN	85.8	75.7	57.9	44.7	66.7	117	112	69.3	56.0	87.0	96.3	68.3
MAX	140	110	75	55	100	184	307	311	153	250	148	103
MIN	72	50	45	30	45	70	55	28	23	16	63	56
AC-FT	5280	4500	3560	2750	3700	7180	6670	4260	3330	5350	5920	4060

CAL YR 1986 TOTAL 38977 MEAN 107 MAX 5280 MIN 10 AC-FT 77310
WTR YR 1987 TOTAL 28518 MEAN 78.1 MAX 311 MIN 16 AC-FT 56570

e Estimated

MISSOURI RIVER MAIN STEM

06109500 MISSOURI RIVER AT VIRGELLE, MT

LOCATION.--Lat 48°00'18", long 110°15'25", in SW¼SW¼SE¼ sec.13, T.26 N., R.11 E., Chouteau County, Hydrologic Unit 10040101, on left bank 0.2 mi upstream from Virgelle ferry, 0.6 mi southwest of Virgelle, 1.8 mi downstream from Spring Coulee, and at mile 2,034.2.

DRAINAGE AREA.--34,379 mi^2.

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

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,507.50 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 30, 1953, water-stage recorder at Loma, 18 mi upstream, at datum 2,543.40 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Nov. 3-18, Dec. 18-21, Feb. 25-27. Records good. Flow regulated by 23 smaller irrigation reservoirs and powerplants, Clark Canyon Reservoir (station number 06015300), Canyon Ferry Lake (station number 06058500), and Lake Elwell (station number 06101300). Diversions for irrigation of about 850,400 acres upstream from station.

AVERAGE DISCHARGE.--52 years, 8,666 ft^3/s, 6,279,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 122,000 ft^3/s, June 5, 1953, gage height, 23.4 ft, from flood-mark, from rating curve for former site at Loma extended above 66,000 ft^3/s, adjusted to present site; minimum daily, 638 ft^3/s, July 5, 1936.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1908 reached a stage about 2 ft higher than that of June 5, 1953, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12,400 ft^3/s, Jan. 12, gage height, 5.68 ft; minimum daily, 3,970 ft^3/s, July 4.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5930	7690	7800	7060	7520	5990	5760	8350	7830	4610	4440	5140
2	6280	7690	7960	6440	7300	5680	5850	9190	7060	4490	4500	5090
3	6890	7820	7670	6940	7570	5840	6070	10800	6810	4210	4580	4920
4	7220	8010	7810	7220	7410	6160	6300	10500	6240	3970	4580	5170
5	8040	8110	7370	7570	7270	5580	6350	9650	5720	4190	4450	5200
6	7970	7950	7690	7460	6660	5550	6430	8340	5410	4450	4830	5340
7	7810	7980	7970	7310	6720	5660	6490	7850	4900	4820	4610	5350
8	7540	7800	7600	6780	6420	6120	6770	7150	5000	4530	5040	5220
9	6890	7540	7830	5440	6190	6170	6630	6460	4810	4760	5010	7950
10	7640	7350	7940	5600	6430	6000	6670	5960	4790	4810	5010	5540
11	7580	7530	7300	5490	5850	5980	6430	5540	4740	4650	5070	5240
12	7770	7670	7630	9640	5310	5560	6420	5440	4950	4860	4970	4660
13	7880	e7800	8330	9090	5790	6310	6360	5820	4570	5100	5040	5160
14	7560	e7600	7830	8530	5510	5940	6220	6470	4600	5020	5120	5120
15	7650	e7200	7530	8100	5760	5180	6190	6060	4370	4920	5200	5410
16	7830	e7000	7360	5620	5950	5870	6160	5340	4300	4650	5470	5210
17	7510	e7200	7480	5190	5810	5860	5970	4860	4350	4630	5600	5360
18	7240	e7400	e7400	5430	6040	6120	6090	4470	4730	4740	5210	5230
19	7310	7740	e7200	6910	5720	5670	6290	4500	4590	5660	5140	4960
20	7290	7750	e7000	8870	5840	6050	6650	4500	5550	7630	5250	5190
21	6880	8030	e7200	9390	5540	6070	7550	4390	5850	8920	5210	5280
22	6960	7960	7230	9500	5740	6040	7020	4520	5780	7900	5160	5730
23	6660	8210	7500	8790	5840	6020	6930	4690	5410	6910	5030	5330
24	6740	8170	7500	8400	5810	5980	7180	4670	5180	6830	5070	5300
25	6670	8450	7290	7830	e5400	5940	7080	4660	5190	6470	5470	5160
26	6690	8170	7210	7670	e5200	5960	7160	5010	4900	6360	5950	5190
27	6750	8220	6960	7810	e5600	6110	7580	5290	4730	5980	5710	5150
28	7400	8070	6860	7780	5690	6040	7900	5820	4910	5750	5590	5110
29	7730	8060	6830	8120	---	5880	8360	6220	4500	5550	6020	5120
30	7680	7820	6750	8170	---	5650	8300	9530	5500	5450	5190	5240
31	7870	---	6970	8020	---	5640	---	8920	---	5080	5290	---
TOTAL	225860	233990	231000	232170	171890	182620	201160	200970	157270	167900	158810	159070
MEAN	7286	7800	7452	7489	6139	5891	6705	6483	5242	5416	5123	5302
MAX	8040	8450	8330	9640	7570	6310	8360	10800	7830	8920	6020	7950
MIN	5930	7000	6750	5190	5200	5180	5760	4390	4300	3970	4440	4660
AC-FT	448000	464100	458200	460500	340900	362200	399000	398600	311900	333000	315000	315500

CAL YR 1986 TOTAL 3206710 MEAN 8786 MAX 25000 MIN 5930 AC-FT 6361000
WTR YR 1987 TOTAL 2322710 MEAN 6364 MAX 10800 MIN 3970 AC-FT 4607000

e Estimated

MISSOURI RIVER MAIN STEM

06115200 MISSOURI RIVER NEAR LANDUSKY, MT

(National stream quality accounting network station)

LOCATION.--Lat 47°37'51", long 108°41'13", in NW¼NE¼ sec.31, T.22 N., R.24 E., Fergus County, Hydrologic Unit 10040104, Fort Peck Game Range, on right bank 380 ft upstream from bridge on U.S. Highway 191, 0.9 mi upstream from Armells Creek, 20 mi south of Landusky, and at mile 1,921.61.

DRAINAGE AREA.--40,987 mi^2. Area at site used prior to Dec. 13, 1968, 40,763 mi^2.

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,239.96 ft above National Geodetic Vertical Datum of 1929 (State Highway bench mark). Prior to Feb. 7, 1935, nonrecording gage, and Feb. 7, 1935, to Dec. 12, 1968, water-stage recorder, at site 16.5 mi upstream at datum 33.06 ft higher.

REMARKS.--Estimated daily discharges: Nov. 10 to Mar. 7. Water-discharge records good except those for estimated daily discharges, which are poor. Flow regulated by 24 smaller irrigation reservoirs and powerplants, Clark Canyon Reservoir (station number 06015300), Canyon Ferry Lake (station number 06058500), and Lake Elwell (station number 06101300). Diversions for irrigation of about 870,400 acres upstream from station.

AVERAGE DISCHARGE.--53 years, 9,415 ft^3/s, 6,821,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 137,000 ft^3/s, June 6, 1953, gage height 22.20 ft, from graph based on gage readings, site and datum then in use; maximum gage height, 30.16 ft, Mar. 19, 1947 (ice jam), from floodmark, site and datum then in use; maximum gage height, present site and datum, 34.17 ft, Mar. 26, 1978, (ice jam), from floodmark; minimum discharge, 1,120 ft^3/s, July 8, 1936, gage height, 1.92 ft, site and datum then in use.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 11,000 ft^3/s, May 4, gage height, 16.51 ft; maximum gage height, 22.45 ft, Nov. 26 (backwater from ice); minimum daily discharge, 3,810 ft^3/s, July 6.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8500	8410	e8500	e7500	e8500	e6200	6460	8390	9010	4840	5440	5370
2	7690	8340	e8500	e7500	e8000	e6200	6440	8600	8230	4900	4570	5430
3	7200	8370	e8500	e7000	e7500	e6200	6730	8820	7340	4340	4500	5240
4	7900	8430	e8500	e7000	e7500	e6200	6850	10700	7050	4320	4580	5090
5	8080	8630	e8500	e7500	e7500	e6200	6990	10600	6770	3990	4650	5090
6	8810	8720	e8500	e7600	e7000	e7000	7160	9780	6160	3810	4500	5310
7	8850	8730	e8500	e7600	e7000	e7400	7120	8840	5820	4160	4690	5330
8	8790	8570	e8500	e7000	e6500	7720	7190	8140	5310	4410	4850	5420
9	8380	8290	e8500	e6500	e6000	6720	7250	7510	5260	4510	4790	5380
10	8170	e7500	e8500	e5500	e6000	6730	7190	6860	5390	4400	5160	6440
11	8080	e8000	e8500	e5500	e6500	6640	7020	6290	5090	4620	5090	7020
12	8320	e8000	e7800	e6500	e6000	6630	6950	5780	5060	4700	4990	5340
13	8490	e8000	e7500	e9500	e5500	6390	6790	5720	4860	4480	4910	5280
14	8510	e8000	e8000	e10000	e5500	6720	6820	5460	4870	4830	5150	4960
15	8460	e8500	e8400	e9500	e5500	7010	6640	6400	4710	4990	5050	5250
16	8520	e8500	e8400	e9000	e6000	5980	6550	6180	4590	4780	5190	5460
17	8500	e8500	e8400	e7000	e6000	6220	6640	5810	4360	4590	5370	5260
18	8410	e8000	e8400	e6000	e6000	6370	6500	5360	4310	4580	5430	5350
19	8100	e8000	e8400	e5500	e6000	6550	6500	4940	4770	4700	5490	5350
20	8030	e8000	e8400	e6000	e6000	6490	6630	4870	5490	5170	5210	5220
21	8130	e8000	e8000	e6500	e6000	6330	7010	4740	6670	6610	5290	5070
22	7960	e8500	e8000	e8000	e6000	6550	7810	4850	6400	8370	5230	5400
23	7710	e8500	e8000	e8500	e6000	6510	7320	4750	6060	7980	5190	5700
24	7600	e8500	e7500	e8000	e6000	6480	7480	4980	5700	6900	5190	5430
25	7560	e8500	e7400	e7500	e5500	6490	7560	5100	5350	6740	5240	5380
26	7550	e9000	e7500	e7500	e6000	6460	7430	5420	5100	6590	5490	5320
27	7480	e9000	e7500	e7500	e5800	6650	7530	5540	4950	6260	6020	5220
28	7560	e9000	e7500	e7500	e5800	6560	7740	5800	4850	6020	5920	5240
29	7770	e9000	e7500	e8000	---	6490	8050	5910	4710	5970	5830	5210
30	8240	e9000	e7500	e8000	---	6340	8490	6660	4480	5550	6070	5250
31	8350	---	e7500	e8500	---	6450	---	9220	---	5560	5540	---
TOTAL	251700	252490	251100	230700	177600	202880	212840	208020	168720	163670	160620	161810
MEAN	8119	8416	8100	7442	6343	6545	7095	6710	5624	5280	5181	5394
MAX	8850	9000	8500	10000	8500	7720	8490	10700	9010	8370	6070	7020
MIN	7200	7500	7400	5500	5500	5980	6440	4740	4310	3810	4500	4960
AC-FT	499200	500800	498100	457600	352300	402400	422200	412600	334700	324600	318600	321000

CAL YR 1986 TOTAL 3584360 MEAN 9820 MAX 20300 MIN 6930 AC-FT 7110000
WTR YR 1987 TOTAL 2442150 MEAN 6691 MAX 10700 MIN 3810 AC-FT 4844000

e Estimated

MISSOURI RIVER MAIN STEM

06115200 MISSOURI RIVER NEAR NEAR LANDUSKY, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1972 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: March 1979 to September 1981.
WATER TEMPERATURE: March to September 1979.
SUSPENDED-SEDIMENT DISCHARGE: October 1971 to current year

REMARKS.--Unpublished records of once-daily water temperature are available in files of the District office. Prior to July 1972, sampling and record computations were under supervision of Corps of Engineers, U.S. Army. Sediment loads estimated for many days during winter period. Flow affected by ice during most of winter period.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1979-81): Maximum daily, 1,240 microsiemens, June 20, 1979; minimum daily, 410 microsiemens, July 3, 1980.
WATER TEMPERATURE (water year 1979): Maximum, 24.0°C, on several days during June to August 1979; minimum, 0.5°C, on several days during March 1979.
SEDIMENT CONCENTRATION : Maximum daily mean, 27,400 mg/L, June 22, 1976; minimum daily mean, 2 mg/L, Dec. 21, 1983.
SEDIMENT LOAD : Maximum daily, 1,680,000 tons, June 22, 1976; minimum daily, 33 tons, Dec. 21, 1983.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATION: Maximum daily mean, 13,200 mg/L, June 21; minimum daily mean, 12 mg/L, Nov. 19.
SEDIMENT LOAD: Maximum daily, 238,000 tons, June 21; minimum daily, 252 tons, Jan. 11.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)
NOV								
19...	1030	8000	0	0	526	-5.0	0.0	698
JAN								
21...	1230	5610	0	0	498	0.0	0.0	711
MAR								
18...	1020	6330	--	--	620	2.0	5.5	--
30...	1100	6330	75	1	692	3.0	4.0	706
MAY								
14...	1130	5250	0	0	442	21.0	21.0	705
JUL								
15...	1200	5060	0	0	465	26.0	22.0	699
SEP								
15...	0845	5250	95	3	532	17.0	18.0	702

DATE	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BICAR-BONATE WATER WHOLE IT-FLD (MG/L) (00450)	CAR-BONATE WATER WHOLE IT-FLD (MG/L) (00447)	ALKA-LINITY WH WAT TOTAL FIELD MG/L AS CACO3 (00410)
NOV							
19...	11.6	87	K2	K22	154	0	124
JAN							
21...	12.8	94	K4	K4	194	0	160
MAR							
18...	--	--	--	--	--	--	--
30...	12.1	100	K1	K1	178	0	146
MAY							
14...	7.5	91	K4	K10	150	8	136
JUL							
15...	7.8	98	K6	K27	173	9	155
SEP							
15...	5.2	60	K9	K5	186	0	151

MISSOURI RIVER MAIN STEM

06115200 MISSOURI RIVER NEAR NEAR LANDUSKY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV 19...	1030	8.00	2.1	200	80	50	19	26	0.8
JAN 21...	1230	8.10	3.8	220	57	54	20	27	0.8
MAR 30...	1100	8.50	32	270	120	60	28	52	1
MAY 14...	1130	8.40	16	180	43	42	18	25	0.8
JUL 15...	1200	8.30	16	210	50	49	20	25	0.8
SEP 15...	0845	8.40	15	220	68	51	22	27	0.8

DATE	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
NOV 19...	3.1	150	88	8.8	0.80	17	300	290	0.41
JAN 21...	3.4	160	90	9.2	0.80	17	328	320	0.45
MAR 30...	3.3	167	170	10	0.80	16	436	430	0.59
MAY 14...	2.8	131	94	10	0.70	2.2	269	280	0.37
JUL 15...	3.2	153	100	9.7	0.90	11	299	310	0.41
SEP 15...	3.2	139	99	9.3	0.80	8.9	316	310	0.43

DATE	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	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 19...	6480	<0.010	0.300	<0.010	<0.010	0.40	0.030	0.020	0.040
JAN 21...	4970	<0.010	0.300	0.030	<0.010	0.50	0.020	0.020	0.020
MAR 30...	7450	<0.010	0.380	0.020	0.010	0.70	0.060	0.010	0.010
MAY 14...	3810	0.020	<0.100	0.030	0.040	0.90	0.050	<0.010	0.010
JUL 15...	4080	<0.010	<0.100	0.010	0.020	0.60	0.050	<0.010	<0.010
SEP 15...	4480	<0.010	<0.100	<0.010	0.020	1.1	<0.010	<0.010	<0.010

MISSOURI RIVER MAIN STEM

06115200 MISSOURI RIVER NEAR NEAR LANDUSKY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)
NOV											
19...	1030	<10	17	47	<0.5	1	<1	<3	2	3	<5
MAR											
30...	1100	20	17	51	<0.5	<1	<1	<3	1	6	<5
JUL											
15...	1200	20	11	60	<0.5	<1	<1	<3	4	6	<5
SEP											
15...	0845	30	10	59	<0.5	<1	<1	<3	3	<3	<5

DATE	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
NOV										
19...	55	7	<0.1	<10	2	<1	<1	410	<6	8
MAR										
30...	68	5	0.1	<10	1	2	<1	540	<6	12
JUL										
15...	54	2	0.2	<10	<1	<1	<1	460	<6	<3
SEP										
15...	43	2	0.2	<10	1	<1	<1	470	<6	12

DATE	TIME	TEMPERATURE WATER (DEG C) (00010)	STREAMFLOW, INSTANTANEOUS (CFS) (00061)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV									
19...	1030	0.0	8000	11	238	--	--	--	22
JAN									
21...	1230	0.0	5610	11	167	--	--	--	82
MAR									
18...	1020	5.5	6330	232	3970	52	78	100	--
MAY									
14...	1130	21.0	5250	79	1120	--	--	--	46
JUL									
15...	1200	22.0	5060	134	1830	--	--	--	68
SEP									
15...	0845	18.0	5250	108	1530	--	--	--	50

DATE	TIME	BED MAT. FALL DIAM. % FINER THAN .004 MM (80157)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)
MAY							
14...	1130	--	12	35	70	99	100
JUL							
15...	1200	3	18	41	72	98	100
SEP							
15...	0845	3	13	29	56	98	100

MISSOURI RIVER MAIN STEM

06115200 MISSOURI RIVER NEAR NEAR LANDUSKY, MT--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	2190	50300	420	9540	33	757	61	1240	109	2500	66	1100
2	1370	28400	400	9010	27	620	64	1300	110	2380	92	1540
3	580	11300	370	8360	23	528	73	1380	98	1980	105	1760
4	622	13300	360	8190	20	459	84	1590	79	1600	102	1710
5	472	10300	370	8620	20	459	81	1640	79	1600	132	2210
6	562	13400	418	9840	19	436	64	1310	77	1460	528	9980
7	460	11000	398	9380	19	436	42	862	72	1360	880	17600
8	408	9680	438	10100	19	436	21	397	67	1180	695	14500
9	325	7350	405	9070	19	436	16	281	60	972	488	8850
10	300	6620	295	5970	21	482	28	416	51	826	429	7800
11	438	9560	210	4540	24	551	17	252	47	825	312	5590
12	685	15400	162	3500	28	590	32	562	34	551	300	5370
13	710	16300	140	3020	36	729	60	1540	40	594	290	5000
14	540	12400	105	2270	54	1170	92	2480	40	594	455	8260
15	385	8790	75	1720	62	1410	96	2460	54	802	525	9940
16	380	8740	50	1150	56	1270	75	1820	46	745	380	6140
17	358	8220	40	918	47	1070	45	850	45	729	270	4530
18	360	8170	30	648	42	953	38	616	54	875	232	3990
19	298	6520	12	259	42	953	46	683	68	1100	315	5570
20	278	6030	16	346	43	975	54	875	75	1220	390	6830
21	258	5660	26	562	47	1020	23	404	74	1200	242	4140
22	225	4840	40	918	52	1120	74	1600	70	1130	176	3110
23	358	7450	48	1100	56	1210	88	2020	65	1050	148	2600
24	510	10500	52	1190	59	1190	87	1880	58	940	172	3010
25	605	12300	55	1260	63	1260	86	1740	48	713	226	3960
26	439	8950	62	1510	67	1360	106	2150	42	680	366	6380
27	250	5050	68	1650	68	1380	111	2250	39	611	658	11800
28	218	4450	59	1430	68	1380	71	1440	42	658	544	9640
29	240	5030	48	1170	68	1380	46	994	---	---	262	4590
30	385	8570	39	948	66	1340	59	1270	---	---	308	5270
31	460	10400	---	---	63	1280	86	1970	---	---	470	8190
TOTAL	---	344980	---	118189	---	28640	---	40272	---	30875	---	190960
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	505	8810	354	8020	1000	24300	250	3270	200	2940	160	2320
2	478	8310	368	8540	442	9820	228	3020	109	1340	162	2380
3	472	8580	545	13000	380	7530	222	2600	125	1520	139	1970
4	470	8690	712	20600	260	4950	310	3620	130	1610	112	1540
5	468	8830	648	18500	360	6580	260	2800	138	1730	206	2830
6	468	9050	498	13200	268	4460	148	1520	152	1850	474	6800
7	640	12300	380	9070	185	2910	162	1820	152	1920	322	4630
8	1040	20200	322	7080	170	2440	129	1540	194	2540	160	2340
9	765	15000	315	6390	235	3340	200	2440	209	2700	142	2060
10	540	10500	252	4670	840	12200	132	1570	260	3620	305	5300
11	450	8530	215	3650	715	9830	150	1870	150	2060	510	9670
12	420	7880	278	4340	530	7240	140	1780	130	1750	172	2480
13	315	5770	262	4050	480	6300	102	1230	162	2150	140	2000
14	230	4240	135	1990	400	5260	135	1760	190	2640	105	1410
15	215	3850	336	5810	400	5090	120	1620	162	2210	106	1500
16	210	3710	288	4810	460	5700	130	1680	200	2800	250	3690
17	218	3910	262	4110	280	3300	160	1980	205	2970	282	4000
18	162	2840	148	2140	145	1690	158	1950	150	2200	112	1620
19	156	2740	110	1470	520	6700	184	2330	148	2190	118	1700
20	215	3850	375	4930	5200	77100	288	4020	168	2360	118	1660
21	255	4830	374	4790	13200	238000	738	13200	158	2260	172	2350
22	358	7550	190	2490	8000	138000	1360	30700	110	1550	430	6270
23	345	6820	166	2130	1820	29800	1120	24100	102	1430	590	9080
24	295	5960	640	8610	820	12600	515	9590	108	1510	482	7070
25	248	5060	1560	21500	492	7110	320	5820	146	2070	321	4660
26	236	4730	3240	47400	395	5440	290	5160	180	2670	148	2130
27	226	4590	3850	57600	348	4650	270	4560	225	3660	118	1660
28	288	6020	2790	43700	440	5760	212	3450	190	3040	98	1390
29	312	6780	1090	17400	424	5390	240	3870	296	4660	90	1270
30	316	7240	1200	21600	190	2300	210	3150	364	5970	99	1400
31	---	---	1920	47800	---	---	205	3080	198	2960	---	---
TOTAL	---	217170	---	421390	---	655790	---	151100	---	76880	---	99180

TOTAL LOAD FOR YEAR: 2375426 TONS.

06120500 MUSSELSHELL RIVER AT HARLOWTON, MT

LOCATION.--Lat 46°25'48", long 109°50'24", in NE¼ sec.28, T.8 N., R.15 E., Wheatland County, Hydrologic Unit 10040201, on left bank 350 ft downstream from bridge on U.S. Highway 191, 1.0 mi southwest of Harlowton, 6 mi upstream from American Fork, and at mile 327.8.

DRAINAGE AREA.--1,125 mi^2.

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

REVISED RECORDS.--WSP 1309: 1912, 1915(M), 1918, 1925. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 4,171.46 ft above National Geodetic Vertical Datum of 1929 (levels by Morrison and Maierle, Inc.). Prior to Dec. 8, 1937, nonrecording gages at site 1.2 mi downstream at different datums. Dec. 8, 1937, to Aug. 26, 1955, nonrecording gage at bridge 300 ft upstream at different datums.

REMARKS.--Estimated daily discharges: Nov. 1, Nov. 6 to Mar. 6, Mar. 28-31. Records good except those for estimated daily discharges, which are poor. Some regulation by Bair and Martinsdale Reservoirs. Several observation 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 30,100 acres upstream from station of which about 2,300 acres is flood irrigated.

AVERAGE DISCHARGE.--77 years (water years 1908-29, 1931-32, 1935-87), 163 ft^3/s, 118,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 7,270 ft^3/s, June 20, 1975, gage height, 10.01 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 367 ft^3/s, May 28, gage height, 3.41 ft; maximum gage height, 4.02 ft, Dec. 12 (backwater from ice); minimum daily discharge, 6.9 ft^3/s, May 8, result of diversions to reservoirs upstream.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	121	e72	e90	e52	e84	e54	66	44	162	49	61	15
2	127	74	e80	e64	e74	e65	61	39	140	48	54	15
3	128	72	e70	e70	e60	e80	59	37	120	73	52	18
4	124	71	e60	e66	e70	e100	58	33	113	110	53	18
5	122	68	e66	e60	e80	e105	59	21	94	106	48	21
6	120	e62	e60	e54	e90	e110	61	19	79	151	44	21
7	120	e52	e58	e50	e84	103	63	11	79	109	56	22
8	118	e45	e62	e56	e76	98	64	6.9	71	98	58	25
9	118	e38	e56	e66	e70	77	63	10	70	97	51	22
10	116	e30	e60	e78	e76	71	61	23	91	74	46	22
11	114	e40	e64	e90	e72	78	52	24	96	95	40	23
12	116	e33	e68	e90	e70	70	44	26	67	99	44	25
13	114	e40	e72	e86	e68	76	46	79	47	85	45	25
14	113	e54	e70	e70	e66	80	42	83	43	77	41	26
15	112	e70	e72	e45	e62	77	43	91	44	62	44	29
16	111	e95	e70	e37	e56	73	42	96	53	60	52	33
17	107	e90	e64	e45	e58	69	43	121	53	77	49	35
18	110	e75	e74	e60	e58	68	38	142	54	204	44	32
19	108	e90	e62	e58	e58	74	40	134	78	217	37	31
20	107	e110	e68	e54	e58	76	42	159	77	163	31	31
21	107	e120	e72	e59	e54	69	40	163	68	127	23	34
22	106	e140	e80	e62	e54	62	37	122	74	118	20	27
23	106	e120	e78	e66	e54	56	38	100	78	99	21	27
24	109	e110	e74	e70	e50	65	37	87	74	90	23	26
25	109	e100	e72	e70	e45	60	36	95	72	80	30	26
26	106	e95	e70	e74	e40	59	36	117	71	77	40	26
27	103	e90	e70	e74	e40	60	35	168	63	68	37	32
28	102	e85	e66	e70	e45	e52	35	275	59	57	27	33
29	101	e80	e68	e72	---	e42	33	331	55	57	22	34
30	101	e72	e66	e64	---	e52	36	239	54	85	19	36
31	84	---	e64	e76	---	e70	---	181	---	75	17	---
TOTAL	3460	2293	2126	2008	1772	2251	1410	3076.9	2299	2987	1229	790
MEAN	112	76.4	68.6	64.8	63.3	72.6	47.0	99.3	76.6	96.4	39.6	26.3
MAX	128	140	90	90	90	110	66	331	162	217	61	36
MIN	84	30	56	37	40	42	33	6.9	43	48	17	15
AC-FT	6860	4550	4220	3980	3510	4460	2800	6100	4560	5920	2440	1570

CAL YR 1986 TOTAL 46162.0 MEAN 126 MAX 1050 MIN 23 AC-FT 91560
WTR YR 1987 TOTAL 25701.9 MEAN 70.4 MAX 331 MIN 6.9 AC-FT 50980

e Estimated

06122800 MUSSELSHELL RIVER NEAR SHAWMUT, MT

LOCATION.--Lat 46°21'02", long 109°33'18", in NE¼NW¼SE¼ sec. 23, T.7 S., R.17 E., Wheatland County, Hydrologic Unit 10040201, on left bank 1.6 mi west of Shawmut, 3.2 mi upstream from county bridge located 0.5 mi south of Shawmut, 4.8 mi downstream from diversion to Deadman's Basin Reservoir, and at mile 304.1.

DRAINAGE AREA.--1,479 mi^2.

PERIOD OF RECORD.--March 1986 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,880 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges this year. Seasonal records good. Diversions for irrigation of about 40,000 acres upstream from station of which about 29,000 acres is downstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 691 ft^3/s, June 9, 1986, gage height, 4.09 ft, from rating curve extended above 53 ft^3/s; minimum, daily, 0.62 ft^3/s, Mar. 3, 4, 1987.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 148 ft^3/s, Oct. 4, gage height, 2.10 ft, from rating curve extended above 53 ft^3/s; minimum daily, 0.62 ft^3/s, Mar. 3, 4.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	123	---	---	---	---	.86	.97	3.5	39	13	33	6.2
2	134	---	---	---	---	.77	.92	4.2	36	14	30	6.0
3	137	---	---	---	---	.68	1.0	4.0	30	16	28	5.8
4	137	---	---	---	---	.62	1.1	4.0	30	19	28	5.9
5	134	---	---	---	---	.62	1.1	4.8	30	23	18	6.1
6	133	---	---	---	---	.67	1.1	7.4	27	21	14	6.5
7	117	---	---	---	---	.70	1.1	9.0	26	22	15	6.9
8	18	---	---	---	---	.75	.96	8.8	26	21	16	6.7
9	11	---	---	---	---	.75	.98	6.9	30	23	17	8.0
10	7.8	---	---	---	---	.71	.89	6.7	39	27	19	13
11	6.4	---	---	---	---	.71	.80	5.8	27	42	22	9.6
12	5.8	---	---	---	---	.88	.80	5.3	24	40	19	8.6
13	5.3	---	---	---	---	.90	.79	4.7	20	35	22	8.3
14	4.9	---	---	---	---	.98	.94	3.8	18	33	22	8.5
15	4.8	---	---	---	---	.81	3.6	3.2	17	31	24	8.1
16	4.4	---	---	---	---	.89	3.9	9.6	19	30	25	8.1
17	4.2	---	---	---	---	.84	4.6	29	23	41	23	8.4
18	4.0	---	---	---	---	.80	5.2	34	26	53	21	9.7
19	3.8	---	---	---	---	1.2	5.1	34	28	77	19	9.9
20	3.7	---	---	---	---	1.2	5.3	40	29	68	17	8.5
21	3.6	---	---	---	---	1.6	6.0	42	26	55	16	5.4
22	3.4	---	---	---	---	1.7	6.1	41	26	51	13	5.0
23	3.3	---	---	---	---	1.7	3.6	34	25	50	13	5.0
24	3.3	---	---	---	---	1.6	4.0	31	24	45	12	4.4
25	3.2	---	---	---	---	1.6	5.5	28	23	42	15	4.6
26	3.2	---	---	---	---	1.5	4.3	16	22	40	14	4.6
27	3.1	---	---	---	---	1.5	3.9	20	21	38	10	4.9
28	2.9	---	---	---	---	1.7	3.9	33	20	37	8.4	5.1
29	2.9	---	---	---	---	1.7	3.6	70	19	35	7.8	5.1
30	2.8	---	---	---	---	1.4	3.7	66	16	34	7.4	5.1
31	2.8	---	---	---	---	1.1	---	40	---	36	6.7	---
TOTAL	1033.6	---	---	---	---	33.44	85.75	649.7	766	1112	555.3	208.0
MEAN	33.3	---	---	---	---	1.08	2.86	21.0	25.5	35.9	17.9	6.93
MAX	137	---	---	---	---	1.7	6.1	70	39	77	33	13
MIN	2.8	---	---	---	---	.62	.79	3.2	16	13	6.7	4.4
AC-FT	2050	---	---	---	---	66	170	1290	1520	2210	1100	413

MUSSELSHELL RIVER BASIN

06126470 HALFBREED CREEK NEAR KLEIN, MT

LOCATION.--Lat 46°23'14", long 108°32'29", in SW¼NE¼SW¼ sec.1, T.7 N., R.25 E., Musselshell County, Hydrologic Unit 10040201, on left bank, 800 ft upstream from private road bridge, 1.2 mi south of Klein, 3.2 mi upstream from mouth, and 4.1 mi south of Roundup.

DRAINAGE AREA.--53.2 mi^2.

PERIOD OF RECORD.--October 1977 to September 1986, July to September 1987.

GAGE.--Water-stage recorder. Elevation of gage is 3,330 ft, from topographic map.

REMARKS.--No estimated daily discharges this year. Several observations of water temperatures and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--9 years (water years, 1978-86), 1.08 ft^3/s, 782 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 630 ft^3/s, revised, July 16, 1986, gage height, 8.69 ft, from floodmark, from rating curve extended above 345 ft^3/s based on extension of 1978 slope-area data; no flow Feb. 2-14, 1985.

EXTREMES FOR MAY TO SEPTEMBER--Peak discharges greater than base discharge of 5.0 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage Height (ft)	Date	Time	Discharge (ft^3/s)	Gage Height (ft)
July 30	0200	*2.7	*4.39	Peak may have been higher prior to gage operation.			

Minimum discharge, 0.12 ft^3/s, Sept. 3, but may have been lower prior to gage operation.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	.24	.32	.26
2	---	---	---	---	---	---	---	---	---	.23	.25	.21
3	---	---	---	---	---	---	---	---	---	.24	.26	.17
4	---	---	---	---	---	---	---	---	---	.19	.23	.23
5	---	---	---	---	---	---	---	---	---	.19	.22	.35
6	---	---	---	---	---	---	---	---	---	.28	.20	.36
7	---	---	---	---	---	---	---	---	---	.32	.22	.31
8	---	---	---	---	---	---	---	---	---	.31	.26	.29
9	---	---	---	---	---	---	---	---	---	.27	.29	.28
10	---	---	---	---	---	---	---	---	---	.27	.28	.24
11	---	---	---	---	---	---	---	---	---	.49	.23	.21
12	---	---	---	---	---	---	---	---	---	.62	.23	.24
13	---	---	---	---	---	---	---	---	---	.43	.32	.29
14	---	---	---	---	---	---	---	---	---	.36	.41	.29
15	---	---	---	---	---	---	---	---	---	.27	.48	.28
16	---	---	---	---	---	---	---	---	---	.24	.50	.28
17	---	---	---	---	---	---	---	---	---	.45	.45	.31
18	---	---	---	---	---	---	---	---	---	1.3	.40	.33
19	---	---	---	---	---	---	---	---	---	.95	.35	.38
20	---	---	---	---	---	---	---	---	---	.47	.32	.39
21	---	---	---	---	---	---	---	---	---	.38	.26	.37
22	---	---	---	---	---	---	---	---	---	.42	.22	.35
23	---	---	---	---	---	---	---	---	---	.49	.24	.35
24	---	---	---	---	---	---	---	---	---	.46	.35	.34
25	---	---	---	---	---	---	---	---	---	.41	1.8	.37
26	---	---	---	---	---	---	---	---	---	.36	2.2	.40
27	---	---	---	---	---	---	---	---	---	.29	1.1	.46
28	---	---	---	---	---	---	---	---	---	.23	.55	.43
29	---	---	---	---	---	---	---	---	---	.44	.34	.50
30	---	---	---	---	---	---	---	---	---	1.5	.29	.53
31	---	---	---	---	---	---	---	---	---	.41	.29	---
TOTAL	---	---	---	---	---	---	---	---	---	13.51	13.86	9.80
MEAN	---	---	---	---	---	---	---	---	---	.44	.45	.33
MAX	---	---	---	---	---	---	---	---	---	1.5	2.2	.53
MIN	---	---	---	---	---	---	---	---	---	.19	.20	.17
AC-FT	---	---	---	---	---	---	---	---	---	27	27	19

MUSSELSHELL RIVER BASIN

06126500 MUSSELSHELL RIVER NEAR ROUNDUP, MT

LOCATION.--Lat 46°25'41", long 108°34'19", in NW¼SE¼SE¼ sec.22, T.8 N., R.25 E., Musselshell County, Hydrologic Unit 10040202, on left bank 20 ft downstream from Halfbreed Creek, 0.1 mi upstream from bridge on U.S. Highway 87, 2.0 mi southwest of Roundup, and at mile 211.6.

DRAINAGE AREA.--4,023 mi^2.

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

REVISED RECORDS.--WSP 1086: 1946. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,188.15 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Sept. 26, 1949, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharge: Nov. 7 to Mar. 7, 28, 29. Records good except those for estimated daily discharge, which are poor. Some regulation by Bair (station number 06116500), Martinsdale (station number 06119000) and Deadman's Basin (station number 06122500) Reservoirs. Diversions for irrigation of about 59,600 acres upstream from station, of which about 11,000 acres is flood irrigated. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--41 years, 224 ft^3/s, 162,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,610 ft^3/s, June 18, 1967, gage height, 12.45 ft; maximum gage height, 13.73 ft, Mar. 9, 1979 (ice jam); minimum discharge, 0.60 ft^3/s, May 12, 1962, gage height, 0.63 ft; minimum gage height, 0.23 ft, July 31, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 469 ft^3/s, July 19, gage height, 2.77 ft; minimum daily, 12 ft^3/s, Apr. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	138	51	e42	e33	e45	e35	54	13	119	198	97	70
2	145	50	e37	e30	e42	e40	55	31	94	214	97	72
3	154	52	e32	e31	e40	e45	53	73	88	217	98	74
4	161	49	e30	e33	e45	e50	51	119	74	233	97	72
5	161	54	e33	e33	e60	e60	49	113	55	246	81	73
6	159	54	e30	e31	e80	e66	48	94	51	251	67	71
7	155	e50	e24	e29	e75	e76	47	81	50	209	62	69
8	159	e45	e28	e28	e72	83	48	50	51	208	66	66
9	140	e30	e26	e35	e72	77	48	39	48	225	78	65
10	95	e20	e25	e45	e78	66	46	25	77	268	170	64
11	80	e30	e30	e60	e76	62	44	35	118	344	217	62
12	73	e25	e28	e50	e74	62	44	34	102	403	205	62
13	69	e37	e35	e40	e70	63	41	20	70	396	113	62
14	66	e40	e40	e30	e68	63	39	17	58	325	100	61
15	63	e45	e40	e25	e64	66	39	48	57	224	103	60
16	61	e50	e36	e24	e60	66	36	70	62	203	118	64
17	59	e45	e34	e31	e64	64	34	129	71	208	162	61
18	58	e35	e34	e40	e64	62	31	171	74	297	155	60
19	56	e45	e30	e37	e54	61	30	184	83	411	150	60
20	55	e50	e30	e35	e40	58	30	211	208	291	136	53
21	52	e54	e33	e40	e40	56	31	252	269	218	133	55
22	52	e52	e40	e38	e37	61	30	273	188	177	127	52
23	52	e50	e45	e38	e35	50	30	241	178	169	116	45
24	51	e66	e40	e43	e30	50	22	163	171	150	168	47
25	50	e60	e40	e47	e27	59	22	144	166	142	214	48
26	48	e64	e40	e45	e25	59	19	150	153	130	207	47
27	48	e64	e43	e42	e24	59	17	163	126	142	221	45
28	46	e56	e43	e40	e30	e52	16	201	161	136	151	43
29	47	e50	e40	e45	---	e40	16	166	161	123	110	44
30	48	e45	e36	e40	---	45	12	151	151	128	87	43
31	48	---	e36	e48	---	51	---	130	---	115	76	---
TOTAL	2649	1418	1080	1166	1491	1807	1082	3591	3334	7001	3982	1770
MEAN	85.5	47.3	34.8	37.6	53.2	58.3	36.1	116	111	226	128	59.0
MAX	161	66	45	60	80	83	55	273	269	411	221	74
MIN	46	20	24	24	24	35	12	13	48	115	62	43
AC-FT	5250	2810	2140	2310	2960	3580	2150	7120	6610	13890	7900	3510

CAL YR 1986 TOTAL 46548 MEAN 128 MAX 2020 MIN 15 AC-FT 92330
WTR YR 1987 TOTAL 30371 MEAN 83.2 MAX 411 MIN 12 AC-FT 60240

e Estimated

06127500 MUSSELSHELL RIVER AT MUSSELSHELL, MT

LOCATION.--Lat 46°31'23", long 108°06'30", in SE¼SW¼SW¼ sec.20, T.9 N., R.29 E., Musselshell County, Hydrologic Unit 10040202, on left bank 0.9 mi upstream from Hawk Creek, 1 mi west of Musselshell, and at mile 164.5.

DRAINAGE AREA.--4,568 mi^2.

PERIOD OF RECORD.--August 1928 to September 1932 (no records December to February for the water years 1930-31), August 1945 to September 1979, October 1982 to September 1983, October 1983 to current season (seasonal record only). Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,984.72 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 8, 1949, nonrecording gage at site 1 mi downstream at different datums.

REMARKS.--No estimated daily discharges this year. Records good. Some regulation by Bair (station number 06116500) Martinsdale (station number 06119000), and Deadman's Basin (station number 06122500) Reservoirs. Diversions for irrigation of about 63,300 acres upstream from station, of which about 12,500 acres is flood irrigated. 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.--37 years (1928-29, 1931-32, 1945-79, 1982-83), 215 ft^3/s, 155,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,850 ft^3/s, June 19, 1967, gage height, 11.57 ft; maximum gage height, 12.96 ft, Mar. 10, 1979 (ice jam); no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 428 ft^3/s, July 19, gage height, 3.52 ft; minimum daily, 1.1 ft^3/s, May 14.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	138						54	8.1	126	72	115	69
2	145						58	11	115	110	103	60
3	151						59	10	97	122	99	60
4	160						58	45	89	127	101	64
5	166						55	96	69	150	96	58
6	166						53	90	50	170	79	64
7	163						53	70	38	148	64	60
8	160						53	55	38	119	52	57
9	165						52	25	35	116	49	53
10	139						51	4.6	29	141	59	52
11	106						49	2.8	35	208	130	50
12	95						49	1.6	84	291	167	50
13	88						47	1.3	74	327	161	50
14	84						45	1.1	50	283	104	51
15	81						41	1.2	28	213	91	48
16	77						41	1.9	24	165	104	50
17	75						39	3.7	41	176	112	57
18	73						36	77	47	212	135	64
19	71						34	117	40	332	129	68
20	70						31	147	41	332	122	67
21	68						29	181	159	251	103	62
22	65						29	222	164	197	100	57
23	65						28	235	121	167	99	53
24	64						28	184	102	152	93	49
25	63						25	130	99	133	161	48
26	62						20	119	100	125	215	53
27	64						14	151	85	120	191	51
28	61						12	170	65	135	201	51
29	58						13	171	91	127	137	48
30	60						11	136	80	133	107	48
31	60						---	130	---	121	88	---
TOTAL	3063						1167	2598.3	2216	5475	3567	1672
MEAN	98.8						38.9	83.8	73.9	177	115	55.7
MAX	166						59	235	164	332	215	69
MIN	58						11	1.1	24	72	49	48
AC-FT	6080						2310	5150	4400	10860	7080	3320

06130500 MUSSELSHELL RIVER AT MOSBY, MT
(National stream quality accounting network station)

LOCATION.-Lat 46°59'34", long 107°53'34", in NW¼SW¼NW¼ sec.11, T.14 N., R.30 E., Petroleum County, Hydrologic Unit 10040205, on left bank 300 ft upstream from bridge on State Highway 20, 0.3 mi west of Mosby, 10.9 mi downstream from Flatwillow Creek, and at mile 60.0.

DRAINAGE AREA.--7,846 mi^2.

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1559: 1935-36. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,495.9 ft above National Geodetic Vertical Datum of 1929. Dec. 6, 1962, to Mar. 14, 1966, water-stage recorder at site 900 ft downstream at different datum. Mar. 15, 1966, to Dec. 11, 1973, water-stage recorder and nonrecording gages at site 400 ft downstream at same datum. Dec. 12, 1973, to Oct. 1, 1981, nonrecording gage at site 300 ft downstream at same datum. See WSP 2116 for history of changes prior to 1962.

REMARKS.--Estimated daily discharges: Nov. 8 to Mar. 4, Mar. 28-31. Water-discharge records good except those for Mar. 5-27, Apr. 1-7, which are fair, and those for estimated daily discharges, which are poor. Some regulation by Bair (station number 06116500), Martinsdale (station number 06119000) and Deadman's Basin (station number 06122500) Reservoirs. Diversions for irrigation of about 103,000 acres upstream from station.

AVERAGE DISCHARGE.--55 years (water years 1931-32, 1935-87), 289 ft^3/s, 209,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,000 ft^3/s, June 18, 1944, gage height, 14.43 ft; maximum gage height, 15.1 ft, Mar. 12, 1979, from floodmark (backwater from ice jam); no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,870 ft^3/s, May 28, gage height, 8.20 ft; minimum daily, 0.21 ft^3/s, July 6.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	360	81	e90	e62	e28	e30	201	16	271	13	147	96
2	392	81	e95	e60	e30	e50	139	17	219	7.9	114	79
3	342	82	e90	e65	e26	e80	165	15	180	2.7	104	67
4	301	83	e75	e70	e21	e110	177	12	146	1.0	100	55
5	286	83	e65	e70	e22	102	195	7.6	110	.46	91	49
6	270	84	e60	e65	e24	97	166	8.0	95	.21	91	48
7	270	84	e50	e60	e28	99	135	24	88	.48	81	43
8	248	e60	e55	e55	e29	100	112	55	75	2.0	65	35
9	235	e45	e45	e55	e29	108	109	54	69	1.4	55	31
10	229	e35	e40	e60	e28	115	110	42	61	1.5	42	29
11	217	e25	e55	e52	e32	122	125	27	58	5.2	33	27
12	180	e35	e60	e70	e30	126	122	16	52	6.7	29	28
13	153	e35	e55	e80	e28	115	115	13	43	10	25	27
14	140	e60	e70	e60	e25	129	108	5.2	38	130	85	27
15	128	e55	e80	e35	e24	113	102	2.0	52	146	89	27
16	122	e70	e78	e15	e22	102	96	7.6	39	120	73	25
17	117	e85	e75	e16	e16	104	91	36	19	109	57	30
18	111	e80	e75	e18	e17	106	87	21	14	372	61	26
19	108	e85	e75	e19	e16	119	81	25	16	537	62	29
20	104	e90	e70	e19	e14	115	80	20	18	366	86	38
21	102	e90	e70	e21	e13	124	75	50	12	418	75	44
22	101	e85	e75	e19	e12	126	65	97	15	371	72	45
23	98	e85	e80	e18	e11	129	57	116	19	296	52	44
24	95	e90	e78	e18	e10	129	52	209	84	222	40	41
25	94	e110	e75	e22	e9.0	141	50	230	58	190	45	33
26	91	e105	e73	e23	e8.0	149	47	193	39	158	70	29
27	90	e105	e70	e23	e13	162	45	857	27	147	143	27
28	88	e105	e66	e25	e20	e140	42	2820	25	157	187	24
29	88	e100	e68	e26	---	e120	33	1100	19	174	171	25
30	85	e110	e70	e28	---	e100	23	615	16	144	156	27
31	81	---	e68	e30	---	e140	---	398	---	156	117	---
TOTAL	5326	2323	2151	1259	585.0	3502	3005	7108.4	1977	4265.55	2618	1155
MEAN	172	77.4	69.4	40.6	20.9	113	100	229	65.9	138	84.5	38.5
MAX	392	110	95	80	32	162	201	2820	271	537	187	96
MIN	81	25	40	15	8.0	30	23	2.0	12	.21	25	24
AC-FT	10560	4610	4270	2500	1160	6950	5960	14100	3920	8460	5190	2290

CAL YR 1986 TOTAL 107784.00 MEAN 295 MAX 8750 MIN 21 AC-FT 213800
WTR YR 1987 TOTAL 35274.93 MEAN 96.6 MAX 2820 MIN .21 AC-FT 69970

e Estimated

06130500 MUSSELSHELL RIVER AT MOSBY, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1975 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1974 to September 1981.
WATER TEMPERATURE: October 1974 to September 1979.
SUSPENDED-SEDIMENT DISCHARGE: October 1982 to current year.

REMARKS.--Unpublished records of once-daily water temperatures are available in files of District office. Flow affected by ice during most of winter months.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1975-81): Maximum daily, 4,900 microsiemens, Aug. 14, 1977; minimum daily, 678 microsiemens, Mar. 23, 1978.
WATER TEMPERATURE (water years 1975-79): Maximum daily, 26.0°C, Aug. 7, 9, 1978; minimum daily, 0.0°C on many days during winter periods.
SEDIMENT CONCENTRATION: Maximum daily mean, 25,800 mg/L, Aug. 3, 1985; minimum daily mean, 11 mg/L Sep. 18, 1983.
SEDIMENT LOAD: Maximum daily, 242,000 tons, Sep. 26, 1986; minimum daily, 0 ton, July 22, 23, 27-29, 1985, during period of no flow.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATION: Maximum daily mean, 7,520 mg/L, May 28; minimum daily mean, 21 mg/L, July 13.
SEDIMENT LOAD: Maximum daily, 57,300 tons, May 28; minimum daily, 0.04 ton, July 6.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)
OCT								
09...	1300	238	--	--	2250	16.0	13.0	--
NOV								
18...	1100	80	75	1	3550	-2.0	0.0	--
FEB								
20...	1100	13	20	1	2630	3.5	0.5	695
MAR								
03...	1330	80	100	2	2820	6.0	1.0	--
APR								
02...	1330	125	0	0	4100	13.0	9.5	--
MAY								
04...	1140	17	20	1	3700	23.0	17.5	--
21...	1400	64	100	2	5500	11.0	13.0	--
JUN								
03...	1115	184	0	0	2400	21.0	14.5	--
15...	1045	56	0	0	3330	30.0	24.5	--
30...	1145	17	--	--	2890	26.5	21.0	695
SEP								
30...	1130	28	--	0	3080	22.0	14.0	696

DATE	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BICAR-BONATE WATER WHOLE IT-FLD (MG/L) (00450)	CAR-BONATE WATER WHOLE IT-FLD (MG/L) (00447)	ALKA-LINITY WH WAT TOTAL FIELD MG/L AS CACO3 (00410)
OCT							
09...	--	--	--	--	--	--	--
NOV							
18...	12.1	--	K4	48	--	--	--
FEB							
20...	12.3	95	<1	K10	341	0	275
MAR							
03...	--	--	--	--	--	--	--
APR							
02...	--	--	--	--	--	--	--
MAY							
04...	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--
JUN							
03...	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--
30...	8.0	100	K11000	91	300	0	248
SEP							
30...	9.2	99	48	<1	291	6	244

06130500 MUSSELSHELL RIVER AT MOSBY, MT--Continued

DATE	TIME	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV 18...	1100	--	4.1	1200	820	200	160	460	6
FEB 20...	1100	8.20	5.2	760	490	140	100	350	6
JUN 30...	1145	8.30	5.0	780	530	130	110	410	7
SEP 30...	1130	8.30	7.1	730	490	110	110	420	7

DATE	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
NOV 18...	6.5	344	1700	18	0.40	4.0	2930	2800	4.0
FEB 20...	4.4	276	1200	24	0.30	4.1	2160	2000	2.9
JUN 30...	6.9	245	1400	34	0.40	2.1	2300	2200	3.1
SEP 30...	5.5	243	1500	32	0.40	2.4	2480	2330	3.4

DATE	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	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 18...	631	<0.010	0.200	<0.010	<0.010	0.50	0.020	<0.010	<0.010
FEB 20...	76	<0.010	0.360	0.070	0.070	1.0	<0.010	<0.010	<0.010
JUN 30...	106	<0.010	<0.100	0.040	0.040	0.90	0.030	0.010	<0.010
SEP 30...	187	<0.010	<0.100	0.230	0.170	0.90	<0.010	0.010	<0.010

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)
NOV 18...	1100	10	<1	100	<10	<1	<1	1	4	20
FEB 20...	1100	20	<1	<100	<10	1	<1	1	5	20
JUN 30...	1145	20	<1	<100	<10	1	4	<1	2	20
SEP 30...	1130	20	1	<100	<10	1	<1	2	4	20

MUSSELSHELL RIVER BASIN

06130500 MUSSELSHELL RIVER AT MOSBY, MT--Continued

DATE	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	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											
18...	7	140	60	<0.1	5	4	2	<1	3700	<1	20
FEB											
20...	<5	100	80	0.1	2	6	1	<1	2600	<8	10
JUN											
30...	<5	120	30	<0.1	<1	4	1	<1	2600	<1	20
SEP											
30...	<5	120	10	<0.1	1	1	1	<1	2500	<1	<10

DATE	TIME	TEMPER-ATURE WATER (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)
OCT						
09...	1300	13.0	238	83	53	97
NOV						
18...	1100	0.0	80	62	13	58
DEC						
30...	1430	0.0	71	92	18	23
FEB						
20...	1100	0.5	13	96	3.4	66
APR						
02...	1330	9.5	125	145	49	99
MAY						
21...	1400	13.0	64	38	6.5	76
JUN						
30...	1145	21.0	17	46	2.1	59
AUG						
19...	1130	19.0	61	106	17	91
SEP						
30...	1130	14.0	28	39	2.9	96

DATE	TIME	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)
JUN						
30...	1145	55	88	99	100	--
AUG						
19...	1130	50	81	96	99	100
SEP						
30...	1130	50	82	97	99	100

MUSSELSHELL RIVER BASIN

06130500 MUSSELSHELL RIVER AT MOSBY, MT--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	207	201	36	7.9	58	14	42	7.0	89	6.7	35	2.8
2	251	266	28	6.1	122	31	42	6.8	84	6.8	32	4.3
3	112	103	32	7.1	58	14	35	6.1	96	6.7	40	8.6
4	114	93	28	6.3	51	10	42	7.9	110	6.2	65	19
5	130	100	29	6.5	98	17	68	13	80	4.8	66	18
6	139	101	24	5.4	205	33	74	13	73	4.7	57	15
7	125	91	28	6.4	288	39	72	12	88	6.7	96	26
8	92	62	32	5.2	321	48	66	9.8	66	5.2	78	21
9	76	48	44	5.3	265	32	54	8.0	78	6.1	53	15
10	64	40	38	3.6	261	28	55	8.9	86	6.5	76	24
11	45	26	48	3.2	60	8.9	59	8.3	89	7.7	61	20
12	40	19	56	5.3	55	8.9	51	9.6	85	6.9	49	17
13	38	16	43	4.1	64	9.5	60	13	118	8.9	45	14
14	32	12	56	9.1	57	11	42	6.8	99	6.7	48	17
15	29	10	58	8.6	47	10	34	3.2	80	5.2	218	67
16	28	9.2	56	11	55	12	61	2.5	95	5.6	70	19
17	26	8.2	47	11	51	10	45	1.9	110	4.8	78	22
18	26	7.8	71	15	60	12	54	2.6	205	9.4	61	17
19	42	12	158	36	64	13	84	4.3	128	5.5	53	17
20	44	12	132	32	64	12	81	4.2	89	3.4	95	29
21	40	11	129	31	62	12	76	4.3	134	4.7	78	26
22	36	9.8	110	25	65	13	82	4.2	158	5.1	88	30
23	36	9.5	127	29	66	14	96	4.7	127	3.8	80	28
24	42	11	110	27	92	19	74	3.6	106	2.9	60	21
25	35	8.9	130	39	55	11	68	4.0	95	2.3	66	25
26	32	7.9	122	35	76	15	83	5.2	86	1.9	50	20
27	42	10	150	43	86	16	74	4.6	111	3.9	87	38
28	33	7.8	135	38	91	16	75	5.1	52	2.8	76	29
29	32	7.6	102	28	93	17	78	5.5	---	---	56	18
30	31	7.1	67	20	88	17	85	6.4	---	---	53	14
31	28	6.1	---	---	54	9.9	62	5.0	---	---	75	28
TOTAL	---	1333.9	---	510.1	---	533.2	---	201.5	---	151.9	---	669.7
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	310	168	104	4.5	292	214	69	2.4	163	65	175	45
2	158	59	120	5.5	235	139	64	1.4	147	45	113	24
3	156	69	87	3.5	165	80	70	.51	127	36	156	28
4	125	60	115	3.7	119	47	63	.17	118	32	140	21
5	55	29	132	2.7	94	28	61	.08	123	30	170	22
6	65	29	91	2.0	98	25	65	.04	119	29	169	22
7	83	30	117	7.6	118	28	70	.09	101	22	99	11
8	52	16	135	20	102	21	62	.33	122	21	97	9.2
9	72	21	107	16	91	17	57	.22	95	14	112	9.4
10	105	31	78	8.8	81	13	56	.23	84	9.5	124	9.7
11	134	45	94	6.9	76	12	60	.84	63	5.6	130	9.5
12	158	52	96	4.1	66	9.3	46	.83	46	3.6	150	11
13	165	51	86	3.0	56	6.5	21	.57	49	3.3	170	12
14	158	46	65	.91	69	7.1	94	33	112	26	173	13
15	111	31	105	.57	71	10	95	37	91	22	156	11
16	94	24	100	2.1	66	6.9	71	23	91	18	151	10
17	94	23	89	8.7	44	2.3	110	32	65	10	155	13
18	95	22	66	3.7	35	1.3	1630	1640	83	14	124	8.7
19	157	34	124	8.4	39	1.7	1650	2390	147	25	113	8.8
20	117	25	73	3.9	32	1.6	780	771	208	48	201	21
21	112	23	85	11	26	.84	288	325	175	35	125	15
22	123	22	79	21	55	2.2	220	220	213	41	93	11
23	157	24	81	25	39	2.0	198	158	167	23	52	6.2
24	203	29	271	153	61	14	122	73	110	12	106	12
25	174	23	652	405	38	6.0	114	58	187	23	98	8.7
26	128	16	528	275	34	3.6	107	46	179	34	74	5.8
27	123	15	2050	4740	32	2.3	103	41	202	78	32	2.3
28	139	16	7520	57300	34	2.3	435	184	148	75	55	3.6
29	148	13	2200	6530	37	1.9	609	286	128	59	116	7.8
30	128	7.9	1090	1810	67	2.9	265	103	142	60	67	4.9
31	---	---	474	509	---	---	144	61	181	57	---	---
TOTAL	---	1053.9	---	71895.58	---	708.74	---	6488.71	---	976.0	---	396.6

TOTAL LOAD FOR YEAR 84919.83 TONS.

06131000 BIG DRY CREEK NEAR VAN NORMAN, MT

LOCATION.--Lat 47°20'58", long 106°21'26", in NE¼SW¼NW¼ sec.3, T.18 N., R.42 E., Garfield County, Hydrologic Unit 10040105, on left bank 900 ft downstream from Little Dry Creek, 3.2 mi northeast of Van Norman Post Office, 26 mi east of Jordan, and at mile 55.1.

DRAINAGE AREA.--2,554 mi^2.

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

REVISED RECORDS.--WSP 1309: 1947(M). WSP 1559: 1944(M), 1947. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,330 ft, by barometer. Prior to July 24, 1978, at site 400 ft upstream at same datum.

REMARKS.--Estimated daily discharges: Nov. 8 to Mar. 10 and Mar. 21 to Apr. 1. Records fair except those for estimated daily discharges, which are poor. Few small diversions for irrigation of hay meadows upstream 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.--44 years (1939-47, 1949-68, 1970-87), 53.8 ft^3/s, 38,990 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,600 ft^3/s, Mar. 21, 1947, gage height, 13.39 ft; maximum gage height, 15.26 ft, Mar. 21, 1947 (ice jam); no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 28	1100	*1,740	*4.00

Only peak greater than base discharge this year.

Minimum daily discharge, 1.3 ft^3/s, Sept. 25, 26.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	332	18	e14	e5.0	e17	e5.0	e40	4.3	133	2.2	138	3.1
2	315	18	e13	e6.0	e17	e6.0	47	6.0	77	1.9	58	2.8
3	282	18	e11	e6.0	e15	e7.0	53	6.8	57	1.6	26	2.0
4	243	17	e9.0	e6.0	e13	e9.0	56	5.4	45	1.7	14	2.0
5	215	17	e10	e7.0	e14	e10	47	4.6	33	4.4	9.7	1.9
6	189	17	e10	e6.0	e15	e11	36	4.2	27	4.6	8.3	1.7
7	163	16	e9.0	e5.0	e16	e11	30	3.8	21	2.2	6.5	1.5
8	147	e13	e9.0	e5.0	e15	e9.0	29	3.3	17	2.3	5.6	1.5
9	134	e11	e8.0	e5.0	e13	e9.0	25	2.7	14	1.7	5.8	1.5
10	126	e10	e8.0	e5.0	e14	e9.0	20	2.2	12	1.6	5.0	1.4
11	112	e11	e9.0	e6.0	e14	11	20	2.1	11	5.7	4.2	2.8
12	93	e11	e10	e6.0	e13	11	19	2.0	9.2	4.1	3.6	2.3
13	78	e11	e10	e6.0	e12	11	17	2.0	9.9	3.2	3.1	2.2
14	65	e12	e9.0	e5.0	e11	11	15	1.8	9.3	2.6	3.5	2.0
15	56	e11	e10	e4.0	e12	12	14	1.7	8.3	2.0	9.2	1.7
16	50	e12	e10	e4.0	e11	11	12	2.9	6.7	1.5	11	1.5
17	45	e12	e9.0	e5.0	e11	12	11	19	5.9	2.0	8.1	1.6
18	41	e10	e9.0	e6.0	e10	12	11	12	5.0	13	5.9	1.7
19	38	e11	e9.0	e6.0	e9.0	12	10	7.6	6.0	5.8	4.7	1.7
20	35	e11	e8.0	e5.0	e8.0	13	9.4	10	5.8	4.3	3.8	1.7
21	32	e13	e8.0	e5.0	e8.0	e11	8.5	21	4.2	3.9	3.0	1.7
22	30	e15	e9.0	e6.0	e8.0	e13	8.1	18	3.8	4.6	2.5	1.5
23	27	e14	e10	e5.0	e7.0	e14	7.8	16	3.8	4.0	2.2	1.4
24	25	e18	e10	e4.0	e6.0	e14	7.3	9.3	3.6	7.4	2.0	1.4
25	24	e18	e9.0	e5.0	e5.0	e13	6.5	17	4.5	8.5	1.9	1.3
26	23	e17	e8.0	e6.0	e5.0	e13	5.7	13	5.2	6.3	13	1.3
27	21	e17	e7.0	e8.0	e5.0	e12	5.5	403	4.3	4.8	8.7	65
28	21	e16	e7.0	e10	e4.0	e11	5.2	1290	3.4	3.9	5.5	31
29	21	e15	e6.0	e13	---	e10	5.0	672	2.9	3.0	4.5	8.2
30	21	e15	e7.0	e15	---	e15	4.6	421	2.7	8.1	3.7	11
31	20	---	e6.0	e15	---	e25	---	252	---	211	3.2	---
TOTAL	3024	425	281.0	201.0	308.0	353.0	585.6	3236.7	551.5	333.9	384.2	162.4
MEAN	97.5	14.2	9.06	6.48	11.0	11.4	19.5	104	18.4	10.8	12.4	5.41
MAX	332	18	14	15	17	25	56	1290	133	211	138	65
MIN	20	10	6.0	4.0	4.0	5.0	4.6	1.7	2.7	1.5	1.9	1.3
AC-FT	6000	843	557	399	611	700	1160	6420	1090	662	762	322

CAL YR 1986 TOTAL 40177.8 MEAN 110 MAX 8500 MIN .00 AC-FT 79690
WTR YR 1987 TOTAL 9846.2 MEAN 27.0 MAX 1290 MIN 1.3 AC-FT 19530

e Estimated

MISSOURI RIVER MAIN STEM

06131500 FORT PECK LAKE AT FORT PECK, MT

LOCATION.--Lat 48°00'26", long 106°23'49", in sec. 14, T.26 N., R.41 E., McCone County, Hydrologic Unit 10040104, in No. 4 emergency gate shaft of Fort Peck Dam on Missouri River at Fort Peck, 2 mi downstream from Bear Creek, 9.5 mi southwest of Nashua, 9.5 mi upstream from Milk River, and at mile 1,771.6.

DRAINAGE AREA.--57,500 mi^2.

PERIOD OF RECORD.--October 1937 to current year. (Monthend contents only, except October 1938 to September 1940, when elevations were included.) Monthend contents for October 1937 to August 1938, published only in WSP 1309. Daily elevations and contents for May to June 1964, published in WSP 1840-B. Prior to October 1970, published as "Fort Peck Reservoir." Daily elevations on file in Helena district office.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is referenced to National Geodetic Vertical Datum of 1929. Prior to May 1, 1941, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by earthfill dam completed in 1939; storage began in 1937. The following capacity figures are from capacity table effective July 1, 1973; see previous reports for superseded figures. Total capacity, 18,910,000 acre-ft between elevation 2,095.00 ft, invert of lower ring gates, and 2,250.00 ft, top of 25 ft gates. Elevation of spillway crest, 2,225.00 ft. Normal operating level, 17,930,000 acre-ft, elevation, 2,246.00 ft. Dead storage, 542,800 acre-ft below elevation 2,095.00 ft. Minimum operating level, 4,283,000 acre-ft, elevation, 2,160.00 ft, for on-site power generation. Figures given herein represent total contents; usable contents published in previous water-supply papers for October 1950 to September 1955. Water is used for navigation, recreation, flood control, and power generation. Elevations materially affected by wind.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 19,310,000 acre-ft, July 15-17, 1975, elevation, 2,251.6 ft; minimum since first filling, 5,061,000 acre-ft, Jan. 25, 26, 1956, elevation, 2,167.67 ft, by capacity table used Mar. 1, 1940, to Dec. 31, 1965.

EXTREMES FOR CURRENT YEAR.--Maximum contents at 2400, 16,200,000 acre-ft, June 1, elevation, 2,238.49 ft; minimum, 15,760,000 acre-ft, Sept. 24,25,30, elevation, 2,236.48 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

Date	Elevation (feet)	Contents (acre-feet)	Change in Contents (acre-feet)
Sept. 30	2,237.43	15,970,000	---
Oct. 31	2,237.94	16,080,000	+110,000
Nov. 30	2,238.18	16,130,000	+50,000
Dec. 31	2,238.27	16,150,000	+20,000
CAL YR 1986			+2,090,000
Jan. 31	2,237.89	16,070,000	-80,000
Feb. 28	2,237.00	15,870,000	-200,000
Mar. 31	2,237.27	15,930,000	+60,000
Apr. 30	2,237.90	16,070,000	+140,000
May 31	2,238.40	16,180,000	+110,000
June 30	2,237.99	16,090,000	-90,000
July 31	2,237.64	16,010,000	-80,000
Aug. 31	2,236.87	15,840,000	-170,000
Sept. 30	2,236.48	15,760,000	-80,000
WTR YR 1987			-210,000

MISSOURI RIVER MAIN STEM

06132000 MISSOURI RIVER BELOW FORT PECK DAM, MT

LOCATION.--Lat 48°02'39", long 106°21'21", in NW¼ sec.6, T.26 N., R.42 E., McCone County, Hydrologic Unit 10060001, on right bank 2 mi upstream from Milk River, 6 mi south of Nashua, 8 mi downstream from Fort Peck Dam, and at mile 1,763.5.

DRAINAGE AREA.--57,556 mi^2.

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,018.00 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Apr. 14, 1938, at site 0.7 mi upstream at different datum; Apr. 14, 1938, to Sept. 30, 1963, at present site at datum 2.00 ft higher, all water-stage recorders. Since Oct. 1, 1, 1969, published discharge is determined by flowmeters at Fort Peck Dam.

REMARKS.--Flow completely regulated by Fort Peck Lake. Diversions for irrigation of about 880,400 acres upstream from station.

COOPERATION.--Records since Oct. 1, 1969, furnished by U.S. Army Corps of Engineers; 2 to 4 discharge measurements are made each year and the records are reviewed by Geological Survey. Records for March 1934 to September 1969 collected and computed by Geological Survey.

AVERAGE DISCHARGE.--5 years (1934-39, prior to Fort Peck Lake reaching operational level), 6,347 ft^3/s, 4,598,000 acre-ft/yr; 44 years (1943-87, after operational level in Fort Peck Lake was reached), 9,912 ft^3/s, 7,181,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 51,000 ft^3/s including 32,000 ft^3/s inflow from spillway 1 mi downstream from station, Aug. 8, 1946; maximum gage height observed, 12.30 ft Mar. 10, 1936 (ice jam), site and datum then in use; maximum daily reverse flow, 400 ft^3/s, Mar. 29, 1943 (backwater from Milk River).

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 11,400 ft^3/s, Feb. 4; minimum daily, 2,900 ft^3/s, Oct. 6, 9.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6100	7700	5600	7100	11300	11200	4900	5200	6200	7000	6800	5800
2	4900	7900	5400	6900	11200	11200	4800	5200	5900	7000	6900	5900
3	4000	7600	5700	6900	11100	11100	4600	5200	6400	7000	6800	5900
4	4100	7400	5700	6900	11400	9000	4600	5100	6200	6800	6700	5900
5	3800	7400	5500	7000	11000	6900	4600	5200	6100	7000	6800	5900
6	2900	7700	5500	6800	11000	6000	4500	5200	6000	7100	7200	5900
7	3000	7400	5600	7300	10900	5800	4700	5200	6000	6900	7200	5900
8	3100	7300	5800	7300	10700	5700	4500	5300	5900	6900	7200	6000
9	2900	7200	7900	7400	10800	5900	4800	5400	6200	6900	7200	6200
10	3100	7200	7500	7000	10900	6100	4900	5100	6200	7400	7100	6100
11	3000	7200	7400	6900	11200	6000	5100	5900	7000	7000	7200	6000
12	3900	7100	7400	6700	11000	6000	4900	5800	7000	7100	7000	6100
13	4000	7000	7000	6900	11000	6100	5100	6700	7100	7000	7000	6200
14	5100	6900	7000	7200	11100	6100	5100	6200	7100	6900	7200	6300
15	5700	5200	7000	7100	11100	6100	5300	6100	7100	6900	7300	6200
16	6200	5100	7100	6800	11200	6100	5100	6000	7300	6900	7000	6200
17	6200	5300	7000	8300	11100	6200	5400	6200	7000	6900	7100	6100
18	6900	5800	7300	9900	11000	6100	5300	6100	7000	6800	7100	6100
19	7000	5700	7300	10000	11100	5900	5100	6300	7100	6800	7000	6300
20	7600	5700	7100	10100	10900	6100	5200	6000	7000	7100	7000	6100
21	7500	5700	7000	10200	10900	6000	4600	6200	7100	6800	7000	6200
22	7600	5600	7000	10000	10800	5700	4700	6000	7000	6900	7000	6100
23	7500	5600	7000	10000	11000	6000	4400	5900	7000	7000	7000	6100
24	7600	5700	7000	9700	10900	7700	5100	6000	7000	6800	6900	6000
25	7500	5600	7100	9800	10900	9000	5300	6500	7000	6900	7100	5800
26	7600	5600	7000	9900	10900	9100	5200	6200	7000	6900	7100	5900
27	7500	5100	6900	9900	10700	9300	5100	6200	7400	7900	7100	5700
28	7600	5200	7100	11300	11200	7000	5200	6200	7000	7000	6000	5800
29	7500	5200	6900	11100	---	5200	5200	6200	7400	6800	5900	6000
30	7500	5200	6700	11200	---	5000	5200	6200	7200	6900	6000	6100
31	7600	---	6700	11100	---	4100	---	6100	---	6900	5900	---
TOTAL	176500	190300	208200	264700	308300	213700	148500	181100	202900	216200	213800	180800
MEAN	5694	6343	6716	8539	11010	6894	4950	5842	6763	6974	6897	6027
MAX	7600	7900	7900	11300	11400	11200	5400	6700	7400	7900	7300	6300
MIN	2900	5100	5400	6700	10700	4100	4400	5100	5900	6800	5900	5700
AC-FT	350100	377500	413000	525000	611500	423900	294500	359200	402500	428800	424100	358600

CAL YR 1986 TOTAL 2921700 MEAN 8005 MAX 14500 MIN 1100 AC-FT 5795000
WTR YR 1987 TOTAL 2505000 MEAN 6863 MAX 11400 MIN 2900 AC-FT 4969000

06132000 MISSOURI RIVER BELOW FORT PECK DAM, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1964, 1975 to current year (discontinued).

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1974 to September 1981.
WATER TEMPERATURE: October 1974 to September 1979.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1975-81): Maximum daily, 1,080 microsiemens, Nov. 30, 1976; minimum daily, 520 microsiemens, June 29, 1978.
WATER TEMPERATURE (water years 1975-79): Maximum daily, 14.5°C, on several days during August and September 1976; minimum daily, 0.0°C, on several days during December 1977 to January 1978.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	DISCHARGE, IN CUBIC FEET PER SECOND (00060)	STREAMFLOW, INSTANTANEOUS (CFS) (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRESSURE (MM OF HG) (00025)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)
DEC 02...	1200	5400	--	0	0	640	-6.0	1.0	722	12.8	95
FEB 19...	1200	11100	--	0	0	605	3.0	1.0	720	12.4	93
MAR 30...	1200	5000	--	100	2	600	1.0	2.5	715	12.4	97
MAY 13...	1100	6700	--	80	1	602	20.0	10.0	710	9.6	91
JUL 14...	1100	6900	--	30	1	630	26.5	12.5	715	10.0	100
AUG 12...	1200	--	8240	0	0	630	20.0	13.0	715	10.6	107

DATE	PH (STANDARD UNITS) (00400)	COLOR (PLATINUM-COBALT UNITS) (00080)	HARDNESS (MG/L AS CACO3) (00900)	HARDNESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	CALCIUM TOTAL RECOVERABLE (MG/L AS CA) (00916)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, TOTAL RECOVERABLE (MG/L AS MG) (00927)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)
DEC 02...	8.60	3	220	63	--	54	--	21	43	1	3.5
FEB 19...	8.40	2	220	64	--	54	--	21	43	1	3.7
MAR 30...	8.70	1	220	63	44	54	20	21	46	1	3.7
MAY 13...	8.50	9	220	64	--	54	--	21	45	1	3.5
JUL 14...	8.60	2	230	70	--	55	--	22	48	1	3.8
AUG 12...	8.50	2	220	63	56	52	22	22	48	1	3.5

DATE	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
DEC 02...	158	150	9.1	0.80	7.2	380	0.52	5590	--	--	<0.100
FEB 19...	157	150	9.2	0.70	7.3	380	0.52	11500	--	--	<0.100
MAR 30...	158	150	11	0.70	7.0	390	0.53	5240	--	--	<0.100
MAY 13...	157	150	12	0.70	6.9	390	0.53	7010	--	--	0.200
JUL 14...	158	160	21	0.70	6.9	410	0.56	7680	--	--	<0.100
AUG 12...	157	160	8.8	0.70	7.2	400	0.54	8820	<0.010	<0.010	<0.100

MISSOURI RIVER MAIN STEM

06132000 MISSOURI RIVER BELOW FORT PECK DAM, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, ORGANIC 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)	PHOS-PHORUS, ORTHO, TOTAL (MG/L AS P) (70507)	PHOS-PHORUS, ORTHO, DIS-SOLVED (MG/L AS P) (00671)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
DEC 02...	<0.100	<0.010	--	--	0.50	<0.010	<0.010	--	9	131	66
FEB 19...	<0.100	<0.010	--	--	0.50	0.010	<0.010	--	--	--	--
MAR 30...	<0.100	<0.010	--	--	0.20	0.010	<0.010	--	--	--	--
MAY 13...	<0.100	0.020	--	0.58	0.60	0.010	<0.010	--	--	--	--
JUL 14...	<0.100	0.010	--	0.49	0.50	0.010	<0.010	--	--	--	--
AUG 12...	0.110	0.020	0.020	--	<0.20	0.020	<0.010	<0.010	--	--	--

DATE	TIME	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	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)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)
MAY 13...	1100	4	<0.5	<1	<10	1	6
JUL 14...	1100	3	<0.5	<1	<10	2	<3

DATE	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
MAY 13...	<5	4	0.7	<1	<1	<3
JUL 14...	<5	2	<0.1	<1	1	<3

06132200 SOUTH FORK MILK RIVER NEAR BABB, MT

(International gaging station)

LOCATION.--Lat 48°45'14", long 113°10'00", in NE¼NW¼NW¼ sec.34, T.35 N., R.12 W., Glacier County, Hydrologic Unit 10050001, Blackfeet Indian Reservation, on right bank 900 ft, revised, upstream from bridge on FAS 464 ("Duck Lake Road"), 14.4 mi southeast of Babb, 15.2 mi northwest of Browning, and at mile 17.3.

DRAINAGE AREA.--70.4 mi^2.

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

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 4,731.6 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Mar. 1-11, 14-30, and Oct. 30-31. Records good. Many small diversions for irrigation upstream 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.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft^3/s, June 8, 1964, gage height, 6.61 ft, from rating curve extended above 400 ft^3/s, on basis of slope-area measurement of peak flow at site 3 mi downstream; maximum gage height, 7.17 ft, Feb. 24, 1986; no flow Aug. 23, 1973, June 28 to Aug. 14, 1977, Aug. 26 to Sept. 2, 1984.

EXTREMES FOR CURRENT SEASON.--Peak discharges greater than base discharge of 260 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
July 23	0700	*406	*5.08	No other greater than base discharge.			

Minimum daily discharge, 6.1 ft^3/s, July 16.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e10	51	58	38	11	27	19	17		
2			e10	75	50	33	16	21	17	16		
3			e20	159	43	29	15	21	15	16		
4			e120	180	39	26	16	22	15	15		
5			e150	114	38	23	15	21	18	15		
6			e90	80	36	23	16	20	18	15		
7			e60	65	34	22	15	22	19	16		
8			e45	57	31	21	13	21	19	16		
9			e35	50	27	31	11	19	18	16		
10			e26	48	26	31	13	17	17	16		
11			e23	42	24	24	17	17	16	16		
12			24	39	24	21	18	19	16	17		
13			29	36	26	19	14	20	16	17		
14			e33	34	29	17	9.9	36	16	16		
15			e27	36	30	15	7.9	61	16	17		
16			e24	43	30	15	6.1	41	17	17		
17			e22	68	30	17	12	31	21	18		
18			e20	115	30	18	88	30	22	18		
19			e17	80	28	31	148	25	20	17		
20			e17	59	26	37	69	21	18	17		
21			e18	49	26	25	35	17	17	16		
22			e17	47	37	18	151	17	16	16		
23			e16	48	37	17	348	19	16	16		
24			e18	48	34	15	175	55	16	16		
25			e20	48	31	13	95	81	16	16		
26			e21	45	42	12	66	56	16	15		
27			e17	43	114	11	47	41	21	15		
28			e14	42	133	11	39	30	25	15		
29			e15	41	74	12	33	24	22	15		
30			e18	44	52	12	31	21	19	e15		
31			23	---	43	---	30	21	---	e15		
TOTAL			999	1886	1282	637	1580.9	894	537	498		
MEAN			32.2	62.9	41.4	21.2	51.0	28.8	17.9	16.1		
MAX			150	180	133	38	348	81	25	18		
MIN			10	34	24	11	6.1	17	15	15		
AC-FT			1980	3740	2540	1260	3140	1770	1070	988		

e Estimated

06133000 MILK RIVER AT WESTERN CROSSING OF INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°00'27", long 112°32'42", in NE¼ sec.1, T.1, R.20 W., fourth meridian, in Alberta, Hydrologic Unit Unit 10050001, on left bank 0.8 mi north of international boundary, 22 mi upstream from North Milk River, 23 mi southwest of Milk River, Alberta, and at mile 656.4.

DRAINAGE AREA.--401 mi^2.

PERIOD OF RECORD.--March 1931 to current season (seasonal records only). Prior to October 1961, published as South Fork Milk River near international boundary.

REVISED RECORDS.--WSP 1389: 1934(M), 1935, 1936(M), 1937, 1942(M), 1947-48(M). W 1983: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,820 ft, from topographic map. Prior to Aug. 9, 1948, and Aug. 9, 1948, to Oct. 31, 1958, water-stage recorders at sites 0.4 mi and 0.5 mi downstream, respectively, at different datums.

REMARKS.--Estimated daily discharges: Mar. 1-14, 28-30. Records good. Several diversions for irrigation upstream from station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,930 ft^3/s, June 9, 1964, gage height, 9.77 ft; maximum gage height, 12.55 ft, Mar. 18, 1976 (backwater from ice); no flow at times.

EXTREMES FOR CURRENT SEASON.--Peak discharges greater than base discharge of 430 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 5	1600	*816	*5.01	No other peak greater than base discharge this year.			

Minimum daily discharge, 0.42 ft^3/s, July 16.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e20	73	79	62	1.7	31	25	28		
2			e17	148	87	50	1.8	29	22	25		
3			e22	262	86	42	.99	28	20	23		
4			e59	530	74	36	.60	25	19	21		
5			e117	660	65	32	.64	22	18	20		
6			e177	403	60	27	.57	21	17	19		
7			e138	252	56	24	6.5	21	16	19		
8			e106	183	53	21	6.4	20	18	19		
9			e86	152	48	22	5.5	20	19	18		
10			e80	127	44	22	4.3	20	18	19		
11			e79	117	40	22	3.1	19	19	20		
12			e78	102	37	24	2.3	18	18	20		
13			e74	89	36	20	1.6	17	17	20		
14			e70	78	34	15	1.1	21	16	20		
15			74	73	34	12	.71	25	16	21		
16			63	75	36	11	.42	39	17	21		
17			65	93	36	10	.49	56	20	21		
18			59	135	36	11	3.5	42	23	22		
19			53	201	29	13	20	33	24	23		
20			40	164	21	13	88	29	25	23		
21			37	125	27	17	92	25	24	22		
22			37	103	28	26	58	22	21	21		
23			39	94	29	20	58	20	20	21		
24			42	96	33	14	307	73	19	21		
25			43	92	38	10	252	36	18	21		
26			52	87	40	7.7	146	73	18	19		
27			55	83	58	6.4	99	70	19	20		
28			e36	80	125	4.8	70	54	20	20		
29			e39	78	183	3.8	59	43	23	20		
30			e43	77	124	2.4	46	35	30	19		
31			70	---	84	---	37	30	---	19		
TOTAL			1970	4832	1760	601.1	1374.22	1017	599	645		
MEAN			63.5	161	56.8	20.0	44.3	32.8	20.0	20.8		
MAX			177	660	183	62	307	73	30	28		
MIN			17	73	21	2.4	.42	17	16	18		
AC-FT			3910	9580	3490	1190	2730	2020	1190	1280		

e Estimated

06133500 NORTH FORK MILK RIVER ABOVE ST. MARY CANAL, NEAR BROWNING, MT

(International gaging station)

LOCATION.--Lat 48°58'15", long 113°03'19", in NE¼NW¼NE¼ sec.16, T.37 N., R.11 W., Glacier County, Hydrologic Unit 10050001, Blackfeet Indian Reservation, on left bank 1.7 mi upstream from outlet of canal, 1.9 mi south of International boundary, 29 mi north of Browning, and at mile 57.8.

DRAINAGE AREA.--60.2 mi^2.

PERIOD OF RECORD.--May 1911 to July 1912 and June to July 1918 (published as "near Browning"), May 1919 to current season (seasonal records only). Monthly discharge only for some periods published in WSP 1309. Records usually obtained at this station only when St. Mary Canal is in operation.

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-discharge recorder. Concrete control since 1936. Elevation of gage is 4,220 ft, from topographic map. Prior to June 20, 1921, nonrecording gages at several sites within 1 mi of present site at different datums.

REMARKS.--Estimated daily discharges: Mar. 1-5, 9-11, 15, 19-24, 27-30, and Oct. 31. Records good. Many small diversions for irrigation upstream 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.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,090 ft^3/s, May 8, 1967, gage height, 7.95 ft, from rating curve extended above 130 ft^3/s, on basis of slope-area measurements at gage heights 7.55 ft and 7.95 ft; maximum gage height, 8.24 ft, Feb. 24, 1986, backwater from ice and snow; no flow Oct. 29, 1942.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 490 ft^3/s, Apr. 6, gage height, 4.80 ft; maximum gage height, 4.81 ft, Mar. 5, backwater from ice; minimum daily discharge, 6.7 ft^3/s, July 15-16.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e10	21	15	10	8.0	7.6	8.6	10		
2			e11	23	13	10	9.5	7.3	8.3	10		
3			e15	37	12	9.6	8.4	7.6	8.3	10		
4			e60	116	11	9.1	7.3	8.3	9.1	9.7		
5			e100	200	11	9.1	8.0	8.0	9.1	9.9		
6			40	162	11	8.7	8.0	8.3	9.5	10		
7			24	42	11	8.3	7.3	10	9.6	10		
8			16	30	10	8.3	7.3	8.4	9.6	10		
9			e12	25	10	9.6	7.3	8.3	8.7	11		
10			e11	20	9.6	9.1	9.1	8.3	8.7	11		
11			e12	20	9.6	8.3	11	9.5	8.7	11		
12			15	17	9.6	8.0	8.4	10	8.3	11		
13			16	16	9.6	8.0	7.7	9.1	8.3	11		
14			13	17	9.6	7.6	7.0	13	8.7	10		
15			e12	19	9.1	7.3	6.7	15	8.7	12		
16			13	19	9.6	8.0	6.7	12	11	12		
17			12	19	9.6	8.7	9.1	10	13	12		
18			12	20	9.6	8.3	22	9.1	10	11		
19			e8.0	17	8.7	13	26	8.7	9.1	11		
20			e9.0	16	8.7	10	13	8.3	9.1	11		
21			e10	15	9.6	9.1	10	8.0	8.7	11		
22			e9.5	15	10	8.0	16	8.3	8.7	11		
23			e9.0	15	9.6	7.6	21	8.7	8.7	11		
24			e11	15	9.1	7.6	13	17	8.7	11		
25			12	14	10	7.6	10	16	9.1	11		
26			14	14	16	7.3	8.7	13	10	11		
27			e9.0	13	36	7.3	8.0	10	18	11		
28			e7.0	13	28	7.3	7.8	9.6	12	11		
29			e8.0	13	14	7.6	8.0	8.7	11	10		
30			e10	13	12	7.5	8.0	9.1	11	10		
31			15	---	12	---	8.0	8.7	---	e10		
TOTAL			535.5	996	373.6	255.9	316.3	303.9	290.3	331.6		
MEAN			17.3	33.2	12.1	8.53	10.2	9.80	9.68	10.7		
MAX			100	200	36	13	26	17	18	12		
MIN			7.0	13	8.7	7.3	6.7	7.3	8.3	9.7		
AC-FT			1060	1980	741	508	627	603	576	658		

e Estimated

06134000 NORTH MILK RIVER NEAR INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°01'19", long 112°58'16", in SW¼NE¼ sec.11, T.1, R.23 W., fourth meridian, in Alberta, Hydrologic Unit 10050001, on right bank 0.4 mi upstream from highway bridge, 1.6 mi north of international boundary, 2.8 mi east of Whiskey Gap, Alberta, 11 mi southeast of Kimball, Alberta, and at mile 49.9.

DRAINAGE AREA.--91.8 mi^2. Area at site used Apr. 12, 1930, to Aug. 15, 1962, 97.4 mi^2.

PERIOD OF RECORD.--July 1909 to October 1912 (seasonal records only), January 1913 to October 1922, March 1923 to current season (seasonal records only). Records for November and December 1912, published in WSP 1309, have been found to be unreliable and should not be used. Published as "near Kimball, Alberta" 1913-16. Prior to February 1962, published as North Fork Milk River near international boundary.

REVISED RECORDS.--WSP 1309: 1909-13, 1915(M), 1920(M), 1937(M). WSP 1559: 1948(M). WSP 1729: 1944(M). W 1983: Drainage area. See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Datum of gage is 4,112.16 ft above mean sea level (Geodetic Surveys of Canada datum). Prior to May 1913, nonrecording gage at site 2 mi downstream at different datum. May 1, 1913, to Apr. 11, 1930, water-stage recorder 700 ft downstream at different datum. Apr. 12, 1930, to Aug. 15, 1962, water-stage recorder 1,500 ft downstream at different datum.

REMARKS.--Estimated daily discharges: Mar. 1-12, 28, 29. Records good. Since 1917, flow increased during irrigation season by water from St. Mary Canal (station number 05018500). Several small diversions for irrigation upstream from station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,950 ft^3/s, June 17, 1948, gage height, 6.47 ft, site and datum then in use, from rating curve extended above 1,500 ft^3/s; no flow Mar. 1, 2, 1940.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 777 ft^3/s, Apr. 6, gage height, 4.21 ft; minimum daily, 8.0 ft^3/s, Oct. 4.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e8.8	374	227	593	544	509	516	8.2		
2			e11	349	265	590	551	491	516	8.2		
3			e16	396	267	604	551	498	512	8.2		
4			e82	438	267	629	544	498	519	8.0		
5			e134	498	264	639	558	491	519	8.3		
6			e53	484	266	650	530	501	519	8.3		
7			e53	333	307	653	367	505	523	8.5		
8			e129	325	424	653	257	512	516	8.6		
9			e208	320	448	667	220	512	367	9.1		
10			e235	311	459	657	278	512	174	9.5		
11			e284	306	480	653	341	512	68	9.4		
12			e388	272	523	650	345	519	35	9.1		
13			417	250	558	569	341	530	22	9.0		
14			438	198	600	491	378	551	18	9.2		
15			452	136	636	480	427	530	17	11		
16			459	130	675	484	459	509	19	11		
17			459	121	692	523	470	509	16	11		
18			456	127	653	561	505	523	13	10		
19			470	122	561	586	512	533	11	9.9		
20			466	121	657	593	480	537	10	9.7		
21			463	121	696	593	477	530	9.5	9.6		
22			456	116	611	583	509	537	9.4	9.6		
23			445	140	494	576	448	540	8.9	9.8		
24			427	180	371	572	413	565	8.2	10		
25			410	179	306	565	477	544	8.2	9.8		
26			392	173	308	561	473	526	9.8	9.4		
27			374	177	347	551	470	523	17	9.8		
28			e364	174	480	544	473	519	13	10		
29			e367	177	579	544	491	516	9.9	9.3		
30			367	175	590	544	505	519	8.7	9.3		
31			364	---	597	---	512	519	---	9.6		
TOTAL			9647.8	7223	14608	17558	13906	16120	5012.6	290.4		
MEAN			311	241	471	585	449	520	167	9.37		
MAX			470	498	696	667	558	565	523	11		
MIN			8.8	116	227	480	220	491	8.2	8.0		
AC-FT			19140	14330	28970	34830	27580	31970	9940	576		

e Estimated

MILK RIVER BASIN

06134500 MILK RIVER AT MILK RIVER, ALBERTA

(International gaging station)

LOCATION.--Lat 49°08'37", long 112°04'44", in NE¼ sec.21, T.2, R.16 W., fourth meridian, in Alberta, Hydrologic Unit 10050002, on right bank 5 ft downstream from highway bridge at Milk River, Alberta, 22 mi downstream from North Milk River, and at mile 613.4.

DRAINAGE AREA.--1,050 mi^2.

PERIOD OF RECORD.--June 1909 to October 1910 (no winter records), April 1911 to current year. Monthly discharge only for June 1909, published in WSP 1309.

REVISED RECORDS.--WSP 1309: 1912. WSP 1599: 1916, 1927(M), 1947(M). W 1983: Drainage area. W 1984: 1983 (M).

GAGE.--Water-stage recorder. Datum of gage is 3,402.78 ft above mean sea level (Geodetic Survey of Canada datum). Prior to June 17, 1919, nonrecording gages, and June 17, 1919, to Nov. 2, 1921, water-stage recorder at several sites 300 ft upstream at datum 0.61 ft higher. Nov. 3, 1921, to Aug. 28, 1947, water-stage recorder at site 60 ft upstream at present datum. Aug. 29, 1947, to Nov. 10, 1976, water-stage recorder located 700 ft downstream on left bank at present datum.

REMARKS.--Estimated daily discharges: Oct. 31 to Nov. 3, Nov. 7 to Mar. 16. Records good except those for estimated daily discharge, which are poor. Since 1917, flow increased during irrigation season by water from St. Mary Canal (station number 05018500). Several diversions for irrigation upstream from station.

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

AVERAGE DISCHARGE.--71 years (1916-87), 324 ft^3/s, 234,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,850 ft^3/s, Feb. 25, 1986, gage height, 12.46 ft, from flood-marks, from rating curve extended above 8,600 ft^3/s; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,430 ft^3/s, Apr. 6, gage height, 4.74 ft; maximum gage height, 5.12 ft, Mar. 6 (backwater from ice); minimum daily discharge, 2.8 ft^3/s, Dec. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	e29	e26	e30	484	241	629	530	526	554	38	32	e37
2	e30	e24	e30	501	273	604	533	523	547	40	32	e34
3	e27	e26	e40	600	334	597	540	512	544	35	33	e40
4	e27	e31	e69	886	340	600	537	516	540	33	31	e40
5	e24	e35	e84	1150	331	611	540	505	544	31	33	e40
6	e21	e39	e335	1140	319	611	544	505	544	30	33	e42
7	e16	e46	e332	855	316	607	512	516	540	30	33	e41
8	e20	e43	e238	614	341	614	371	512	540	29	34	e34
9	e23	e40	e132	530	445	622	266	516	537	29	34	e36
10	e23	e37	e139	484	466	618	226	519	406	29	34	e34
11	e20	e48	e245	452	477	614	264	523	245	30	33	e33
12	e20	e44	e392	427	491	618	342	526	146	31	32	e30
13	e19	e42	e579	381	526	618	344	530	101	31	32	e25
14	e17	e42	e547	344	561	551	334	561	75	31	32	e17
15	e16	e39	e611	301	597	477	360	576	59	32	e27	e15
16	e13	e36	e586	218	625	470	413	558	50	32	e23	e9.3
17	e8.5	e37	544	201	657	470	445	554	51	34	e28	e7.5
18	e8.3	e34	547	226	667	512	505	569	49	34	28	e9.0
19	e8.5	e34	561	267	632	561	547	569	48	35	29	e10
20	e9.5	e34	547	305	565	593	530	569	46	35	37	e14
21	e9.9	e32	526	260	636	586	572	561	43	36	41	e21
22	e11	e28	516	230	664	572	576	558	41	35	44	e18
23	e12	e25	512	212	593	576	569	558	38	35	31	e12
24	e13	e25	505	209	505	569	558	639	35	35	30	e8.4
25	e13	e24	498	260	413	558	738	643	33	34	48	e6.4
26	e13	e25	498	258	364	551	664	590	33	33	42	e5.3
27	e15	e25	480	250	378	544	600	607	33	33	46	e4.5
28	e17	e26	466	242	417	540	554	597	32	31	e35	e4.3
29	e18	---	484	239	597	533	540	576	32	31	e37	e3.2
30	e20	---	466	242	696	530	544	569	36	32	e39	e2.8
31	e21	---	459	---	657	---	544	561	---	32	---	e3.2
TOTAL	542.7	947	11998	12768	15124	17156	15142	17144	6522	1016	1023	636.9
MEAN	17.5	33.8	387	426	488	572	488	553	217	32.8	34.1	20.5
MAX	30	48	611	1150	696	629	738	643	554	40	48	42
MIN	8.3	24	30	201	241	470	226	505	32	29	23	2.8
AC-FT	1080	1880	23800	25330	30000	34030	30030	34010	12940	2020	2030	1260

CAL YR 1987 TOTAL 100019.5 MEAN 274 MAX 1150 MIN 2.8 AC-FT 198400

e Estimated

06134700 VERDIGRIS COULEE NEAR THE MOUTH, NEAR MILK RIVER, ALBERTA

(International gaging station)

LOCATION.--Lat 49°06'39", long 111°45'31", in NW¼ sec.12, T.2, R.14 W., fourth meridian, in Alberta, Hydrologic Unit 10050002, on left bank, 0.6 mi upstream from mouth, 5 mi downstream from culvert on provincial highway 501, and 15 mi east of Milk River, Alberta.

DRAINAGE AREA.--137 mi^2, of which 130 mi^2 is probably noncontributing.

PERIOD OF RECORD.--May 1985 to current season (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 3,040 ft, from topographic map.

REMARKS.--Estimated daily discharges: Mar. 1, 2, 10, 11, 23-29, Apr. 11-27, Nov. 24-30. Records fair. Nearly all flow is the result of interbasin diversion from St. Mary River into Weston Lake 25 miles upstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42 ft^3/s, Oct. 9, 1985, gage height, 5.61 ft; maximum gage height, 5.70 ft, Nov. 6, 1985 (backwater from ice); no flow at times most years.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 25 ft^3/s, Aug. 24, gage height, 4.65 ft; no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.00	.53	.00	15	6.1	7.5	12	10	.85	
2			e.00	.07	.00	16	2.1	9.4	12	9.0	.92	
3			.04	.04	.00	12	1.8	9.0	13	9.8	3.3	
4			.28	.04	.00	12	4.3	6.2	13	11	.81	
5			.25	1.3	.00	11	1.5	7.4	11	10	.21	
6			.25	.39	.00	12	2.9	8.5	12	10	.18	
7			.11	.46	.00	12	1.4	6.9	12	9.4	.14	
8			.07	2.2	.00	10	.49	6.5	11	12	.14	
9			.04	4.2	.00	11	1.2	7.0	11	12	.14	
10			e.00	.39	.00	12	3.1	5.1	11	8.2	.25	
11			e.00	e3.5	.00	12	1.3	9.9	10	11	.92	
12			.04	e3.9	.00	11	.60	7.5	9.4	11	1.5	
13			.14	e2.8	.07	11	1.1	7.5	9.3	12	.39	
14			.46	e2.1	.07	10	1.1	12	10	11	2.5	
15			.32	e1.4	.18	10	2.2	14	9.1	13	.92	
16			.21	e.71	3.9	11	2.8	11	10	9.7	.14	
17			.21	e1.1	.49	11	2.9	12	8.8	11	.14	
18			.25	e1.8	.07	9.7	5.1	11	8.2	9.7	.11	
19			.14	e2.1	3.9	11	12	10	8.3	10	.07	
20			2.3	e1.4	4.7	13	9.3	9.9	7.9	6.4	.07	
21			2.4	e.71	2.2	11	8.5	11	7.9	6.6	.11	
22			.92	e.35	4.3	12	7.7	10	7.5	7.4	1.0	
23			e1.2	e.18	6.0	12	8.8	9.6	7.5	5.2	.14	
24			e1.0	e.14	6.0	11	8.5	19	7.9	1.7	e.11	
25			e2.2	e.07	7.4	9.4	9.0	17	6.2	6.8	e.11	
26			e4.2	e.00	10	8.8	7.9	13	8.5	4.3	e.07	
27			e4.6	e.00	12	9.6	8.2	11	12	2.1	e.07	
28			e.85	.00	12	11	8.7	11	9.1	2.5	e.07	
29			e.57	.00	12	8.9	9.3	13	8.5	1.9	e.04	
30			1.6	.00	12	6.3	9.0	13	9.2	.92	e.04	
31			2.6	---	12	---	8.5	12	---	.42	---	
TOTAL			27.25	31.88	109.28	332.7	157.39	317.9	293.3	246.04	15.46	
MEAN			.88	1.06	3.53	11.1	5.08	10.3	9.78	7.94	.52	
MAX			4.6	4.2	12	16	12	19	13	13	3.3	
MIN			.00	.00	.00	6.3	.49	5.1	6.2	.42	.04	
AC-FT			54	63	217	660	312	631	582	488	31	

e Estimated

06135000 MILK RIVER AT EASTERN CROSSING OF INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 48°59'03", long 110°28'10", in SE¼NE¼NW¼ sec.7, T.37 N., R.10 E., Hill County, Hydrologic Unit 10050002, on right bank 1.1 mi south of international boundary, 6.5 mi upstream from Lost River, 12.5 mi northwest of Simpson, 29.5 mi north of Rudyard, and at mile 484.1.

DRAINAGE AREA.--2,506 mi^2.

PERIOD OF RECORD.--August 1909 to current season. No winter record. A few winter records were collected and are on file in the Helena district office. Monthly discharge only for April 1912, published in WSP 1309.

REVISED RECORDS.--WSP 1086: 1927, 1935. WSP 1559: 1920(M), 1922(M), 1926, 1928(M), 1929, 1930(M), 1932(M). WSP 1729: 1921-13, 1921-22, 1929(M). W 1983: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,659.64 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 1, 1970, water-stage recorder or nonrecording gages of several sites within 10.5 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Mar. 1-15, 29, July 19, 20, Aug. 24, Oct. 10-31. Records fair. Since 1917, flow increased during irrigation season by water from St. Mary Canal (station number 05018500). Many diversions for irrigation upstream from station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,700 ft^3/s, Apr. 9, 1965, gage height, 9.53 ft, site and datum then in use, but may have been higher Mar. 28, 1952; maximum gage height, 13.65 ft, Mar. 28, 1952 (backwater from ice), site and datum then in use; no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 1,570 ft^3/s, Apr. 6, gage height, 6.00 ft; maximum gage height, 6.62 ft, Mar. 29 (backwater from ice); minimum daily discharge, 43 ft^3/s on many days in October.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e55.0	446	252	553	514	532	575	52		
2			e55.0	459	252	597	492	529	592	50		
3			e55.0	455	241	536	479	503	589	44		
4			e60.0	462	233	518	478	503	575	43		
5			e100	581	238	523	482	509	558	43		
6			e200	1160	300	536	498	497	572	43		
7			e150	1380	325	543	511	485	577	45		
8			e120	1170	321	560	516	515	586	45		
9			e250	941	303	564	522	487	586	43		
10			e220	710	290	556	463	484	573	e44		
11			e200	639	289	549	335	485	565	e44		
12			e190	625	354	546	262	495	549	e44		
13			e190	596	379	551	230	496	417	e43		
14			e250	597	381	547	225	518	296	e43		
15			e500	530	400	556	310	593	222	e43		
16			576	455	452	555	324	612	182	e43		
17			607	401	513	480	301	586	160	e43		
18			596	357	557	420	319	596	131	e43		
19			534	289	630	418	e444	527	122	e44		
20			523	246	652	514	e468	512	110	e44		
21			519	234	637	666	513	524	98	e44		
22			488	253	562	653	499	526	92	e45		
23			438	302	517	606	472	531	88	e45		
24			463	272	616	573	481	e590	80	e45		
25			440	249	618	555	500	781	75	e45		
26			465	229	551	567	518	694	68	e46		
27			500	211	482	558	585	696	71	e46		
28			511	241	428	540	929	626	73	e46		
29			e500	256	365	533	1030	579	75	e45		
30			453	251	382	524	707	637	59	e45		
31			362	---	374	---	618	619	---	e45		
TOTAL			10570.0	14997	12894	16397	15025	17267	9316	1383		
MEAN			341	500	416	547	485	557	311	44.6		
MAX			607	1380	652	666	1030	781	592	52		
MIN			55	211	233	418	225	484	59	43		
AC-FT			20970	29750	25580	32520	29800	34250	18480	2740		

e Estimated

06137400 BIG SANDY CREEK AT RESERVATION BOUNDARY, NEAR ROCKY BOY, MT

LOCATION.--Lat 48°10'21", long 109°49'31", in SE¼NE¼NW¼ sec. 20, T.28 N., R.15 E., Chouteau County, Hydrologic Unit 10050005, on left bank 1.0 mi downstream from Muddy Creek, 6.0 mi south of Rocky Boy Agency, and at mile 90.5.

DRAINAGE AREA.--24.7 mi^2.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Elevation of gage is 3,830 ft, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 7-19. Dec. 2 to Mar. 4, Mar. 21-29. Water-discharge records fair except those for estimated daily discharges, which are poor. No known regulation or diversions upstream of station.

AVERAGE DISCHARGE.--5 years, 8.75 ft^3/s, 6,340 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 371 ft^3/s, May 23, 1986, gage height, 4.84 ft; minimum, 0.71 ft^3/s, Aug. 28, 1984, gage height, 2.23 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 30 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 21	1115	(a)	*3.72	June 20	0945	*44	2.98
Apr. 6	2000	35	2.83				

(a) Backwater from ice.

Minimum daily discharge, 3.2 ft^3/s, on several days in Sept.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18	7.9	11	e7.5	e6.5	e6.0	9.7	16	11	6.8	4.8	3.6
2	16	9.1	e10	e8.5	e6.5	e6.4	9.6	19	10	6.5	4.6	3.5
3	15	9.5	e10	e7.5	e6.4	e7.5	13	18	10	6.4	4.7	3.3
4	13	9.2	e9.5	e8.0	e6.4	e8.5	19	17	9.7	6.3	4.8	3.5
5	13	10	e10	e8.0	e6.4	11	25	16	9.5	6.3	4.5	3.5
6	13	10	e9.5	e7.5	e7.0	13	28	16	9.0	6.2	4.4	3.5
7	12	e9.0	e10	e7.0	e7.0	12	27	15	8.7	6.0	4.4	3.6
8	12	e9.0	e9.5	e7.0	e7.0	8.4	25	15	8.4	6.1	4.3	3.6
9	9.9	e9.0	e9.0	e7.5	e7.0	7.4	22	14	8.4	6.0	4.0	3.5
10	12	e8.5	e9.2	e8.0	e6.4	7.2	20	14	8.4	6.0	3.8	3.4
11	11	e8.0	e9.4	e9.0	e6.4	7.0	21	13	7.8	6.1	3.8	3.6
12	11	e7.0	e9.6	e8.5	e6.4	7.1	18	13	7.6	5.9	4.1	3.5
13	11	e8.0	e9.6	e8.0	e6.2	8.5	17	13	7.2	5.6	4.0	3.4
14	11	e9.0	e9.4	e7.5	e6.2	11	17	13	7.1	5.4	4.1	3.2
15	11	e8.5	e9.4	e7.0	e6.2	9.4	20	13	6.9	5.3	4.7	3.2
16	11	e11	e9.3	e6.0	e6.0	8.3	21	14	7.2	5.3	4.6	3.6
17	10	e11	e9.2	e7.0	e6.0	8.0	21	13	6.7	6.4	5.5	3.8
18	10	e11	e9.2	e8.0	e6.0	8.1	20	13	6.5	7.8	4.6	3.6
19	10	e11	e9.2	e7.5	e6.0	8.4	20	12	10	7.1	4.2	3.6
20	10	12	e9.0	e7.0	e5.8	7.3	18	12	30	6.1	4.0	3.5
21	9.9	13	e9.0	e6.5	e5.8	e6.2	19	12	14	5.6	3.7	3.5
22	9.9	12	e8.6	e7.0	e5.8	e6.0	19	12	13	7.1	3.7	3.5
23	9.7	11	e8.6	e7.0	e5.5	e5.8	20	12	9.8	6.8	3.6	3.3
24	9.6	12	e8.5	e7.0	e5.5	e5.8	21	12	8.9	5.7	4.8	3.2
25	9.5	13	e8.5	e7.5	e5.4	e5.8	19	13	8.2	5.0	5.7	3.2
26	9.5	12	e8.0	e7.0	e5.2	e6.4	18	14	7.8	4.9	5.4	3.2
27	9.4	12	e8.5	e7.0	e5.2	e6.0	17	15	7.6	4.7	4.3	6.5
28	9.3	12	e8.0	e7.0	e5.4	e5.6	17	14	7.1	4.8	4.0	4.7
29	9.0	12	e8.4	e6.8	---	e7.0	17	11	7.0	6.3	3.8	3.8
30	9.5	11	e8.8	e6.8	---	8.2	17	11	6.9	8.1	3.9	3.6
31	9.5	---	e8.0	e6.8	---	8.9	---	11	---	5.8	3.7	---
TOTAL	344.7	307.7	283.9	228.4	171.6	242.2	575.3	426	280.4	188.4	134.5	108.5
MEAN	11.1	10.3	9.16	7.37	6.13	7.81	19.2	13.7	9.35	6.08	4.34	3.62
MAX	18	13	11	9.0	7.0	13	28	19	30	8.1	5.7	6.5
MIN	9.0	7.0	8.0	6.0	5.2	5.6	9.6	11	6.5	4.7	3.6	3.2
AC-FT	684	610	563	453	340	480	1140	845	556	374	267	215

CAL YR 1986 TOTAL 6579.9 MEAN 18.0 MAX 286 MIN 4.5 AC-FT 13050
WTR YR 1987 TOTAL 3291.6 MEAN 9.02 MAX 30 MIN 3.2 AC-FT 6530

e Estimated

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1982-84, October 1986 to September 1987.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT							
01...	1700	19	--	--	338	10.0	8.0
21...	0740	9.9	--	--	345	0.5	4.0
NOV							
18...	1410	12	--	--	345	3.0	0.0
DEC							
15...	1230	9.4	--	--	349	3.0	0.0
JAN							
21...	1415	9.4	--	--	345	5.0	0.0
FEB							
17...	1145	6.0	--	--	350	9.0	0.5
MAR							
18...	1445	8.5	--	--	333	6.0	1.0
APR							
14...	1215	16	95	2	310	20.0	6.5
MAY							
20...	1030	12	100	71	345	4.0	7.0
JUN							
16...	1140	7.6	--	--	354	27.0	17.0
JUL							
16...	0900	5.4	--	--	350	14.0	15.0
AUG							
18...	1130	4.6	15	1	351	25.0	13.0
SEP							
22...	1335	3.6	--	--	371	35.0	13.0
30...	1100	3.8	0	0	372	30.0	12.0

DATE	TIME	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
APR									
14...	1215	8.20	130	0	35	10	12	0.5	9.2
MAY									
20...	1030	8.00	140	0	36	11	14	0.5	11
AUG									
18...	1130	7.50	150	0	40	11	14	0.5	12
SEP									
30...	1100	7.90	150	0	41	11	14	0.5	12

DATE	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)
APR									
14...	145	24	1.5	0.20	17	200	0.27	8.5	<0.100
MAY									
20...	158	23	1.5	0.20	19	210	0.29	6.8	<0.100
AUG									
18...	170	23	1.3	0.20	21	220	0.31	2.8	<0.100
SEP									
30...	167	24	1.7	0.20	20	220	0.30	2.3	<0.100

DATE	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)
APR									
14...	<1	30	<1	<10	20	<5	16	<0.1	<1
MAY									
20...	--	30	--	--	17	--	--	--	--
AUG									
18...	--	20	--	--	92	--	--	--	--
SEP									
30...	--	20	--	--	27	--	--	--	--

06137570 BOXELDER CREEK NEAR ROCKY BOY, MT

LOCATION.--Lat 48°18'07", long 109°50'37", in SW¼SW¼NW¼ sec.6, T.29 N., R.15 E., Hill County, Hydrologic Unit 10050005, on Rocky Boy Indian Reservation, on right bank 1,000 ft upstream from Bonneau Reservoir, 4,000 ft downstream from Wolf Creek, 4.1 mi northwest of Rocky Boy Agency, and a mile 14.0.

DRAINAGE AREA.--48.2 mi^2.

PERIOD OF RECORD.--October 1975 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,225 ft, from topographic map.

REMARKS.--Estimated daily discharges: Oct. 2-9, Nov. 9-21, Dec. 4 to Jan. 11, Jan. 14-17, Feb. 16 to Mar. 1, Mar. 22-25, 27-29, Aug. 25 to Sept. 30. Records poor. Other than beaver dams no known regulation or diversions upstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellanous water-quality data in the back of this report.

AVERAGE DISCHARGE.--12 years, 10.0 ft^3/s, 7,250 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 898 ft^3/s, May 23, 1986, gage height, 10.95 ft, from outside highwater mark; minimum, 0.02 ft^3/s, Sept. 15, 1980, Sept. 1, 2, 1984, but may have been less during the period Sept. 9-23, 1980, backwater from beaver dams; minimum gage height, 3.79 ft, Sept. 17, 1976, present site and datum and previous control.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 30 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 1	0030	[a]*35		Apr. 5	0500	34	7.58
Oct. 5	0230	unknown	*7.74				

[a]May have been higher during the period Oct. 2-5.

Minimum daily discharge, 2.5 ft^3/s, Sept. 23-26.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	21	20	e10	10	e7.5	16	21	14	7.9	5.9	e4.0
2	e33	21	19	e11	12	7.6	20	22	13	7.7	5.1	e3.8
3	e32	22	17	e11	11	8.1	22	25	13	7.4	4.6	e3.5
4	e30	23	e16	e10	10	9.5	28	24	12	7.0	4.7	e3.6
5	e29	22	e17	e10	9.4	11	33	21	11	6.8	4.9	e3.7
6	e28	23	e17	e9.0	9.4	11	31	19	11	6.7	4.6	e3.6
7	e27	22	e16	e9.0	10	11	27	18	10	6.4	4.4	e3.5
8	e26	21	e16	e9.0	9.7	9.7	24	17	9.6	6.2	4.3	e3.4
9	e25	e19	e15	e10	9.0	8.6	23	17	9.5	6.0	4.2	e3.2
10	26	e18	e15	e11	8.7	8.0	23	16	10	6.0	4.1	e3.0
11	26	e18	e16	e13	8.6	7.9	23	16	10	6.1	4.0	e3.0
12	26	e17	e16	16	8.8	8.2	23	15	10	5.9	4.1	e2.9
13	27	e19	e16	15	9.1	8.7	22	15	9.6	5.6	4.1	e2.9
14	26	e20	e17	e12	9.4	9.5	22	15	8.9	5.2	4.0	e2.8
15	25	e19	e15	e9.0	9.6	9.8	22	14	8.3	4.8	4.4	e2.8
16	25	e19	e15	e11	e9.5	9.4	21	17	8.0	4.5	5.0	e2.9
17	25	e18	e14	e15	e9.0	9.9	21	18	8.1	4.6	5.0	e3.0
18	24	e17	e14	16	e8.5	10	21	17	8.2	6.4	4.7	e2.8
19	24	e17	e13	15	e8.5	11	21	16	8.7	6.8	4.9	e2.7
20	23	e19	e13	13	e9.0	12	22	15	14	6.2	4.1	e2.7
21	29	e24	e14	13	e8.5	12	22	15	19	6.0	4.1	e2.6
22	28	23	e15	13	e8.0	e12	22	15	16	6.3	4.4	e2.6
23	24	21	e15	12	e8.5	e11	22	15	14	7.7	4.1	e2.5
24	22	21	e14	12	e8.0	e10	24	14	12	7.1	5.0	e2.5
25	22	22	e13	12	e7.5	e11	24	14	11	6.9	e5.5	e2.5
26	22	21	e13	12	e7.0	12	23	16	10	6.6	e6.0	e2.5
27	21	21	e12	11	e6.5	e11	22	21	9.7	6.4	e5.5	e5.0
28	20	20	e11	11	e7.0	e10	22	22	8.9	8.7	e5.0	e4.0
29	20	20	e11	10	---	e10	21	18	8.4	8.5	e4.5	e3.5
30	20	20	e11	10	---	11	21	15	8.1	7.4	e4.6	e3.0
31	21	---	e11	9.8	---	12	---	14	---	6.7	e4.2	---
TOTAL	791	608	457	360.8	250.2	310.4	688	537	324.0	202.5	144.0	94.5
MEAN	25.5	20.3	14.7	11.6	8.94	10.0	22.9	17.3	10.8	6.53	4.65	3.15
MAX	35	24	20	16	12	12	33	25	19	8.7	6.0	5.0
MIN	20	17	11	9.0	6.5	7.5	16	14	8.0	4.5	4.0	2.5
AC-FT	1570	1210	906	716	496	616	1360	1070	643	402	286	187

CAL YR 1986 TOTAL 8989.2 MEAN 24.6 MAX 637 MIN 5.2 AC-FT 17830
WTR YR 1987 TOTAL 4767.4 MEAN 13.1 MAX 35 MIN 2.5 AC-FT 9460

e Estimated

06137580 SAGE CREEK NEAR WHITLASH, MT

LOCATION.--Lat 48°53'30", long 111°01'47", in NW¼NW¼SW¼ sec.12, T.36 N., R.5 E., Liberty County, Hydrologic Unit 10050006, on left bank, 0.2 mi downstream from bridge on Black Jack Road, 10 mi southeast of Whitlash.

DRAINAGE AREA.--7.26 mi^2.

PERIOD OF RECORD.--October 1976 to September 1982, October 1984 to current year.

GAGE.--Water-stage recorder, Parshall flume, and V-notch sharp-crested weir. Elevation of gage is 3,900 ft from topographic map.

REMARKS.--Estimated daily discharges: Nov. 8-13, 16, Dec. 3-10, 25, Dec. 31 to Feb. 11, Feb. 19, Feb. 24 to Mar. 1, Mar. 9-12, 21, 28-29. Records good except those for estimated daily discharges, which are poor. No known regulation upstream of station. Diversions for irrigation of about 40 acres upstream 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.--9 years, 2.66 ft^3/s, 1,930 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 100 ft^3/s, Aug. 10, 1982, gage height, 3.04 ft; no flow part of several days during winter periods of 1978, 1980, and 1981, result of siphon action over weir.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 20 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Aug. 24	2345	*61	*2.62	No other peak greater than base discharge.			

Minimum discharge, 0.29 ft^3/s, July 15, 16, gage height, 0.11 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.5	2.7	2.1	e.90	e1.0	e1.0	2.5	2.5	2.5	.81	1.7	6.4
2	8.0	3.0	1.7	e1.0	e1.0	2.1	2.2	2.6	2.4	.74	1.8	6.1
3	7.8	2.7	e1.4	e.95	e.90	3.4	2.9	2.5	2.2	.69	1.7	5.8
4	7.4	2.6	e1.5	e.90	e.90	3.9	3.5	2.4	2.1	.70	1.5	5.7
5	7.5	2.6	e1.5	e.85	e1.0	2.2	4.3	2.3	2.0	.73	1.4	5.3
6	7.4	2.6	e1.3	e.80	e1.1	2.0	4.3	2.2	1.9	.72	1.4	5.0
7	7.2	2.1	e1.3	e.75	e1.4	1.6	3.5	2.1	1.8	.71	1.3	4.7
8	6.9	e1.7	e1.4	e.70	e1.3	1.1	3.1	2.0	1.7	.67	1.1	4.3
9	6.5	e1.2	e1.3	e.80	e1.2	e1.0	2.9	1.8	1.6	.64	1.1	3.9
10	6.7	e1.0	e1.6	e1.0	e1.3	e.95	2.9	1.7	1.4	.81	1.0	3.7
11	6.0	e1.5	2.1	e1.4	e1.2	e.90	3.3	1.7	1.3	.79	1.1	3.4
12	5.7	e2.0	2.1	e1.6	1.1	e1.6	3.1	1.6	1.1	.63	1.1	3.1
13	5.5	e2.4	1.9	e1.5	1.0	1.4	2.9	1.6	.99	.58	1.0	2.9
14	5.2	2.6	1.8	e1.1	1.1	1.5	2.9	1.5	.90	.49	2.0	2.8
15	4.9	1.7	1.7	e.60	.93	1.3	2.9	1.5	.89	.43	1.8	2.6
16	4.6	e2.1	1.6	e.65	.96	1.3	3.0	1.5	.90	.48	2.2	2.6
17	4.4	2.3	1.5	e.80	1.1	1.3	3.1	1.5	.94	.63	2.0	2.5
18	4.2	2.1	1.5	e.90	1.0	1.3	3.3	1.5	.82	2.5	1.9	2.4
19	4.0	2.2	1.5	e.90	e.95	1.2	3.2	1.4	.94	3.2	1.8	2.2
20	3.8	2.9	1.7	e.95	.95	1.1	3.1	1.4	2.0	1.6	1.6	2.0
21	3.7	3.0	1.8	e1.0	.98	e.90	3.0	1.4	1.2	1.4	1.6	1.9
22	3.6	2.3	1.8	e.85	.95	1.0	2.9	1.4	1.1	2.1	1.5	1.8
23	3.4	2.3	1.6	e.90	.91	1.3	3.1	1.2	1.1	1.9	1.6	1.7
24	3.4	3.0	1.7	e.95	e.85	1.6	3.0	1.2	1.1	1.8	15	1.7
25	3.2	2.3	e1.6	e1.0	e.80	1.6	2.7	1.5	1.0	1.7	34	1.6
26	3.1	2.2	1.5	e1.0	e.70	1.6	2.7	1.7	.97	1.8	16	1.6
27	3.0	2.3	1.5	e1.0	e.70	1.3	2.6	5.4	.91	2.5	11	1.9
28	2.9	2.1	1.4	e.95	e.80	e1.1	2.5	4.4	.97	1.9	9.7	1.6
29	2.9	2.1	1.4	e.95	---	e1.3	2.5	3.2	.94	2.1	8.4	1.5
30	2.9	2.1	1.2	e.90	---	1.8	2.5	2.6	.83	2.1	7.6	1.4
31	2.7	---	e1.1	e.90	---	2.5	---	2.5	---	1.9	6.9	---
TOTAL	156.0	67.7	49.1	29.45	28.08	48.15	90.4	63.8	40.50	39.75	143.8	94.1
MEAN	5.03	2.26	1.58	.95	1.00	1.55	3.01	2.06	1.35	1.28	4.64	3.14
MAX	8.0	3.0	2.1	1.6	1.4	3.9	4.3	5.4	2.5	3.2	34	6.4
MIN	2.7	1.0	1.1	.60	.70	.90	2.2	1.2	.82	.43	1.0	1.4
AC-FT	309	134	97	58	56	96	179	127	80	79	285	187

CAL YR 1986 TOTAL 1465.80 MEAN 4.02 MAX 56 MIN .48 AC-FT 2910
WTR YR 1987 TOTAL 850.82 MEAN 2.33 MAX 34 MIN .43 AC-FT 1690

e Estimated

MILK RIVER BASIN

06139500 BIG SANDY CREEK NEAR HAVRE, MT

LOCATION.--Lat 48°31'36", long 109°50'27", in SW¼SW¼SW¼ sec.18, T.32 N., R.15 E., Hill County, Hydrologic Unit 10050005, on right bank, 6 mi upstream from mouth, 7.7 mi west southwest of Havre post office, and 22 mi downstream from Sage Creek.

DRAINAGE AREA.--1,805 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February 1946 to November 1953 (monthly discharge only for February 1946, published in WSP 1309 as "Big Sandy Creek near Assinniboine"), annual maximum, water years 1955-67 (published as "Big Sandy Creek near Assinniboine"), and May 1984 to current year (seasonal records only).

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 2,510 ft, from topographic map.

REMARKS.--Estimated daily discharge: Sept. 30. Water-discharge records fair. Diversions for irrigation of about 1,000 acres upstream from station.

AVERAGE DISCHARGE.--7 years (water years, 1947-53), 25.2 ft^3/s, 18,240 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,570 ft^3/s, Apr. 3, 1952, gage height, 14.70 ft, from floodmarks; no flow at times during most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 30, 1978, reached a stage of 15.15 ft, from floodmarks, discharge, about 6,000 ft^3/s.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 52 ft^3/s, Mar. 31, gage height, 3.05 ft; minimum daily, 0.09 ft^3/s, Sept. 27.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				40	38	8.8	13	.58	.30			
2				38	34	7.9	14	.45	.26			
3				37	32	11	10	.40	.22			
4				36	29	17	7.9	.35	.19			
5				37	32	16	4.7	.30	.13			
6				39	27	16	3.7	.26	.13			
7				40	17	16	2.8	.22	.11			
8				45	11	17	2.8	.19	.13			
9				43	9.2	14	2.5	.16	.11			
10				41	6.2	12	2.2	.16	.11			
11				42	5.8	9.2	2.2	.13	.13			
12				47	6.2	8.3	2.2	.13	.13			
13				49	5.8	6.6	2.2	.13	.13			
14				47	7.0	5.0	2.2	.13	.13			
15				47	9.7	4.0	1.6	.19	.13			
16				43	10	4.0	1.1	.42	.34			
17				29	11	4.0	.96	.90	.45			
18				33	11	3.7	1.3	.75	.40			
19				37	9.7	3.1	1.7	.58	.35			
20				30	7.9	6.5	1.7	.58	.30			
21				25	7.4	6.2	4.0	.51	.26			
22				27	6.6	6.2	6.5	.40	.22			
23				29	5.8	6.2	6.2	.30	.19			
24				32	4.0	7.0	5.8	.26	.16			
25				34	2.8	6.6	4.0	.40	.13			
26				34	2.8	5.4	2.8	.96	.11			
27				33	5.4	4.0	2.0	1.3	.09			
28				32	6.2	3.7	1.7	.75	.11			
29				36	7.0	5.8	1.3	.58	.11			
30				40	7.4	11	.97	.40	.11			
31				---	9.2	---	.84	.40	---			
TOTAL				1122	384.1	252.2	116.87	13.27	5.67			
MEAN				37.4	12.4	8.41	3.77	.43	.19			
MAX				49	38	17	14	1.3	.45			
MIN				25	2.8	3.1	.84	.13	.09			
AC-FT				2230	762	500	232	26	11			

06139500 BIG SANDY CREEK NEAR HAVRE, MT--Continued

PERIOD OF RECORD.--Water years 1986 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
NOV										
06...	0900	42	100	3	650	0.5	3.5	698	11.7	96
FEB										
09...	1315	18	90	1	820	7.0	0.0	695	15.1	114
MAR										
24...	1450	33	--	--	522	0.0	0.0	--	--	--
APR										
10...	1350	41	--	--	857	14.0	10.0	--	--	--
21...	1410	25	70	1	750	22.0	13.0	700	11.0	114
MAY										
18...	1300	11	90	2	870	20.0	19.0	--	--	--
JUN										
19...	1000	2.9	30	1	920	20.0	19.0	696	7.8	93
JUL										
15...	1100	2.1	10	1	1020	31.0	23.5	690	9.8	128
AUG										
10...	1330	0.15	30	1	1770	29.0	26.0	690	10.8	148
17...	1725	0.74	--	--	1660	22.0	18.0	--	--	--
SEP										
29...	0920	0.10	10	0	2920	11.0	10.0	--	--	--

DATE	TIME	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV												
06...	0900	8.20	13	210	0	48	23	62	2	8.0	271	86
FEB												
09...	1315	8.40	4.2	240	0	51	27	88	3	7.8	279	160
APR												
21...	1410	8.10	6.0	230	0	51	26	85	2	7.8	287	130
MAY												
18...	1300	8.30	18	230	0	40	31	110	3	7.5	304	140
JUN												
19...	1000	8.90	6.4	170	0	20	29	130	4	7.4	262	130
JUL												
15...	1100	8.60	21	200	0	20	36	160	5	8.4	266	240
AUG												
10...	1330	8.40	20	220	0	20	42	330	10	12	447	290
SEP												
29...	0920	8.70	20	320	0	25	63	550	13	14	452	640

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	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)	SOLIDS, RESIDUE AT 105 DEG. C, SUS-PENDED (MG/L) (00530)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS, TOTAL (MG/L AS P) (00665)
NOV												
06...	7.8	12	420	410	0.57	48	24	--	<0.010	--	<0.100	--
FEB												
09...	11	8.5	510	520	0.69	25	8	--	<0.010	--	<0.100	--
APR												
21...	11	12	483	500	0.66	33	22	--	<0.010	--	<0.100	--
MAY												
18...	15	6.5	543	530	0.74	16	24	<0.010	<0.010	<0.100	<0.100	0.040
JUN												
19...	29	0.5	545	500	0.74	4.3	15	0.010	<0.010	<0.100	<0.100	0.070
JUL												
15...	40	0.8	672	670	0.91	3.8	8	--	<0.010	--	<0.100	--
AUG												
10...	160	2.2	1130	1100	1.5	0.46	35	0.010	<0.010	<0.100	<0.100	0.080
SEP												
29...	260	1.0	1870	1800	2.5	0.50	35	--	<0.010	--	<0.100	--

06139500 BIG SANDY CREEK NEAR HAVRE, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	PHOS-PHORUS, DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS, ORTHO, TOTAL (MG/L AS P) (70507)	PHOS-PHORUS, ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ANTI-MONY, TOTAL (UG/L AS SB) (01097)	ANTI-MONY, DIS-SOLVED (UG/L AS SB) (01095)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	BORON, TOTAL RECOV-ERABLE (UG/L AS B) (01022)
NOV 06...	0.020	--	0.007	--	<1	--	2	--	79	--	1	--
FEB 09...	0.010	--	<0.001	--	<1	--	2	--	77	--	<0.5	--
APR 21...	0.030	--	0.028	--	<1	--	3	--	74	--	<0.5	--
MAY 18...	0.020	0.008	0.001	1	<1	5	4	<100	66	<10	<0.5	--
JUN 19...	0.020	0.009	0.001	1	<1	9	7	100	57	<10	<0.5	220
JUL 15...	0.060	--	0.004	--	2	--	5	--	61	--	<0.5	--
AUG 10...	0.010	0.023	<0.001	1	1	7	7	100	77	<10	<0.5	550
SEP 29...	0.020	--	0.009	--	1	--	3	--	<100	--	--	--

DATE	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, 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)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)
NOV 06...	130	--	<1	<1	<3	3	18	<5	8	0.1	--	3
FEB 09...	160	--	<1	<1	<3	2	11	<5	25	<0.1	--	<1
APR 21...	150	--	<1	<1	<3	<1	13	<5	20	<0.1	--	2
MAY 18...	220	<1	<1	<1	<3	2	5	<5	7	0.1	<1	2
JUN 19...	250	<1	<1	2	<3	2	40	<5	14	<0.1	6	2
JUL 15...	260	--	<1	2	<3	4	<3	<5	5	<0.1	--	<1
AUG 10...	510	<1	<1	<1	<3	2	5	<5	4	0.3	6	5
SEP 29...	690	--	<10	<1	<50	4	30	6	<10	0.2	--	7

DATE	SELE-NIUM, TOTAL (UG/L AS SE) (01147)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG) (01077)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	THAL-LIUM, TOTAL (UG/L AS TL) (01059)	THAL-LIUM, DIS-SOLVED (UG/L AS TL) (01057)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	CYANIDE TOTAL (MG/L AS CN) (00720)	CYANIDE DIS-SOLVED (MG/L AS CN) (00723)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 06...	--	<1	--	<1	--	<1	11	--	<0.01	19	2.2	97
FEB 09...	--	<1	--	<1	--	<1	8	--	<0.01	6	0.30	79
APR 21...	--	<1	--	<1	--	<1	6	--	<0.01	21	1.4	99
MAY 18...	<1	<1	<1	<1	<1	<1	10	<0.010	<0.01	22	0.65	89
JUN 19...	<1	<1	<1	<1	<1	<1	7	<0.010	<0.01	13	0.10	79
JUL 15...	--	3	--	<1	--	--	7	--	0.01	42	0.23	91
AUG 10...	<1	<1	<1	<1	<1	<1	<3	--	<0.01	42	0.02	87
SEP 29...	--	3	--	1	--	2	20	--	0.01	23	0.01	98

DATE	TIME	ALA-CHLOR TOTAL RECOVER (UG/L) (77825)	ALDRIN, DIS-SOLVED (UG/L) (39331)	ALDRIN, TOTAL (UG/L) (39330)	AME-TRYNE TOTAL (82184)	ATRA-ZINE, TOTAL (UG/L) (39630)	CHLOR-DANE, DIS-SOLVED (UG/L) (39352)	CHLOR-DANE, TOTAL (UG/L) (39350)	CYAN-AZINE TOTAL (UG/L) (81757)	DDD, DIS-SOLVED (UG/L) (39361)	DDD, TOTAL (UG/L) (39360)	DDE, DIS-SOLVED (UG/L) (39366)
MAY 18...	1300	--	<0.01	<0.010	<0.10	<0.10	<0.1	<0.1	<0.10	<0.01	<0.010	<0.01
JUN 19...	1000	<0.10	<0.01	<0.010	<0.10	<0.10	<0.1	<0.1	<0.10	<0.01	<0.010	<0.01
AUG 10...	1330	<0.10	<0.01	<0.010	<0.10	<0.10	<0.1	<0.1	<0.10	<0.01	<0.010	<0.01

06139500 BIG SANDY CREEK NEAR HAVRE, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	DDE, TOTAL (UG/L) (39365)	DDT, DIS-SOLVED (UG/L) (39371)	DDT, TOTAL (UG/L) (39370)	DI-AZINON, DIS-SOLVED (UG/L) (39572)	DI-AZINON, TOTAL (UG/L) (39570)	DICAMBA (MED-IBEN) (BAN-VEL D) TOTAL (UG/L) (82052)	DI-ELDRIN DIS-SOLVED (UG/L) (39381)	DI-ELDRIN TOTAL (UG/L) (39380)	ENDO-SULFAN DISSOLV (UG/L) (82354)	ENDO-SULFAN, TOTAL (UG/L) (39388)	ENDRIN, DIS-SOLVED (UG/L) (39391)
MAY 18...	<0.010	<0.01	<0.010	<0.01	<0.01	0.01	<0.01	<0.010	<0.01	<0.010	<0.01
JUN 19...	<0.010	<0.01	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.010	<0.01
AUG 10...	<0.010	<0.01	<0.010	<0.01	<0.01	0.01	<0.01	0.080	<0.01	<0.010	<0.01

DATE	ENDRIN, TOTAL (UG/L) (39390)	ETHION DISSOLV (UG/L) (82346)	ETHION, TOTAL (UG/L) (39398)	HEPTA-CHLOR, DIS-SOLVED (UG/L) (39411)	HEPTA-CHLOR, TOTAL (UG/L) (39410)	HEPTA-CHLOR EPOXIDE DIS-SOLVED (UG/L) (39421)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L) (39420)	LINDANE DIS-SOLVED (UG/L) (39341)	LINDANE TOTAL (UG/L) (39340)	MALA-THION, DIS-SOLVED (UG/L) (39532)	MALA-THION, TOTAL (UG/L) (39530)
MAY 18...	<0.010	<0.01	<0.01	<0.01	<0.010	<0.01	<0.010	<0.01	<0.010	<0.01	<0.01
JUN 19...	<0.010	<0.01	<0.01	<0.01	<0.010	<0.01	<0.010	<0.01	<0.010	<0.01	<0.01
AUG 10...	<0.010	<0.01	<0.01	<0.01	<0.010	<0.01	<0.010	<0.01	<0.010	<0.01	<0.01

DATE	METH-OXY-CHLOR DISSOLV (UG/L) (82350)	METH-OXY-CHLOR, TOTAL (UG/L) (39480)	METHYL PARA-THION, DIS-SOLVED (UG/L) (39602)	METHYL PARA-THION, TOTAL (UG/L) (39600)	METHYL-TRI-THION DISSOLV (UG/L) (82344)	METHYL TRI-THION, TOTAL (UG/L) (39790)	METOLA-CHLOR WATER WHOLE TOT.REC (UG/L) (82612)	METRI-BUZIN WATER WHOLE TOT.REC (UG/L) (82611)	MIREX, DIS-SOLVED (UG/L) (39756)	MIREX, TOTAL (UG/L) (39755)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L) (39250)
MAY 18...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01	<0.10
JUN 19...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.01	<0.01	<0.10
AUG 10...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.01	<0.01	<0.10

DATE	PARA-THION, DIS-SOLVED (UG/L) (39542)	PARA-THION, TOTAL (UG/L) (39540)	PCB, DIS-SOLVED (UG/L) (39517)	PCB, TOTAL (UG/L) (39516)	PCN DISSOLV (UG/L) (82360)	PER-THANE DISSOLV (UG/L) (82348)	PER-THANE TOTAL (UG/L) (39034)	PICLO-RAM (TOR-DON) (AMDON) TOTAL (UG/L) (39720)	PROME-TONE TOTAL (UG/L) (39056)	PROME-TRYNE TOTAL (UG/L) (39057)	PRO-PAZINE TOTAL (UG/L) (39024)
MAY 18...	<0.01	<0.01	<0.1	<0.1	<0.10	<0.10	<0.1	0.01	<0.1	<0.1	<0.10
JUN 19...	<0.01	<0.01	<0.1	<0.1	<0.10	<0.10	<0.1	0.01	<0.1	<0.1	<0.10
AUG 10...	<0.01	<0.01	<0.1	<0.1	<0.10	<0.10	<0.1	0.01	<0.1	<0.1	<0.10

DATE	SILVEX, TOTAL (UG/L) (39760)	SIMA-ZINE TOTAL (UG/L) (39055)	SIME-TRYNE TOTAL (UG/L) (39054)	TRI-FLURA-LIN TOTAL RECOVER (UG/L) (39030)	TOX-APHENE, DIS-SOLVED (UG/L) (39401)	TOX-APHENE, TOTAL (UG/L) (39400)	TRI-THION DISSOLV (UG/L) (82342)	TOTAL TRI-THION (UG/L) (39786)	2,4-D, TOTAL (UG/L) (39730)	2, 4-DP TOTAL (UG/L) (82183)	2,4,5-T TOTAL (UG/L) (39740)
MAY 18...	<0.01	<0.10	<0.1	--	<1.0	<1	<0.01	<0.01	0.10	<0.01	<0.01
JUN 19...	<0.01	<0.10	<0.1	<0.10	<1.0	<1	<0.01	<0.01	0.08	<0.01	<0.01
AUG 10...	<0.01	<0.10	<0.1	<0.10	<1.0	<1	<0.01	<0.01	0.09	<0.01	<0.01

MILK RIVER BASIN

06140500 MILK RIVER AT HAVRE, MT

LOCATION.--Lat 48°33'50", long 109°41'42", in SE¼NE¼NE¼ sec.6, T.32 N., R.16 E., Hill County, Hydrologic Unit 10050004, on left bank, 1.25 mi upstream from Bullhook Creek and 7th Avenue East highway bridge in Havre, 8.2 mi downstream from Big Sandy Creek, 15.8 mi downstream from Fresno Dam, and at mile 419.2.

DRAINAGE AREA.--5,785 mi^2, of which 670 mi^2 is probably noncontributing.

PERIOD OF RECORD.--May to November 1898, April 1899 to November 1922, March, April 1923, March, April 1952 (gage heights only, in WSP 1260-B), June 1953 (in WSP 1320-B), August 1954 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1309: 1899-1900, 1902-4, 1907-8, 1909(M), 1912, 1917(M), 1920(M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,465.24 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 4, 1902, nonrecording gage at site 0.75 mi downstream at different datum. Nov. 4, 1902, to Aug. 6, 1980, nonrecording gages 1.25 mi downstream on 7th Avenue East highway bridges, all at datum then in use.

REMARKS.--Estimated daily discharges: Nov. 9 to Mar. 10, May 2-20. Records fair except those for estimated daily discharges, which are poor. Diversions for irrigation of about 6,000 acres upstream from station. Since 1917, flow increased during irrigation season by water from St. Mary Canal (station number 05018500). Since 1939, flow regulated by Fresno Reservoir (station number 06136500). 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.--17 years (water years, 1900-1916), prior to operation of St. Mary Canal, 273 ft^3/s, 197,800 acre-ft/yr; 39 years (water years, 1917-22, 1955-87), 419 ft^3/s, 303,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 20,000 ft^3/s, Apr. 12, 1899, gage height, 19.3 ft, site and datum then in use, from floodmarks, from rating curve extended above 5,200 ft^3/s; no flow at times in several years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,550 ft^3/s, June 20, gage height, 5.77 ft; minimum daily, 25 ft^3/s, Feb. 7-11.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	235	158	e120	e90	e50	e35	112	349	967	992	678	367
2	202	158	e120	e90	e45	e40	107	e900	969	1010	672	365
3	174	155	e120	e90	e40	e40	107	e1000	943	1230	662	362
4	162	152	e120	e90	e35	e40	103	e900	826	678	657	344
5	154	152	e110	e90	e35	e45	111	e600	825	163	621	343
6	146	150	e100	e90	e30	e50	122	e250	817	1060	612	342
7	141	144	e100	e90	e25	e60	129	e120	814	1240	610	343
8	137	107	e100	e90	e25	e70	139	e70	821	1240	604	338
9	165	e100	e90	e95	e25	e80	146	e70	1030	1240	598	339
10	168	e100	e80	e100	e25	e90	140	e70	1030	1240	594	337
11	157	e100	e90	e100	e25	101	134	e150	940	1240	583	337
12	155	e90	e100	e95	e30	86	151	e200	897	1240	587	335
13	149	e100	e100	e95	e35	84	143	e450	886	1230	587	335
14	143	e110	e100	e90	e35	77	136	e750	886	1210	593	332
15	144	e110	e100	e80	e35	74	170	e900	889	1210	583	331
16	150	e120	e100	e80	e35	75	245	e900	884	1190	579	312
17	151	e120	e100	e80	e35	71	282	e900	890	1190	567	130
18	150	e120	e100	e80	e35	62	276	e900	999	1210	514	119
19	147	e120	e100	e80	e40	58	370	e900	1050	1180	503	82
20	147	e120	e90	e70	e40	106	346	e900	1390	1150	494	63
21	156	e130	e100	e70	e40	94	286	1060	1320	1140	448	60
22	158	e130	e100	e70	e40	74	306	1290	1280	1100	444	67
23	158	e140	e100	e70	e40	82	310	1310	913	1080	445	67
24	158	e140	e100	e70	e35	80	338	1310	685	1040	446	64
25	157	e140	e100	e70	e35	93	375	1320	670	827	419	65
26	159	e140	e100	e70	e30	112	377	1320	668	800	402	64
27	162	e140	e100	e70	e35	120	367	1200	664	786	408	64
28	157	e130	e100	e70	e35	109	358	1040	650	775	404	62
29	157	e120	e100	e60	---	119	343	832	648	780	376	46
30	160	e120	e100	e60	---	123	352	845	695	761	369	42
31	157	---	e90	e60	---	124	---	971	---	696	368	---
TOTAL	4916	3816	3130	2505	970	2474	6881	23777	26946	31928	16427	6457
MEAN	159	127	101	80.8	34.6	79.8	229	767	898	1030	530	215
MAX	235	158	120	100	50	124	377	1320	1390	1240	678	367
MIN	137	90	80	60	25	35	103	70	648	163	368	42
AC-FT	9750	7570	6210	4970	1920	4910	13650	47160	53450	63330	32580	12810

CAL YR 1986 TOTAL 156669 MEAN 429 MAX 1520 MIN 30 AC-FT 310800
WTR YR 1987 TOTAL 130227 MEAN 357 MAX 1390 MIN 25 AC-FT 258300

e Estimated

06141600 LITTLE BOX ELDER CREEK AT MOUTH, NEAR HAVRE, MT

LOCATION.--Lat 48°33'43", long 109°31'53", in SE¼SE¼NW¼ sec.4, T.32 N., R.17 E., Hill County, Hydrologic Unit 10050004, on right bank, attached to downstream pier of railroad bridge (number 423.2) 0.6 mi upstream from Milk River, and 7 mi east of Havre, MT.

DRAINAGE AREA.--95.9 mi^2.

PERIOD OF RECORD.--March 1986 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 2,455 ft, from topographic map.

REMARKS.--Estimated daily discharges: Oct. 21-31, July 16, 17, Aug. 2-24, Sept. 4-14, 29, 30. Records fair except those for estimated daily discharges and those for the period July 1 to Sept. 30, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 425 ft^3/s, Sept. 25, 1986, gage height, 9.09 ft; minimum daily, 0.12 ft^3/s, June 11, 1987.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 68 ft^3/s, Apr. 1, gage height, 2.66 ft; minimum daily, 0.12 ft^3/s, June 11.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44	---	---	---	---	16	63	18	5.6	3.9	1.7	2.4
2	41	---	---	---	---	18	46	18	3.6	2.8	e1.2	2.0
3	39	---	---	---	---	18	35	20	1.9	2.5	e1.0	1.7
4	36	---	---	---	---	16	38	24	1.6	1.9	e.90	e1.4
5	33	---	---	---	---	15	42	20	1.6	1.3	e.80	e1.1
6	31	---	---	---	---	14	47	19	2.1	1.1	e.70	e.90
7	28	---	---	---	---	23	42	18	1.6	1.2	e.60	e1.0
8	26	---	---	---	---	19	47	17	1.0	1.2	e.50	e.90
9	26	---	---	---	---	13	43	16	.92	1.4	e.45	e.80
10	26	---	---	---	---	13	37	15	.32	1.4	e.40	e.70
11	28	---	---	---	---	12	33	14	.12	1.3	e.40	e.75
12	25	---	---	---	---	13	32	11	.75	1.0	e.35	e.60
13	24	---	---	---	---	15	27	12	.34	1.4	e.35	e.60
14	23	---	---	---	---	17	24	12	.22	1.4	e.60	e.60
15	22	---	---	---	---	18	25	12	.16	1.3	e.60	.59
16	22	---	---	---	---	16	24	14	.28	e.90	e.50	.69
17	21	---	---	---	---	14	25	16	.21	e.80	e.45	.85
18	21	---	---	---	---	14	10	12	.14	2.0	e.60	1.3
19	20	---	---	---	---	14	13	7.9	.16	3.8	e.60	1.6
20	20	---	---	---	---	16	19	5.5	1.8	3.6	e.60	1.5
21	e20	---	---	---	---	15	15	6.0	14	1.5	e.50	1.6
22	e20	---	---	---	---	11	23	7.0	9.6	1.6	e.50	1.6
23	e20	---	---	---	---	14	25	5.3	4.6	2.6	e.40	1.6
24	e24	---	---	---	---	20	31	2.6	2.1	5.0	e1.5	1.3
25	e28	---	---	---	---	17	29	1.8	1.2	3.2	3.6	.36
26	e30	---	---	---	---	24	24	.44	1.5	2.0	5.7	.39
27	e30	---	---	---	---	31	22	.96	2.3	1.6	5.3	.36
28	e30	---	---	---	---	24	20	12	2.0	1.5	4.1	.41
29	e29	---	---	---	---	24	19	18	5.4	1.4	3.0	e.40
30	e28	---	---	---	---	24	18	8.2	4.6	1.7	2.4	e.40
31	e27	---	---	---	---	35	---	6.3	---	1.8	2.4	---
TOTAL	842	---	---	---	---	553	898	370.00	71.72	60.10	42.70	30.40
MEAN	27.2	---	---	---	---	17.8	29.9	11.9	2.39	1.94	1.38	1.01
MAX	44	---	---	---	---	35	63	24	14	5.0	5.7	2.4
MIN	20	---	---	---	---	11	10	.44	.12	.80	.35	.36
AC-FT	1670	---	---	---	---	1100	1780	734	142	119	85	60

e Estimated

MILK RIVER BASIN

06142400 CLEAR CREEK NEAR CHINOOK, MT

LOCATION.--Lat 48°34'44", long 109°23'26", in SE¼NW¼NW¼ sec.33, T.33 N., R.18 E., Blaine County, Hydrologic Unit 10050004, on right bank, 7 mi west of Chinook, and at mile 2.5.

DRAINAGE AREA.--135 mi^2.

PERIOD OF RECORD.--June 1984 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 2,470 ft, from topographic map.

REMARKS.--Estimated daily discharges: July 30 to Sept. 30. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 2,000 acres upstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 571 ft^3/s, Sept. 25, 1986, gage height, 8.23 ft, revised, from rating curve extended above 312 ft^3/s; no flow at times most years.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 81 ft^3/s, Apr. 7, gage height, 2.60 ft; minimum daily, 0.10 ft^3/s, Sept. 26.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				53	17	20	4.9	e1.1	e.87			
2				48	18	18	4.0	e.93	e.81			
3				40	20	17	3.5	e.70	e.75			
4				42	20	16	3.0	e.64	e.70			
5				54	17	14	2.2	e.59	e.60			
6				69	19	12	1.8	e.44	e.50			
7				73	21	9.4	2.2	e.30	e.45			
8				68	20	8.7	2.0	e.18	e.40			
9				60	18	7.9	1.8	e.14	e.40			
10				54	17	7.9	1.4	e.11	e.35			
11				48	15	6.2	1.7	e.14	e.35			
12				44	15	5.6	1.6	e.14	e.30			
13				40	14	4.0	1.4	e.14	e.30			
14				25	13	4.3	1.0	e.21	e.25			
15				25	12	4.0	.87	e.18	e.25			
16				25	16	4.6	.75	e.20	e.58			
17				21	17	4.0	1.1	e.14	e1.2			
18				20	22	2.3	1.6	e.20	e1.1			
19				23	20	1.9	2.8	e.26	e.92			
20				24	18	4.6	4.6	e.35	e1.0			
21				24	16	15	3.7	e.44	e.91			
22				23	14	17	3.7	e.58	e.64			
23				24	13	14	3.5	e.75	e.67			
24				28	12	14	4.0	e.81	e.49			
25				27	14	11	3.0	e.92	e.28			
26				21	18	9.0	2.3	e.92	e.10			
27				20	26	7.6	1.8	e1.2	e.27			
28				20	31	6.2	1.5	e1.7	e.32			
29				17	31	6.2	1.3	e1.2	e.42			
30				17	25	5.6	1.3	e.77	e.34			
31				---	22	---	e1.5	e.86	---			
TOTAL				1077	571	278.0	71.82	17.24	16.52			
MEAN				35.9	18.4	9.27	2.32	.56	.55			
MAX				73	31	20	4.9	1.7	1.2			
MIN				17	12	1.9	.75	.11	.10			
AC-FT				2140	1130	551	142	34	33			

e Estimated

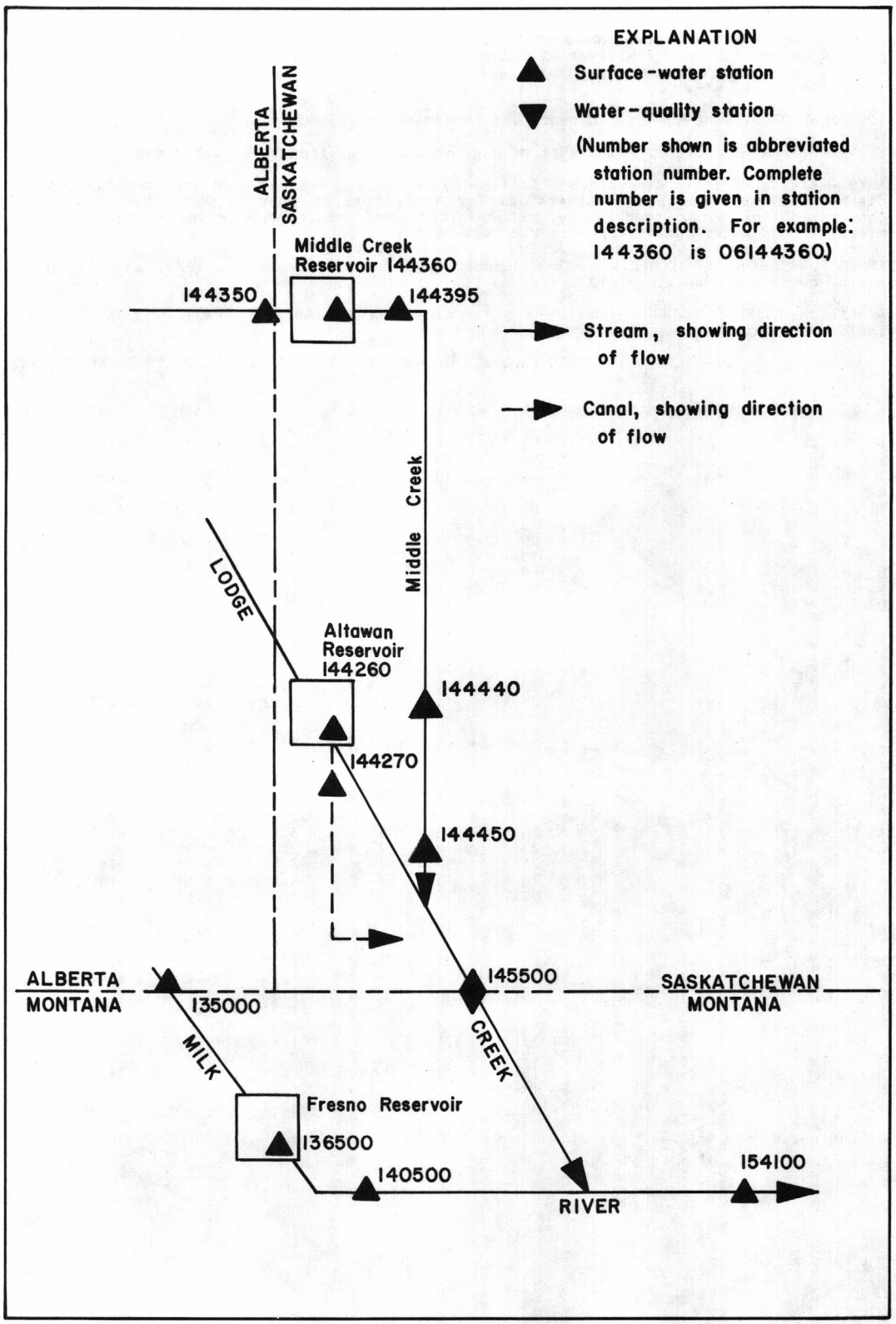


Figure 10.--Schematic diagram showing diversions and storage in Lodge Creek basin.

MILK RIVER BASIN

06144270 SPANGLER DITCH NEAR GOVENLOCK, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°09'16", long 109°54'58", in NW¼ sec.26, T.2, R.30 W., third meridian, Hydrologic Unit 10050007, on right bank 0.9 mi south of Altawan Dam, and 6.8 mi southwest of Govenlock.

PERIOD OF RECORD.--March 1966 to current season (seasonal records only). 1915 to 1936, March 1950 to current season, in reports of Department of the Environment, Canada. Estimates of seasonal diversion only in most years prior to March 1950.

GAGE.--Water-stage recorder. Elevation of gage is 2,920 ft, from topographic map. Prior to March 1950, non-recording gages at several sites within 2 mi of present site at different datums. March 1950 to July 8, 1960, water-stage recorder at site 350 ft downstream at different datum.

REMARKS.--No estimated daily discharges this year. Records fair. Canal diverts water from right bank of Lodge Creek in SW¼ sec.35, T.2, R.30 W., third meridian, for irrigation of 1,320 acres in Spangler irrigation project.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 65 ft^3/s, Apr. 22, 1950, July 9, 1985; no flow most of each season.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	.00	.00	.00	.00	.00		
2			.00	.00	.00	.00	.00	.00	.00	.00		
3			.00	.00	.00	.00	.00	.00	.00	.00		
4			.00	.00	.00	.00	.00	.00	.00	.00		
5			.00	.00	.00	.00	.00	.00	.00	.00		
6			.00	.00	.00	.00	.00	.00	.00	.00		
7			.00	.00	.00	.00	.00	.00	.00	.00		
8			.00	.00	.00	.00	.00	.00	.00	.00		
9			.00	.00	.00	.00	19	.00	.00	.00		
10			.00	.00	.00	.00	35	.00	.00	.00		
11			.00	.00	.00	.00	36	.00	.00	.00		
12			.00	.00	.00	.00	36	.00	.00	.00		
13			.00	.00	.00	.00	36	.00	.00	.00		
14			.00	.00	.00	.00	35	.00	.00	.00		
15			.00	.00	32	.00	35	.00	.00	.00		
16			.00	.00	36	.00	35	.00	.00	.00		
17			.00	.00	43	.00	35	.00	.00	.00		
18			.00	.00	47	.00	34	.00	.00	.00		
19			.00	.00	47	.00	34	.00	.00	.00		
20			.00	.00	47	.00	34	.00	.00	.00		
21			.00	.00	47	.00	29	.00	.00	.00		
22			.00	.00	47	.00	17	.00	.00	.00		
23			.00	.00	47	.00	7.2	.00	.00	.00		
24			.00	.00	47	.00	.00	.00	.00	.00		
25			.00	.00	45	.00	.00	.00	.00	.00		
26			.00	.00	31	.00	.00	.00	.00	.00		
27			.00	.00	8.0	.00	.00	.00	.00	.00		
28			.00	.00	.00	.00	.00	.00	.00	.00		
29			.00	.00	.00	.00	.00	.00	.00	.00		
30			.00	.00	.00	.00	.00	.00	.00	.00		
31			.00	---	.00	---	.00	.00	---	.00		
TOTAL			.00	.00	524.00	.00	457.20	.00	.00	.00		
MEAN			.00	.00	16.9	.00	14.7	.00	.00	.00		
MAX			.00	.00	47	.00	36	.00	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.0	.0	1040	.0	907	.0	.0	.0		

06144350 MIDDLE CREEK NEAR SASKATCHEWAN BOUNDARY

(International gaging station)

LOCATION.--Lat 49°25'30", long 110°03'08", in SW¼ sec.34, T.5, R.1 W., fourth meridian, in Alberta, Hydrologic Unit 10050007, on left bank 2 mi upstream from Middle Creek Reservoir, 2 mi west of Saskatchewan boundary, 18 mi northwest of Govenlock, Saskatchewan, and at mile 65.7.

DRAINAGE AREA.--118 mi^2.

PERIOD OF RECORD.--March 1963 to current season (seasonal records only). Prior to March 1982, published as "Middle Creek near Alberta boundary". June 1910 to April 1915, published as "at McKinnon's Ranch" and September 1949 to current season in reports of Department of the Environment, Canada.

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,381.13 ft above mean sea level (Geodetic Survey of Canada datum). Prior to Mar. 1, 1951, nonrecording gages, and Mar. 1, 1951, to July 5, 1961, water-stage recorder, at site 0.3 mi downstream at different datums.

REMARKS.--Estimated daily discharges: Feb. 1, 2, Mar. 4-16, 27-30, Nov. 26-31. Records good. Minor diversions for irrigation upstream from station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,980 ft^3/s, Apr. 15, 1952, gage height, 10.27 ft, site and datum then in use, from rating curve extended above 600 ft^3/s on basis of slope-area measurement of peak flow; no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, about 570 ft^3/s, Mar. 7, gage height, 8.28 ft (backwater from ice); maximum gage height, 8.47 ft, Mar. 7 (backwater from ice); minimum daily discharge, 0.14 ft^3/s, July 25.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1		e.60	.78	58	1.7	.92	.74	.49	.42	.39		
2		e.60	.78	102	1.6	.81	.74	.42	.35	.49		
3		.60	1.1	85	1.5	.78	.74	.42	.28	.53		
4		.57	e17	82	1.4	.78	.67	.35	.42	.46		
5		.57	e73	91	1.4	.78	.78	.32	.49	.42		
6		.57	e200	107	1.3	.78	.78	.35	.46	.57		
7		.57	e466	109	1.3	.71	.81	.39	.53	.57		
8		.60	e194	84	1.3	.74	.92	.32	.39	.53		
9		.60	e77	59	1.2	.85	.85	.35	.39	.49		
10		.60	e43	35	1.2	.85	.78	.32	.42	.57		
11		.71	e32	27	1.3	.71	.78	.25	.49	.60		
12		.99	e23	21	1.2	.74	.74	.25	.49	1.4		
13		1.2	e22	18	1.2	.71	.74	.28	.42	2.6		
14		1.2	e39	12	1.2	.67	.71	.71	.46	1.2		
15		1.5	e101	9.4	1.2	.71	.57	.85	.46	1.2		
16		1.0	e126	9.4	1.2	.74	.57	.49	.39	1.1		
17		1.4	75	9.5	1.2	.71	.60	.39	.57	.81		
18		1.8	57	11	1.2	.78	.85	.39	.46	.67		
19		1.6	60	12	1.2	.99	.99	.35	.53	.53		
20		1.4	55	8.8	1.1	1.3	.88	.32	.42	.78		
21		1.3	36	6.6	1.2	1.1	.78	.28	.42	.64		
22		1.2	27	4.8	1.2	.95	.81	.32	.60	.53		
23		1.1	17	3.8	1.2	.85	.60	.39	.49	.53		
24		.99	12	3.2	1.2	.81	.18	.99	.46	.57		
25		.95	12	2.9	1.3	.81	.14	1.0	.42	.74		
26		.92	29	2.6	1.3	.78	.42	.67	.49	e.60		
27		.81	e41	2.6	1.3	.74	.53	.53	.49	e.57		
28		.74	e23	2.3	1.2	.74	.60	.46	.42	e.57		
29		---	e15	2.0	1.1	.81	.67	.42	.60	e.53		
30		---	e12	1.9	1.1	.81	.92	.49	.49	e.53		
31		---	17	---	1.0	---	.67	.49	---	e.53		
TOTAL		26.69	1903.66	982.8	39.0	24.46	21.56	14.05	13.72	22.25		
MEAN		.95	61.4	32.8	1.26	.82	.70	.45	.46	.72		
MAX		1.8	466	109	1.7	1.3	.99	1.0	.60	2.6		
MIN		.57	.78	1.9	1.0	.67	.14	.25	.28	.39		
AC-FT		53	3780	1950	77	49	43	28	27	44		

e Estimated

MILK RIVER BASIN

06144395 MIDDLE CREEK BELOW MIDDLE CREEK RESERVOIR, NEAR GOVENLOCK, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°24'44", long 109°55'06", in SW¼ sec.25, T.5, R.30 W., third meridian, Hydrologic Unit 10050007, on right bank 9.1 mi downstream from Middle Creek Reservoir, 14 mi northwest of Govenlock, and at mile 57.6.

DRAINAGE AREA.--149 mi^2.

PERIOD OF RECORD.--April 1972 to current season (seasonal records only). July 1909 to May 1931, September 1935 to October 1936, and April 1972 to current season in reports of Department of the Environment, Canada. Published as "at Ross Ranch" 1909-20, "at Downes and Robert's Ranch" 1920-23, and "at Wright's Ranch" 1920-31, 1935-36. Discharge measurements only during 1928 season.

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,300 ft, from topographic map. Prior to April 1972, non-recording gages at two sites within 2 mi of present site, at different datums.

REMARKS.--Estimated daily discharges: Mar. 7-11. Records good. Flow completely regulated by Middle Creek Reservoir (station number 06144360). Many diversions for irrigation upstream from station. At high reservoir levels flow may be diverted to Lodge Creek through Middle Creek Reservoir. Diversions for irrigation of 920 acres between Middle Creek Reservoir and station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 77 ft^3/s, May 3, 1985; no flow at times most seasons.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	1.5	.00	.00	.00	.00	.00	.00		
2			.00	.53	.00	.00	.00	.00	.00	.00		
3			.00	.18	.00	.00	.00	.00	.00	.00		
4			.00	.11	.00	.00	.00	.00	.00	.00		
5			.00	.11	.00	.00	.00	.00	.00	.00		
6			.32	.07	.00	.00	.00	.00	.00	.00		
7			e36	.04	4.7	.00	.00	.00	.00	.00		
8			e12	.00	9.2	.00	.00	.00	.00	.00		
9			e2.8	.00	9.3	.00	.00	.00	.00	.00		
10			e1.2	.00	4.2	.00	.00	.00	.00	.00		
11			e.42	.00	5.9	.00	.00	.00	.00	.00		
12			.11	.00	7.8	.00	.00	.00	.00	.00		
13			.25	.00	5.8	.00	.00	.00	.00	.00		
14			3.3	.00	5.5	.00	.00	.00	.00	.00		
15			5.9	.00	4.9	.00	.00	.00	.00	.00		
16			2.5	.00	8.1	.00	.00	.00	.00	.00		
17			1.0	.00	2.6	.00	.00	.00	.00	.00		
18			.85	.00	1.2	.00	.00	.00	.00	.00		
19			.92	.00	1.2	.00	.00	.00	.00	.00		
20			.64	.00	.04	.00	.00	.00	.00	.00		
21			.64	.00	.00	.00	.00	.00	.00	.00		
22			.60	.00	.00	.00	.00	.00	.00	.00		
23			.60	.00	.00	.00	.00	.00	.00	.00		
24			.57	.00	.00	.00	.00	.00	.00	.00		
25			.46	.00	31	.00	.00	.00	.00	.00		
26			1.7	.00	37	.00	.00	.00	.00	.00		
27			2.0	.00	4.6	.00	.00	.00	.00	.00		
28			2.0	.00	.21	.00	.00	.00	.00	.00		
29			2.0	.00	.04	.00	.00	.00	.00	.00		
30			1.7	.00	.00	.00	.00	.00	.00	.00		
31			.74	---	.00	---	.00	.00	---	.00		
TOTAL			81.22	2.54	143.29	.00	.00	.00	.00	.00		
MEAN			2.62	.085	4.62	.00	.00	.00	.00	.00		
MAX			36	1.5	37	.00	.00	.00	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			161	5.0	284	.0	.0	.0	.0	.0		

e Estimated

MILK RIVER BASIN

06144440 MIDDLE CREEK NEAR GOVENLOCK, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°13'42", long 109°48'57", in NW¼ sec.23, T.3, R.29 W., third meridian, Hydrologic Unit 10050007, on left bank 43.9 mi downstream from Middle Creek Reservoir, 0.3 mi northwest of Govenlock, and at mile 22.8.

DRAINAGE AREA.--253 mi^2.

PERIOD OF RECORD.--February 1986 to current season (seasonal records only). March 1968 to current season in reports of Department of the Environment, Canada.

GAGE.--Water-stage recorder. Elevation of gage is 3,010 ft, from topographic map.

REMARKS.--Estimated daily discharges: Feb. 1 to Mar. 28 and Oct. 27-31. Records poor. Natural flow of stream is affected by Middle Creek Reservoir (station 06144360), several smaller reservoirs, diversions for irrigation, and return flow from irrigated areas. At high reservoir levels flow may be diverted to Lodge Creek through Middle Creek Reservoir.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,190 ft^3/s, Sept. 25, 1986, gage height, 9.81 ft; no flow at times each season.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, about 150 ft^3/s, Mar. 5, gage height, 5.53 ft (backwater from ice); no flow many days.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1		e.21	e1.1	7.8	1.3	3.2	.21	.18	.00	.04		
2		e.21	e.92	6.9	.92	2.0	.18	.28	.00	.07		
3		e.21	e.99	6.4	.78	2.2	.18	.35	.00	.14		
4		e.21	e18	6.7	.67	1.9	.14	.35	.00	.21		
5		e.25	e88	6.1	.57	1.7	.14	.35	.00	.25		
6		e.25	e78	5.2	.49	1.4	.07	.28	.00	.32		
7		e.25	e77	4.6	.42	1.1	.04	.25	.00	.35		
8		e.28	e30	3.6	.35	.99	.04	.25	.00	.32		
9		e.28	e18	3.3	.32	1.4	.00	.18	.00	.35		
10		e.35	e46	1.9	.25	3.7	.00	.14	.00	.46		
11		e.42	e37	1.5	.21	1.6	.00	.14	.00	.49		
12		e1.7	e23	1.3	.21	1.2	.00	.07	.00	.57		
13		e3.5	e18	1.1	4.3	.81	.00	.04	.00	.57		
14		e5.6	e28	1.8	4.0	.57	.00	.11	.00	.64		
15		e13	e17	12	2.6	.42	.00	.04	.00	.67		
16		e9.5	e17	9.6	4.2	.35	.00	.04	.00	.67		
17		e9.3	e23	11	4.7	.28	.00	.04	.00	.71		
18		e7.0	e17	6.3	4.5	.21	.00	.00	.00	.71		
19		e11	e9.5	4.4	4.3	.18	.00	.00	.00	.78		
20		e12	e17	3.2	5.7	.14	.00	.00	.00	.74		
21		e12	e6.1	2.8	4.9	.11	.00	.00	.00	.81		
22		e9.9	e9.5	2.6	3.6	.04	.00	.00	.00	.78		
23		e6.5	e10	2.4	2.8	.04	.00	.00	.00	.85		
24		e3.6	e7.6	2.4	2.1	.07	.00	.11	.00	.85		
25		e2.2	e7.1	2.4	1.9	.11	.00	.04	.00	.95		
26		e1.6	e9.3	2.2	1.8	.11	.04	.00	.00	.88		
27		e1.7	e7.8	2.1	1.3	.14	.04	.00	.00	.92		
28		e1.6	e4.6	2.0	12	.18	.11	.00	.00	.92		
29		---	4.3	1.9	13	.18	.07	.00	.00	.95		
30		---	7.2	1.8	7.6	.21	.07	.00	.00	.99		
31		---	8.8	---	5.2	---	.11	.00	---	.99		
TOTAL		114.62	646.81	127.3	96.99	26.54	1.44	3.24	.00	18.95		
MEAN		4.09	20.9	4.24	3.13	.88	.046	.10	.00	.61		
MAX		13	88	12	13	3.7	.21	.35	.00	.99		
MIN		.21	.92	1.1	.21	.04	.00	.00	.00	.04		
AC-FT		227	1280	252	192	53	2.9	6.4	.0	38		

e Estimated

MILK RIVER BASIN

06144450 MIDDLE CREEK ABOVE LODGE CREEK, NEAR GOVENLOCK, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°06'01", long 109°49'02", in NE¼ sec.4, T.2, R.29 W., third meridian, Hydrologic Unit 10050007, on left bank, 0.7 mi upstream from Lodge Creek, and 9 mi south of Govenlock.

DRAINAGE AREA.--276 mi^2.

PERIOD OF RECORD.--March 1962 to October 1966 and February 1986 to current season. (seasonal records only). March 1911 to May 1931 and March 1962 to current season in reports of Department of the Environment, Canada. Published as "at Hammond's Ranch" 1911-31.

GAGE.--Water-stage recorder. Elevation of gage is 2,830 ft, from topographic map. Prior to Mar. 1, 1962, nonrecording gage at site 1,000 ft downstream at different datum.

REMARKS.--Estimated daily discharges: Feb. 1 to Apr. 2. Records fair except those for estimated discharges, which are poor. Natural flow of stream affected by Middle Creek Reservoir (station 06144360), several smaller reservoirs, diversions for irrigation, and return flow from irrigated areas. At high reservoir levels flow may be diverted to Lodge Creek through Middle Creek Reservoir.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 738 ft^3/s, Sept. 26, 1986, gage height, 13.84 ft; no flow at times each season.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, about 130 ft^3/s, Mar. 6, gage height, 7.37 ft (backwater from ice); no flow many days.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1		e.21	e1.2	e9.1	1.4	.07	.00	.00	.00	.00		
2		e.21	e2.4	e6.9	1.2	.11	.00	.00	.00	.00		
3		e.21	e1.8	12	1.1	.14	.00	.00	.00	.00		
4		e.21	e3.4	10	.88	.07	.00	.00	.00	.00		
5		e.21	e7.4	8.0	.74	.07	.00	.00	.00	.00		
6		e.25	e93	7.1	.60	.04	.00	.00	.00	.00		
7		e.25	e78	6.5	.46	.04	.00	.00	.00	.00		
8		e.25	e57	6.0	.81	.35	.00	.00	.00	.00		
9		e.25	e33	4.0	.60	1.1	.00	.00	.00	.00		
10		e.28	e13	4.3	.42	2.2	.00	.00	.00	.00		
11		e.28	e53	3.7	.39	1.5	.00	.00	.00	.00		
12		e.28	e48	2.7	.35	1.1	.00	.00	.00	.00		
13		e.25	e36	1.8	.21	.53	.00	.00	.00	.00		
14		e.25	e33	1.5	.18	.18	.00	.00	.00	.00		
15		e.28	e42	2.5	.14	.07	.00	.00	.00	.00		
16		e12	e21	4.7	.11	.04	.00	.00	.00	.00		
17		e24	e5.4	3.4	.07	.00	.00	.00	.00	.00		
18		e19	e2.4	2.0	.07	.00	.00	.00	.00	.00		
19		e14	e3.2	1.8	.07	.00	.00	.00	.00	.00		
20		e11	e4.6	1.6	.07	.07	.00	.00	.00	.00		
21		e16	e4.9	2.7	.07	.07	.00	.00	.00	.00		
22		e19	e3.9	3.6	.07	.04	.00	.00	.00	.00		
23		e13	e7.8	3.4	.07	.04	.00	.00	.00	.00		
24		e9.5	e5.9	3.2	.07	.04	.00	.00	.00	.00		
25		e11	e6.2	2.8	.07	.00	.00	.00	.00	.00		
26		e6.5	e8.2	2.4	.07	.00	.00	.00	.00	.00		
27		e2.9	e6.8	2.3	4.5	.00	.00	.00	.00	.00		
28		e4.5	e7.9	2.1	2.5	.00	.00	.00	.00	.00		
29		---	e6.1	1.9	.71	.00	.00	.00	.00	.00		
30		---	e2.4	1.7	.32	.00	.00	.00	.00	.00		
31		---	e9.4	---	.14	---	.00	.00	---	.00		
TOTAL		166.07	608.3	125.7	18.46	7.87	.00	.00	.00	.00		
MEAN		5.93	19.6	4.19	.60	.26	.00	.00	.00	.00		
MAX		24	93	12	4.5	2.2	.00	.00	.00	.00		
MIN		.21	1.2	1.5	.07	.00	.00	.00	.00	.00		
AC-FT		329	1210	249	37	16	.0	.0	.0	.0		

e Estimated

06145500 LODGE CREEK BELOW MCRAE CREEK, AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°00'19", long 109°43'02", in SW¼ sec.5, T.1, R.28 W., third meridian, in Saskatchewan, Hydrologic Unit 10050007, on right bank 0.3 mi downstream from McRae Creek, 0.4 mi north of international boundary, 0.8 mi northeast of Willow Creek Port of Entry, 31 mi north of Havre, MT, and at mile 84.3.

DRAINAGE AREA.--825 mi^2.

PERIOD OF RECORD.--October 1951 to current season (seasonal records only). Prior to October 1951, records were collected on both McRae Coulee (1927-51) and Lodge Creek above McRae Coulee (1910-51). Summations are equivalent to records at this site. Prior to March 1965, published as "below McRae Coulee."

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,731.0 ft above mean sea level (International Boundary Survey datum).

REMARKS.--Estimated daily discharges: Mar. 6-14, Oct. 29-31. Records good except those for estimated daily discharges, which are poor. Natural flow affected by numerous storage reservoirs, diversions for irrigation of about 3,000 acres, and return flow from irrigation area. 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.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,890 ft^3/s, Sept. 25, 1986, gage height, 16.36 ft, from rating curve extended above 4,100 ft^3/s on basis of slope-area measurement of peak flow; no flow at times each season.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, about 1,240 ft^3/s, Mar. 7, gage height, 9.21 ft (backwater from ice); no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			24	56	15	3.8	.14	.00	.00	.00		
2			19	78	14	2.3	.11	.00	.00	5.7		
3			16	98	13	1.7	.07	.00	.00	38		
4			16	64	13	1.3	.07	.00	.00	39		
5			17	102	12	.99	.04	.00	.00	39		
6			e424	121	11	.78	.04	.00	.00	22		
7			e1130	126	11	.57	.04	.00	.00	8.3		
8			e1060	129	10	.46	.04	.00	.00	4.2		
9			e812	120	9.3	.42	.04	.00	.00	2.4		
10			e388	108	9.1	16	.04	.00	.00	1.6		
11			e213	82	8.6	2.4	.04	.00	.00	1.2		
12			e156	73	8.4	.99	.04	.00	.00	.95		
13			e131	56	8.2	.53	.04	.00	.00	.64		
14			e111	48	7.9	.42	.04	.00	.00	.49		
15			114	42	7.9	.71	.00	.00	.00	.42		
16			187	42	7.7	.64	.00	.00	.00	.42		
17			258	35	7.9	.42	.04	.00	.00	.35		
18			192	32	9.6	.35	.04	.00	.00	.28		
19			141	31	7.9	.49	.04	.00	.00	.25		
20			130	38	5.2	7.9	.04	.00	.00	.18		
21			124	28	4.2	11	.04	.00	.00	.18		
22			106	26	3.9	2.9	.04	.00	.00	.14		
23			89	27	3.5	1.0	.04	.00	.00	.14		
24			75	27	3.4	.64	.00	.04	.00	.14		
25			64	24	2.8	.57	.00	.04	.00	.11		
26			54	22	2.9	.49	.00	.04	.00	.11		
27			27	20	3.0	.39	.00	.04	.00	.11		
28			30	18	8.1	.28	.00	.00	.00	.11		
29			42	17	11	.21	.00	.00	.00	e.11		
30			55	16	8.4	.18	.00	.00	.00	e.11		
31			55	---	5.8	---	.00	.00	---	e.07		
TOTAL			6260	1706	253.7	60.83	1.07	.16	.00	166.71		
MEAN			202	56.9	8.18	2.03	.035	.005	.00	5.38		
MAX			1130	129	15	16	.14	.04	.00	39		
MIN			16	16	2.8	.18	.00	.00	.00	.00		
AC-FT			12420	3380	503	121	2.1	.3	.0	331		

e Estimated

MILK RIVER BASIN

06145500 LODGE CREEK BELOW MCRAE CREEK, AT INTERNATIONAL BOUNDARY--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1964, 1973, 1977-80, February to June 1987.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
FEB							
24...	0950	39	--	--	515	-6.0	0.0
MAR							
06...	1530	667	60	1	556	12.0	0.5
10...	1330	328	--	--	241	0.5	0.0
20...	1200	123	--	--	257	3.5	2.5
APR							
10...	1025	114	--	--	358	8.5	5.5
21...	0800	28	20	1	750	10.0	8.5
MAY							
21...	1200	4.1	--	--	929	11.0	11.5
JUN							
23...	0945	1.1	--	--	504	16.0	15.0
25...	1000	0.56	25	1	518	22.0	19.0

DATE	TIME	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
MAR											
06...	1530	7.60	190	71	47	17	43	1	6.7	116	160
APR											
21...	0800	7.90	240	96	58	24	58	2	5.6	148	220
JUN											
25...	1000	7.70	160	56	38	16	43	2	6.2	105	130

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P) (00666)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	BORON, DIS-SOLVED (UG/L AS B) (01020)
MAR											
06...	4.8	0.20	9.3	360	0.49	644	<0.100	0.150	1	<0.5	50
APR											
21...	5.6	0.20	7.9	470	0.64	35	<0.100	--	2	<0.5	50
JUN											
25...	4.9	0.20	5.8	310	0.42	0.46	<0.100	--	3	<0.5	40

DATE	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
MAR										
06...	1	<10	2	24	<5	83	<0.1	4	<1	15
APR										
21...	<1	<10	<1	46	9	100	<0.1	6	<1	8
JUN										
25...	<1	<10	3	95	6	5	<0.1	3	<1	11

RESERVOIRS IN LODGE CREEK BASIN IN SASKATCHEWAN

(International gaging stations)

06144260 ALTAWAN RESERVOIR.--Lat 49°10'00", long 109°55'00", in SW¼ sec.35, T.2, R.30 W., third meridian, Hydrologic Unit 10050007, at dam on Lodge Creek, 6.3 mi southwest of Govenlock, and at mile 113.5. DRAINAGE AREA, 373 mi^2. PERIOD OF RECORD, February 1966 to current season (seasonal records only). February 1960 to current season in reports of Department of the Environment, Canada. Water-stage recorder. Datum of gage is at mean sea level (Geodetic Survey of Canada datum). Prior to July 7, 1967, nonrecording gage in gate well read every ten days during irrigation season.

Reservoir is formed by earthfill dam with concrete spillway and control works as well as an emergency earthen spillway, completed in 1959. The following capacity figures are from revised capacity table put into use Jan. 1, 1983. Usable capacity is 5,440 acre-ft between elevation 2,918.0 ft, bottom of outlet works, and 2,952.0 ft, maximum design level. No dead storage. Water is used for irrigation. This is one of a number of stations which are maintained jointly by Canada and the United States. REVISED RECORDS, W 1983: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents, 8,300 acre-ft, Sept. 26, 1986, elevation, 2,958.10 ft; no contents Mar. 1, 1960, Oct. 6-31, 1984, Mar. 1-18, and Oct. 3-31, 1985.

EXTREMES FOR CURRENT SEASON: Maximum contents, 5,960 acre-ft, Apr. 6, elevation, 2,953.18 ft; minimum, 2,630 acre-ft, Oct. 27, elevation, 2,944.51 ft.

06144360 MIDDLE CREEK RESERVOIR.--Lat 49°24'22", long 109°59'02", in NE¼ sec.21, T.5, R.30 W., third meridian, Hydrologic Unit 10050007, at dam on Middle Creek, 0.7 mi east of Alberta-Saskatchewan boundary, 6.3 mi west of Battle Creek, 15 mi northwest of Govenlock, and at mile 66.7, revised. DRAINAGE AREA, 143 mi^2. PERIOD OF RECORD, February 1966 to current season. Occasional nonrecording gage readings in 1937 and 1939-51, March 1952 to current season in reports of Department of the Environment, Canada. Seasonal records only. Water-stage recorder. Datum of gage is at mean sea level (Geodetic Survey of Canada datum). Prior to July 7, 1967, nonrecording gage in gate well read every ten days during irrigation season.

Reservoir is formed by earthfill dam with concrete control works and sod spillway at elevation 3,383.0 ft on Middle Creek and at Ducks Unlimited outlet, constructed in 1937. Usable capacity, 13,080 acre-ft between elevation 3,368.60 ft, bottom of outlet works on Middle Creek, and 3,383.0 ft, natural spillway. Invert of outlet pipe at Ducks Unlimited outlet is at elevation 3,372.04 ft. No dead storage. Water is used for irrigation and to maintain levels of Orleans Lakes. Water may be released to Lodge Creek via Ducks Unlimited outlet, Simms Lake and Walburger Coulee. Spillway does not return water to Middle Creek, may return to Lodge Creek via Walburger Coulee. This is one of a number of stations which are maintained jointly by Canada and the United States. REVISED RECORDS, W 1984: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 23,080 acre-ft, Apr. 13, 1952, elevation, 3,387.92 ft; no contents at various times.

EXTREMES FOR CURRENT SEASON: Maximum contents, 10,900 acre-ft, Apr. 14, elevation, 3,380.90 ft; minimum, 4,850 acre-ft, Feb. 13, elevation, 3,375.40 ft.

Monthend contents, in acre-ft, October 1986 to October 1987

Date	Altawan Reservoir	Middle Creek Reservoir
Oct. 31	4,350	4,430
Nov. 30	-	-
Dec. 31	-	-
Jan. 31	-	-
Feb. 28	4,420	4,900
Mar. 31	5,320	9,160
Apr. 30	5,620	10,800
May 31	4,180	9,160
June 30	4,040	8,590
July 31	3,430	8,270
Aug. 31	3,370	7,940
Sept. 30	3,070	7,560
Oct. 31	2,640	7,290

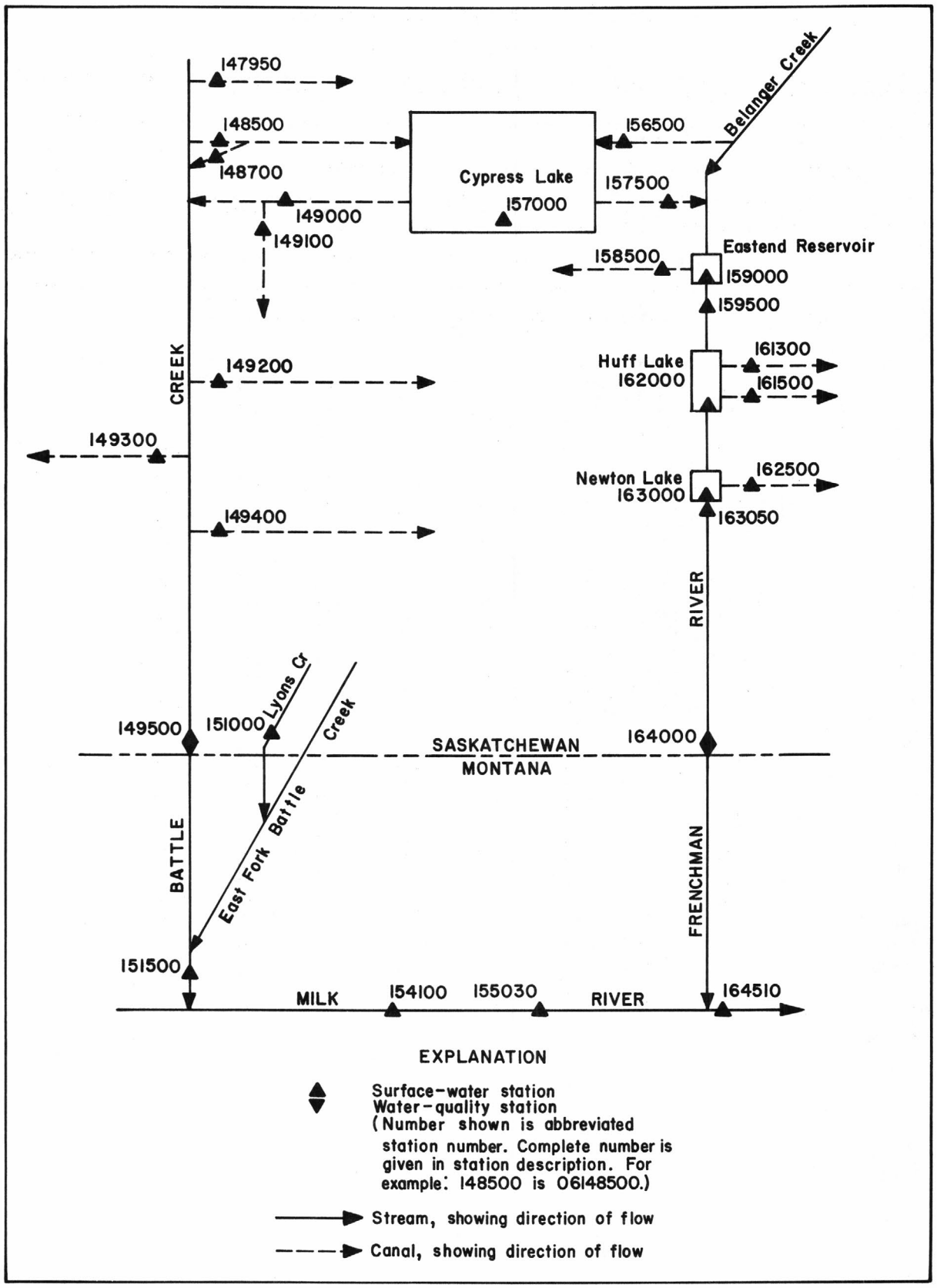


Figure 11.--Schematic diagram showing diversions and storage in Battle Creek and Frenchman River basins.

06147950 GAFF DITCH NEAR MERRYFLAT, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°26'05", long 109°50'07", in NW¼ sec.34, T.5, R.29 W., third meridian, Hydrologic Unit 10050008, on left bank about 200 ft downstream from headgates, and 4 mi southwest of Merryflat.

PERIOD OF RECORD.--March 1972 to current season (seasonal record only). March 1964 to current season in reports of Department of the Environment, Canada.

GAGE.--Water-stage recorder. Elevation of gage is 3,350 ft, from topographic map.

REMARKS.--Estimated daily discharges: Mar. 1 to Apr. 4, Oct. 27-31. Records fair except those for estimated daily discharges, which are poor. Water is diverted from left bank of Battle Creek in NW¼ sec.34, T.5. R.29 W., third meridian, for irrigation of about 890 acres along Battle Creek.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 42 ft^3/s, Apr. 22, 1971; no flows at times each season.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.00	e.18	23	.18	.18	.21	.07	.07		
2			e.00	e.18	22	.18	.18	.21	.07	.07		
3			e.00	e.18	22	.14	.18	.18	.07	.07		
4			e.00	e.25	22	.14	.18	.18	.07	.07		
5			e.07	.42	21	.07	.18	.14	.07	.07		
6			e.07	12	20	.07	.18	.14	.11	.07		
7			e.14	15	20	.11	.14	.14	.14	.21		
8			e.18	11	19	.11	.14	.14	.14	.35		
9			e.11	6.0	18	.11	.14	.14	.14	.32		
10			e.11	10	18	.14	.14	.11	.18	.35		
11			e.11	11	17	.14	.14	.14	.18	.35		
12			e.11	10	16	.14	.14	.14	.18	.35		
13			e.11	13	15	.18	.14	.14	.18	.32		
14			e.11	17	14	.21	.11	.14	.18	.32		
15			e.14	17	13	.21	.04	.18	.14	.32		
16			e.14	18	11	.25	.07	.18	.14	.32		
17			e.14	18	8.7	.25	.07	.18	.11	.28		
18			e.14	18	8.9	.21	.04	.21	.11	.28		
19			e.11	18	9.2	.21	.04	.21	.11	.25		
20			e.11	16	3.8	.18	.04	.07	.11	.25		
21			e.07	14	1.9	.14	.04	.07	.11	.25		
22			e.04	14	1.6	.14	.04	.07	.11	.25		
23			e.04	13	1.4	.11	.04	.04	.11	.28		
24			e.07	12	.92	.11	.21	.04	.07	.28		
25			e.07	13	1.2	.11	.25	.07	.07	.25		
26			e.11	16	1.3	.11	.21	.11	.07	.28		
27			e.11	16	1.2	.11	.21	.07	.07	e.28		
28			e.11	15	1.2	.11	.21	.07	.07	e.28		
29			e.11	16	.81	.14	.21	.07	.07	e.28		
30			e.00	21	.28	.14	.21	.07	.07	e.28		
31			e.14	---	.21	---	.21	.07	---	e.28		
TOTAL			2.77	361.21	333.62	4.45	4.31	3.93	3.32	7.68		
MEAN			.089	12.0	10.8	.15	.14	.13	.11	.25		
MAX			.18	21	23	.25	.25	.21	.18	.35		
MIN			.00	.18	.21	.07	.04	.04	.07	.07		
AC-FT			5.5	716	662	8.8	8.5	7.8	6.6	15		

e Estimated

06148500 CYPRESS LAKE WEST INFLOW CANAL NEAR WEST PLAINS, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°28'18", long 109°37'08", in SE¼ sec.18, T.6, R.27 W., third meridian, Hydrologic Unit 10050008, on left bank 2.5 mi downstream from canal headgates, 5.5 mi northeast of West Plains, and 13 mi northwest of Consul.

PERIOD OF RECORD.--March 1939 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Elevation of gage is 3,210 ft, from topographic map. Prior to Oct. 16, 1956, at site 2.3 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Feb. 1 to Apr. 5. Records fair except those for estimated daily discharges, which are poor. Canal diverts water from Battle Creek in NW¼ sec.1, T.6, R.28 W., third meridian, for storage in Cypress Lake. Part or all of flow may be returned to Battle Creek via wasteway and drain canal 0.4 mi downstream.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 884 ft^3/s, Apr. 27, 1965; no flow at times each season.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1		e.00	e28	e126	17	.00	15	.00	9.0	.00		
2		e.00	e26	e114	.25	.00	16	.00	8.7	.00		
3		e.00	e25	e79	.14	.00	16	.00	8.2	.00		
4		e.00	e39	e60	.11	.00	3.8	.53	8.1	.00		
5		e.00	e139	e126	.07	.00	.14	12	8.7	.00		
6		e.00	e183	238	.11	.00	5.9	12	9.0	.00		
7		e.00	e174	211	.11	.00	6.9	12	8.3	.00		
8		e.00	e209	167	.04	.00	7.1	12	8.9	.00		
9		e.00	e236	136	.04	.00	7.4	12	8.7	.00		
10		e.00	e107	118	.00	.00	7.6	12	8.4	.00		
11		e.00	e73	95	.00	.00	7.7	9.3	8.8	.00		
12		e15	e71	103	.00	.00	8.3	.11	9.0	.00		
13		e36	e65	99	.00	.00	8.8	.00	8.6	.00		
14		e32	e83	81	.00	.00	7.0	.00	5.7	.00		
15		e26	e85	66	.00	.00	.04	.00	.00	.00		
16		e31	e94	65	.00	.00	.00	.00	.00	.00		
17		e36	e95	67	.00	.00	.00	.00	.00	.00		
18		e35	e83	70	.00	.00	.00	.00	.00	.00		
19		e34	e93	68	.00	8.5	.00	.00	.00	.00		
20		e33	e83	62	.00	4.6	.00	.00	.00	.00		
21		e32	e79	57	.00	5.0	.00	.00	.00	.00		
22		e30	e92	53	.00	7.8	.00	.00	.00	.00		
23		e31	e72	31	.00	13	.00	.00	.00	.00		
24		e30	e75	8.6	.00	14	.00	.00	.00	.00		
25		e29	e70	25	.00	14	.00	.28	.00	.00		
26		e28	e75	25	.00	7.3	.00	18	.00	.00		
27		e29	e83	25	.00	.39	.00	24	.00	.00		
28		e29	e62	26	.00	.60	.00	30	.00	.00		
29		---	e57	26	.00	1.1	.00	23	.00	.00		
30		---	e61	26	.00	11	.00	22	.00	.00		
31		---	e91	---	.00	---	.00	9.4	---	.00		
TOTAL		516.00	2808	2453.6	17.87	87.29	117.68	208.62	118.10	.00		
MEAN		18.4	90.6	81.8	.58	2.91	3.80	6.73	3.94	.00		
MAX		36	236	238	17	14	16	30	9.0	.00		
MIN		.00	25	8.6	.00	.00	.00	.00	.00	.00		
AC-FT		1020	5570	4870	35	173	233	414	234	.0		

e Estimated

06148700 CYPRESS LAKE WEST INFLOW CANAL DRAIN NEAR OXARAT, SASKATCHEWAN

(International gaging station)

LOCATION.-Lat 49°28'25", long 109°36'38", in NW¼ sec.17, T.6, R.27 W., third meridian, Hydrologic Unit 10050008, on left bank about 500 ft downstream from drain gate on Cypress Lake west inflow canal, 0.5 mi upstream from Battle Creek, and 4 mi northwest of Oxarat.

PERIOD OF RECORD.--March 1963 to current season (seasonal records only). March 1955 to current season in reports of Department of the Environment, Canada.

GAGE.--Water-stage recorder. Elevation of gage is 3,200 ft, from topographic map.

REMARKS.--Estimated daily discharges: Feb. 1 to Apr. 7. Records poor. Drain used as an emergency bypass to return diverted water to Battle Creek. It may also be used to return stored water from Cypress Lake when lake stage is high.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 450 ft^3/s, Apr. 20, 1955; no flow at times each season.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1		e.00	e19	e.42	.04	.00	.11	.04	.11	.00		
2		e.00	e21	e.21	.07	.00	.11	.04	.11	.00		
3		e.00	e22	e.25	.04	.00	.11	.00	.11	.00		
4		e.00	e26	e.18	.04	.00	.11	.00	.07	.00		
5		e.00	e35	e.25	.04	.00	.11	.18	.07	.00		
6		e.00	e23	e.25	.04	.00	.18	.21	.07	.00		
7		e.00	e8.1	e.11	.04	.00	.14	.18	.07	.00		
8		e.00	e2.3	.04	.04	.00	.14	.18	.07	.00		
9		e.00	e3.1	.04	.04	.00	.11	.14	.07	.00		
10		e.00	e2.5	.04	.04	.00	.11	.14	.07	.00		
11		e.00	e1.4	.04	.04	.00	.11	.14	.07	.00		
12		e2.9	e1.4	.04	.04	.00	.11	.11	.07	.00		
13		e9.9	e1.3	.04	.04	.00	.11	.07	.07	.00		
14		e10	e1.4	.04	.04	.00	.07	.07	.07	.00		
15		e10	e1.3	.04	.04	.00	.07	.07	.07	.00		
16		e13	e1.2	.04	.04	.00	.07	.04	.07	.00		
17		e16	e1.1	.04	.04	.00	.07	.04	.07	.00		
18		e18	e.71	.04	.04	.00	.07	.04	.07	.00		
19		e19	e.67	.04	.00	.04	.04	.04	.07	.00		
20		e19	e.42	.04	.00	.04	.04	.04	.04	.00		
21		e19	e.49	.04	.00	.04	.04	.04	.04	.00		
22		e19	e.64	.04	.00	.04	.04	.04	.07	.00		
23		e18	e.78	.04	.00	.04	.04	.04	.07	.00		
24		e18	e.88	.04	.00	.04	.04	.07	.04	.00		
25		e17	e1.3	.04	.00	.04	.04	.07	.04	.00		
26		e18	e1.4	.04	.00	.07	.04	.11	.04	.00		
27		e18	e1.3	.04	.00	.07	.04	.11	.04	.00		
28		e18	e1.3	.04	.00	.07	.04	.11	.00	.00		
29		---	e1.3	.04	.00	.11	.04	.11	.00	.00		
30		---	e1.4	.04	.00	.11	.04	.11	.00	.00		
31		---	e1.4	---	.00	---	.04	.11	---	.00		
TOTAL		262.80	185.09	2.59	.75	.71	2.43	2.69	1.83	.00		
MEAN		9.39	5.97	.086	.024	.024	.078	.087	.061	.00		
MAX		19	35	.42	.07	.11	.18	.21	.11	.00		
MIN		.00	.42	.04	.00	.00	.04	.00	.00	.00		
AC-FT		521	367	5.1	1.5	1.4	4.8	5.3	3.6	.0		

e Estimated

06149000 CYPRESS LAKE WEST OUTFLOW CANAL NEAR WEST PLAINS, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°28'14", long 109°35'18", in SW¼ sec.16, T.6, R.27 W., third meridian, Hydrologic Unit 10050008, on left bank 1.1 mi downstream from Cypress Lake West Dam, 6 mi northeast of West Plains, and 13 mi north of Consul.

PERIOD OF RECORD.--March 1940 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Elevation of gage is 3,180 ft, from topographic map. Prior to Sept. 18, 1952, at site 1 mi upstream and 300 ft downstream from Cypress Lake West Dam at different datum.

REMARKS.--Estimated daily discharges: Feb. 1 to Apr. 7, Oct. 27-31. Records fair except those for estimated daily discharges, which are poor. Canal diverts water from Cypress Lake in NW¼ sec.15, T.6, R.27 W., third meridian, for irrigation of 5,500 acres in Battle Creek basin in Saskatchewan. Water may be delivered to Battle Creek or diverted into Vidora Ditch at gate structure near lower end of canal.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 304 ft^3/s, May 4, 1951; no flow at times each season.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1		e.00	e.00	e.39	16	.18	.07	.04	.04	.04		
2		e.00	e.00	e1.9	16	3.6	.07	.00	.00	.04		
3		e.00	e.00	e4.4	16	5.2	.04	.04	.00	.04		
4		e.00	e.00	e14	15	.25	.28	.04	.00	.00		
5		e.00	e.00	e20	9.1	.21	7.9	.07	.00	.00		
6		e.00	e.00	e22	.21	.14	10	.07	.04	.00		
7		e.00	e5.6	e20	.21	.14	9.8	.07	.07	.00		
8		e.00	e14	15	.18	15	9.5	.07	.04	.04		
9		e.00	e13	14	23	45	8.0	.07	.04	.04		
10		e.00	e8.1	13	42	46	5.7	.04	.04	.04		
11		e.00	e.88	8.1	30	46	5.5	.00	.04	.04		
12		e.00	e.18	.11	15	47	3.5	.00	.04	.04		
13		e.00	e7.1	.07	14	26	2.4	.00	.04	.04		
14		e.00	e8.4	.07	34	15	2.2	.18	.00	.00		
15		e.00	e11	.04	75	8.0	2.1	.11	.04	.04		
16		e.00	e4.9	.04	90	.14	1.9	.04	.00	.00		
17		e.00	e.07	.07	83	.07	1.3	.07	.04	.04		
18		e.00	e.25	.07	155	.07	.71	.04	.07	.04		
19		e.00	e.18	.07	191	.07	.11	.04	.07	.04		
20		e.00	e.25	.07	177	.11	.00	.00	.04	.00		
21		e.00	e.00	3.8	152	.04	.00	.00	.04	.04		
22		e.00	e1.0	8.4	126	.04	.04	.00	.04	.04		
23		e.00	e.53	10	134	.00	.04	.00	.04	.04		
24		e.00	e.57	12	129	.00	.04	.18	.00	.00		
25		e.00	e.60	18	115	.00	.04	.07	.00	.00		
26		e.00	e.49	25	121	.00	.25	.04	.04	.04		
27		e.00	e1.4	22	84	.00	1.7	.04	.04	e.04		
28		e.00	e.74	18	46	.04	.85	.04	.04	e.04		
29		---	e2.1	16	11	.04	.07	.04	.04	e.04		
30		---	e1.9	16	.32	.04	.04	.04	.04	e.04		
31		---	e2.0	---	.28	---	.04	.04	---	e.04		
TOTAL		.00	85.24	282.60	1920.30	258.38	74.19	1.48	.97	.88		
MEAN		.00	2.75	9.42	61.9	8.61	2.39	.048	.032	.028		
MAX		.00	14	25	191	47	10	.18	.07	.04		
MIN		.00	.00	.04	.18	.00	.00	.00	.00	.00		
AC-FT		.0	169	561	3810	512	147	2.9	1.9	1.7		

e Estimated

06149100 VIDORA DITCH NEAR CONSUL, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°27'27", long 109°35'30", in SW¼ sec.9, T.6, R.27 W., third meridian, Hydrologic Unit 10050008, on left bank 0.5 mi downstream from headgate near lower end of Cypress Lake west outflow canal, 12 mi north of Consul.

PERIOD OF RECORD.--March 1963 to current season (seasonal records only). March 1952 to current season in reports of Department of the Environment, Canada.

GAGE.--Water-stage recorder. Elevation of gage is 3,200 ft, from topographic map. Prior to Aug. 1, 1963, at datum 1.0 ft higher.

REMARKS.--No estimated daily discharges this year. Records fair. Canal diverts water from Cypress Lake west outflow canal in NE¼ sec.8, T.6, R.27 W., third meridian, for irrigation of about 2,140 acres in the Battle Creek basin. Water may be delivered either to this canal or returned to Battle Creek from Cypress Lake.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 97 ft^3/s, June 12, 13, 1975; no flow at times each season.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	.11	.00	.00	.00	.00		
2			.00	.00	.00	.07	.00	.00	.00	.00		
3			.00	.00	.00	.00	.00	.00	.00	.00		
4			.00	.00	.00	.00	.00	.00	.00	.00		
5			.00	.00	.00	.00	.00	.00	.00	.00		
6			.00	.00	.00	.00	.00	.00	.00	.00		
7			.00	.00	.00	.00	.00	.00	.00	.00		
8			.00	.00	.00	18	.00	.00	.00	.00		
9			.00	.00	.00	37	.00	.00	.00	.00		
10			.00	.00	.00	38	.00	.00	.00	.00		
11			.00	.00	.00	39	.00	.00	.00	.00		
12			.00	.00	.00	40	.00	.00	.00	.00		
13			.00	.00	.00	25	.00	.00	.00	.00		
14			.00	.00	13	15	.00	.00	.00	.00		
15			.00	.00	47	8.9	.00	.00	.00	.00		
16			.00	.00	56	.00	.00	.00	.00	.00		
17			.00	.00	55	.00	.00	.00	.00	.00		
18			.00	.00	54	.00	.00	.00	.00	.00		
19			.00	.00	53	.00	.00	.00	.00	.00		
20			.00	.00	55	.00	.00	.00	.00	.00		
21			.00	.00	60	.00	.00	.00	.00	.00		
22			.00	.00	57	.00	.00	.00	.00	.00		
23			.00	.00	66	.00	.00	.00	.00	.00		
24			.00	.00	65	.00	.00	.00	.00	.00		
25			.00	.00	61	.00	.00	.00	.00	.00		
26			.00	.00	65	.00	.00	.00	.00	.00		
27			.00	.00	57	.00	.00	.00	.00	.00		
28			.00	.00	24	.00	.00	.00	.00	.00		
29			.00	.00	.35	.00	.00	.00	.00	.00		
30			.00	.00	.18	.00	.00	.00	.00	.00		
31			.00	---	.14	---	.00	.00	---	.00		
TOTAL			.00	.00	788.67	221.08	.00	.00	.00	.00		
MEAN			.00	.00	25.4	7.37	.00	.00	.00	.00		
MAX			.00	.00	66	40	.00	.00	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.0	.0	1560	439	.0	.0	.0	.0		

06149200 RICHARDSON DITCH NEAR CONSUL, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°21'50", long 109°32'12", near center of south line of sec.11, T.5, R.27 W., third meridian, Hydrologic Unit 10050008, on left bank 420 ft downstream from headgate, 4.8 mi north of Consul.

PERIOD OF RECORD.--March 1963 to current season (seasonal records only). 1910-12, 1914, 1916-20, 1922-33, 1935, July 1946 to current season in reports of Department of the Environment, Canada. Estimates of seasonal diversion only in most seasons prior to 1946.

GAGE.--Water-stage recorder. Prior to June 26, 1949, nonrecording gages at different sites and datums. June 26, 1949, to Aug. 28, 1963, water-stage recorder at present site at datum 1.00 ft higher.

REMARKS.--No estimated daily discharges this year. Records good. Ditch diverts from left bank of Battle Creek in SW¼ sec.11, T.5, R.27 W., third meridian, for irrigation of about 1,330 acres along Battle Creek.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 72 ft^3/s, June 15, 1974; no flow at times each season.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	.00	.00	.00	.00	.00		
2			.00	.00	.00	.00	.00	.00	.00	.00		
3			.00	.00	.00	.00	.00	.00	.00	.00		
4			.00	.00	.00	.00	.00	.00	.00	.00		
5			.00	.00	.00	.00	.00	.00	.00	.00		
6			.00	.00	.00	.00	.00	.00	.00	.00		
7			.00	.00	.00	.00	.00	.00	.00	.00		
8			.00	.00	.00	.00	.00	.00	.00	.00		
9			.00	.00	.00	.00	.00	.00	.00	.00		
10			.00	.00	.00	.00	.00	.00	.00	.00		
11			.00	.00	.00	.00	.00	.00	.00	.00		
12			.00	.00	.00	.00	.00	.00	.00	.00		
13			.00	.00	.00	.00	.00	.00	.00	.00		
14			.00	.00	.00	.00	.00	.00	.00	.00		
15			.00	.00	.00	.00	.00	.00	.00	.00		
16			.00	.00	.00	.00	.00	.00	.00	.00		
17			.00	.00	.00	.00	.00	.00	.00	.00		
18			.00	.00	3.2	.00	.00	.00	.00	.00		
19			.00	.00	34	.00	.00	.00	.00	.00		
20			.00	.00	48	.00	.00	.00	.00	.00		
21			.00	.00	52	.00	.00	.00	.00	.00		
22			.00	.00	51	.00	.00	.00	.00	.00		
23			.00	.00	41	.00	.00	.00	.00	.00		
24			.00	.00	41	.00	.00	.00	.00	.00		
25			.00	.00	39	.00	.00	.00	.00	.00		
26			.00	.00	38	.00	.00	.00	.00	.00		
27			.00	.00	38	.00	.00	.00	.00	.00		
28			.00	.00	32	.00	.00	.00	.00	.00		
29			.00	.00	16	.00	.00	.00	.00	.00		
30			.00	.00	5.8	.00	.00	.00	.00	.00		
31			.00	---	1.1	---	.00	.00	---	.00		
TOTAL			.00	.00	440.10	.00	.00	.00	.00	.00		
MEAN			.00	.00	14.2	.00	.00	.00	.00	.00		
MAX			.00	.00	52	.00	.00	.00	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.0	.0	873	.0	.0	.0	.0	.0		

06149300 MCKINNON DITCH NEAR CONSUL, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°20'00", long 109°29'40", in NW¼ sec.30, T.4, R.26 W., third meridian, Hydrologic Unit 10050008, on right bank 1.0 mi downstream from headgate on Battle Creek, and 2.7 mi northeast of Consul.

PERIOD OF RECORD.--March 1963 to current season (seasonal records only). 1911-26, 1929-31, and March 1938 to current season in reports of Department of the Environment, Canada. Estimates of seasonal diversions only in many years prior to 1947.

GAGE.--Water-stage recorder. Prior to September 1949, nonrecording gages at various sites and datums. Sept. 4, 1949, to Aug. 29, 1963, water-stage recorder at present site at datum 1.00 ft higher.

REMARKS.--No estimated daily discharges this year. Records good. Ditch diverts from right bank of Battle Creek in NE¼ sec.30, T.4, R.26 W., third meridian, for irrigation of about 1,320 acres along Battle Creek.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 68 ft^3/s, June 18, 1975; no flow most of each season.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	10	.00	.00	.00	.00		
2			.00	.00	.00	3.8	.00	.00	.00	.00		
3			.00	.00	.00	.04	.00	.00	.00	.00		
4			.00	.00	.00	.00	.00	.00	.00	.00		
5			.00	.00	.00	.00	.00	.00	.00	.00		
6			.00	.00	.00	.00	.00	.00	.00	.00		
7			.00	.00	.00	.00	.00	.00	.00	.00		
8			.00	.00	.00	.00	.00	.00	.00	.00		
9			.00	.00	.00	.00	.00	.00	.00	.00		
10			.00	.00	.00	.00	.00	.00	.00	.00		
11			.00	.00	.00	.00	.00	.00	.00	.00		
12			.00	.00	.00	.00	.00	.00	.00	.00		
13			.00	.00	.00	.00	.00	.00	.00	.00		
14			.00	.00	.00	.00	.00	.00	.00	.00		
15			.00	.00	.00	.00	.00	.00	.00	.00		
16			.00	.00	.00	.00	.00	.00	.00	.00		
17			.00	.00	.00	.00	.00	.00	.00	.00		
18			.00	.00	6.4	.00	.00	.00	.00	.00		
19			.00	.00	34	.00	.00	.00	.00	.00		
20			.00	.00	49	.00	.00	.00	.00	.00		
21			.00	.00	53	.00	.00	.00	.00	.00		
22			.00	.00	55	.00	.00	.00	.00	.00		
23			.00	.00	55	.00	.00	.00	.00	.00		
24			.00	.00	55	.00	.00	.00	.00	.00		
25			.00	.00	55	.00	.00	.00	.00	.00		
26			.00	.00	51	.00	.00	.00	.00	.00		
27			.00	.00	42	.00	.00	.00	.00	.00		
28			.00	.00	17	.00	.00	.00	.00	.00		
29			.00	.00	10	.00	.00	.00	.00	.00		
30			.00	.00	10	.00	.00	.00	.00	.00		
31			.00	---	11	---	.00	.00	---	.00		
TOTAL			.00	.00	503.40	13.84	.00	.00	.00	.00		
MEAN			.00	.00	16.2	.46	.00	.00	.00	.00		
MAX			.00	.00	55	10	.00	.00	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.0	.0	998	27	.0	.0	.0	.0		

06149400 NASHLYN CANAL NEAR CONSUL, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°13'57", long 109°33'27", in NE¼ sec.22, T.3, T.27 W., third meridian, Hydrologic Unit 10050008, on left bank 0.8 mi downstream from headgate on Battle Creek, and 5.9 mi south of Consul.

PERIOD OF RECORD.--March 1963 to current season (seasonal records only). 1912, 1914-35, 1938 to current season in reports of Department of the Environment, Canada. Prior to March 1950, estimates of seasonal diversions only in many seasons. Prior to Mar. 1, 1971, published as "Stirling and Nash Ditch".

GAGE.--Water-stage recorder. Prior to Sept. 21, 1949, water-stage recorder at present site or nonrecording gages at site 0.5 mi downstream at different datums.

REMARKS.--No estimated daily discharges this year. Records good. Ditch diverts water from left bank of Battle Creek in SW¼ sec.27, T.3, R.27 W., third meridian, for irrigation of about 1,880 acres along Battle Creek.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 85 ft^3/s, Apr. 14, 1952; no flow at times each season.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	15	.00	.07	.00	.00	.00	.00		
2			.00	5.9	.00	.00	.00	.00	.00	.00		
3			.00	11	.00	.00	.00	.00	.00	.00		
4			.00	24	.00	.00	.00	.00	.00	.00		
5			12	23	.00	.00	.00	.00	.00	.00		
6			41	23	.00	.00	.00	.00	.00	.00		
7			47	24	.00	.00	.00	.00	.00	.00		
8			46	26	.00	.00	.00	.00	.00	.00		
9			41	17	.00	.00	.00	.00	.00	.00		
10			35	3.3	.00	.00	.00	.00	.00	.00		
11			29	1.9	.00	.00	.00	.00	.00	.00		
12			28	1.7	.00	.00	.00	.00	.00	.00		
13			29	1.6	.00	.00	.00	.00	.00	.00		
14			29	1.6	.00	.00	.00	.00	.00	.00		
15			31	1.6	.00	.00	.00	.00	.00	.00		
16			32	1.4	.00	.00	.00	.00	.00	.00		
17			34	1.4	.00	.00	.00	.00	.00	.00		
18			36	1.5	.00	.00	.00	.00	.00	.00		
19			36	1.5	5.4	.00	.00	.00	.00	.00		
20			36	1.4	23	.00	.00	.00	.00	.00		
21			34	1.4	26	.00	.00	.00	.00	.00		
22			36	1.4	37	.00	.00	.00	.00	.00		
23			35	1.3	38	.00	.00	.00	.00	.00		
24			34	.25	38	.00	.00	.00	.00	.00		
25			30	.00	38	.00	.00	.00	.00	.00		
26			20	.00	30	.00	.00	.00	.00	.00		
27			20	.00	10	.00	.00	.00	.00	.00		
28			16	.00	1.5	.00	.00	.00	.00	.00		
29			15	.00	.57	.00	.00	.00	.00	.00		
30			14	.00	.32	.00	.00	.00	.00	.00		
31			13	---	.21	---	.00	.00	---	.00		
TOTAL			809.00	192.15	248.00	.07	.00	.00	.00	.00		
MEAN			26.1	6.40	8.00	.002	.00	.00	.00	.00		
MAX			47	26	38	.07	.00	.00	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			1600	381	492	.1	.0	.0	.0	.0		

06149500 BATTLE CREEK AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°00'07", long 109°25'18", in SE¼ sec.4, T.1, R.26 W., third meridian, Hydrologic Unit 10050008, on left bank 600 ft north of international boundary, in Saskatchewan, 8 mi upstream from Woodpile Coulee, 30 mi north of Chinook, MT, and at mile 69.8.

DRAINAGE AREA.--997 mi^2, of which 378 mi^2 is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1917 to current season (seasonal records only most seasons). Monthly discharge only for March 1918 and March 1928, published in WSP 1309.

REVISED RECORDS.--WSP 1389: 1935(M), 1936, 1937-38(M). WSP 1729: 1924, 1926, 1932 (montlhy discharge only). W 1983: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,729.8 ft above mean sea level (International Boundary Survey datum, adjustment of 1928).

REMARKS.--Estimated daily discharge: Mar. 1 to Apr. 2, Oct. 29, 31. Records good except those for estimated daily discharges, which are poor. Natural flow of stream affected by storage reservoirs, diversions for irrigation of about 9,500 acres, and return flow from irrigated areas. Water may be diverted into or from Frenchman River basin through Cypress Lake. 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.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,780 ft^3/s, Sept. 25, 1986, gage height, 11.57 ft, from rating curve extended above 4,400 ft^3/s on basis of slope-area measurement of peak flow; no flow at times most seasons.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, about 360 ft^3/s, Mar. 7, gage height, 6.15 ft (backwater from ice); minimum daily, 0.04 ft^3/s, July 17.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e50	e119	54	48	3.3	38	14	6.6		
2			e48	e101	50	30	3.1	20	8.3	6.6		
3			e42	127	47	35	2.8	22	5.4	6.5		
4			e32	119	45	36	2.2	31	4.4	10		
5			e34	86	55	31	1.9	31	3.5	13		
6			e89	94	56	33	1.5	29	2.3	12		
7			e283	111	54	29	1.2	23	2.3	11		
8			e158	118	48	23	.99	17	1.6	10		
9			e121	111	35	21	.74	12	1.4	9.8		
10			e125	78	30	20	.64	9.5	1.7	9.1		
11			e107	73	27	18	.53	6.7	2.3	9.3		
12			e98	63	32	15	.46	5.5	2.3	10		
13			e117	65	60	14	.35	4.3	1.9	10		
14			e81	66	55	15	.25	3.2	1.6	9.4		
15			e41	60	40	17	.14	2.8	1.4	11		
16			e22	49	36	24	.07	2.8	1.1	12		
17			e27	43	35	22	.04	2.7	1.8	12		
18			e63	40	28	18	3.1	2.1	1.7	12		
19			e58	37	28	16	4.8	1.4	1.6	12		
20			e46	37	29	19	3.7	.95	1.6	14		
21			e32	34	32	14	2.9	.78	1.5	14		
22			e41	34	42	12	2.6	8.8	1.2	14		
23			e48	34	32	12	2.5	14	2.2	14		
24			e37	34	34	11	1.9	18	6.3	16		
25			e75	33	35	9.4	1.7	20	5.7	15		
26			e77	42	28	8.0	3.4	18	6.6	15		
27			e70	73	19	6.7	6.1	16	7.0	14		
28			e98	71	43	5.8	9.1	15	7.1	15		
29			e85	70	72	4.7	9.7	15	6.6	e14		
30			e97	62	90	3.9	34	13	6.7	14		
31			e130	---	82	---	96	18	---	e14		
TOTAL			2432	2084	1353	571.5	201.71	421.53	113.1	365.3		
MEAN			78.5	69.5	43.6	19.0	6.51	13.6	3.77	11.8		
MAX			283	127	90	48	96	38	14	16		
MIN			22	33	19	3.9	.04	.78	1.1	6.5		
AC-FT			4820	4130	2680	1130	400	836	224	725		

e Estimated

06149500 BATTLE CREEK AT INTERNATIONAL BOUNDARY--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1964, 1972-74, February to September 1987.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
FEB							
24...	1410	56	--	--	592	-5.0	0.0
MAR							
08...	1600	157	100	3	211	-4.0	0.0
10...	1015	93	--	--	236	0.0	0.0
25...	1310	89	--	--	320	9.0	0.5
APR							
22...	1515	33	10	1	617	17.0	12.0
JUN							
24...	1440	11	15	1	630	23.0	19.0
JUL							
23...	1600	2.5	--	--	718	27.0	20.0
AUG							
19...	1210	1.5	--	--	485	20.0	17.0
SEP							
29...	1450	6.9	--	--	656	21.0	13.5

DATE	TIME	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
MAR											
08...	1600	7.60	180	19	45	17	23	0.8	6.4	163	62
APR											
22...	1515	8.00	210	31	49	22	51	2	7.7	182	110
JUN											
24...	1440	9.30	180	19	20	32	67	2	4.8	163	170

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P) (00666)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	BORON, DIS-SOLVED (UG/L AS B) (01020)
MAR											
08...	3.5	0.10	10	270	0.36	112	<0.100	0.030	1	<0.5	30
APR											
22...	6.6	0.20	5.9	360	0.49	32	0.180	--	3	<0.5	40
JUN											
24...	5.1	0.30	1.0	400	0.54	12	<0.100	--	7	<0.5	60

DATE	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
MAR										
08...	1	<10	1	150	<5	95	<0.1	5	<1	11
APR										
22...	<1	<10	<1	43	<5	12	<0.1	2	<1	4
JUN										
24...	<1	<10	<1	47	13	6	0.1	<1	<1	6

06151000 LYONS CREEK AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°00'17", long 109°13'48", in SW¼ sec.1, T.1, R.25 W., third meridian, Hydrologic Unit 10050008, on right bank 0.3 mi north of international boundary, 8 mi south of Arena, Saskatchewan, 28 mi north of Chinook, MT, and at mile 20.5.

DRAINAGE AREA.--66.7 mi^2.

PERIOD OF RECORD.--March 1927 to current season (seasonal records only in most seasons). Monthly discharge only for February, March 1934, published in WSP 1309. Prior to March 1962, published as Lyons Coulee at international boundary.

REVISED RECORDS.--WSP 1389: 1929(M), 1936, 1937(M), 1939, 1940-41(M), 1946(M). WSP 1629: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,800 ft, from international boundary map. Prior to Oct. 19, 1935, nonrecording gages at site 0.5 mi south of international boundary at different datum. Oct. 19, 1935, to Oct. 31, 1940, nonrecording gage at site 1.2 mi north of international boundary at different datum. Nov. 1, 1940, to Aug. 4, 1958, nonrecording gages at sites within 300 ft of present site at present datum.

REMARKS.--Estimated daily discharge: Mar. 1 to 28. Records good. Natural flow of stream affected by small stockwater and irrigation dams upstream from station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,400 ft^3/s, Sept. 25, 1986, gage height, 6.78 ft, from rating curve extended above 300 ft^3/s on basis of slope-area measurement of peak flow; no flow most of each season.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 33 ft^3/s, Mar. 6, gage height, 3.03 ft, backwater from ice; no flow many days.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e1.1	1.3	.00	.00	.00	.00	.00	.00		
2			e.81	1.2	.00	.00	.00	.00	.00	.00		
3			e1.4	1.2	.00	.00	.00	.00	.00	.00		
4			e6.7	1.0	.00	.00	.00	.00	.00	.00		
5			e15	.88	.00	.00	.00	.00	.00	.00		
6			e25	.74	.00	.00	.00	.00	.00	.00		
7			e22	.67	.00	.00	.00	.00	.00	.00		
8			e12	.64	.00	.00	.00	.00	.00	.00		
9			e7.1	.57	.00	.00	.00	.00	.00	.00		
10			e4.3	.49	.00	.00	.00	.00	.00	.00		
11			e2.4	.53	.00	.00	.00	.00	.00	.00		
12			e1.9	.42	.00	.00	.00	.00	.00	.00		
13			e1.9	.32	.00	.00	.00	.00	.00	.00		
14			e2.5	.32	.00	.00	.00	.00	.00	.00		
15			e5.4	.25	.00	.00	.00	.00	.00	.00		
16			e3.5	.21	.00	.00	.00	.00	.00	.00		
17			e3.5	.18	.00	.00	.00	.00	.00	.00		
18			e4.0	.14	.00	.00	.00	.00	.00	.00		
19			e2.5	.14	.00	.00	.00	.00	.00	.00		
20			e2.2	.11	.00	.00	.00	.00	.00	.00		
21			e2.0	.07	.00	.00	.00	.00	.00	.00		
22			e1.5	.07	.00	.00	.00	.00	.00	.00		
23			e1.7	.04	.00	.00	.00	.00	.00	.00		
24			e1.5	.04	.00	.00	.00	.00	.00	.00		
25			e1.6	.04	.00	.00	.00	.00	.00	.00		
26			e1.6	.04	.00	.00	.00	.00	.00	.00		
27			e1.6	.00	.00	.00	.00	.00	.00	.00		
28			e1.6	.00	.00	.00	.00	.00	.00	.00		
29			1.9	.00	.00	.00	.00	.00	.00	.00		
30			1.6	.00	.00	.00	.00	.00	.00	.00		
31			1.4	---	.00	---	.00	.00	---	.00		
TOTAL			143.21	11.61	.00	.00	.00	.00	.00	.00		
MEAN			4.62	.39	.00	.00	.00	.00	.00	.00		
MAX			25	1.3	.00	.00	.00	.00	.00	.00		
MIN			.81	.00	.00	.00	.00	.00	.00	.00		
AC-FT			284	23	.0	.0	.0	.0	.0	.0		

e Estimated

06151500 BATTLE CREEK NEAR CHINOOK, MT

LOCATION (REVISED).--Lat 48°39'05", long 109°13'47", in NW¼SW¼NE¼ sec.3, T.33 N., R.19 E., Blaine County, Hydrologic Unit 10050008, on left bank, 4 mi north of Chinook, and at mile 14.

DRAINAGE AREA.--1,539 mi^2.

PERIOD OF RECORD.--April 1905 to September 1921 (monthly discharge only, published in WSP 1309), June 1984 to current year (seasonal records only). Published as North Fork Milk River near Chinook prior to 1913.

GAGE.--Water-stage recorder. Elevation of gage is 2,410 ft above National Geodetic Vertical Datum of 1929, from topographic map. Apr. 22, 1905 to Apr. 8, 1918, chain gage 100 ft downstream, and Apr. 9, 1918 to Sept. 30, 1921, chain gage on bridge 600 ft downstream at same datum but different from present datum.

REMARKS.--Estimated daily discharges: Sept. 15, 16, 30. Records good. Diversions for irrigation of about 11,000 acres upstream 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.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,400 ft^3/s, Sept. 26, 1986, gage height, 22.91 ft, from rating curve extended above 900 ft^3/s, on basis of slope-area measurement of peak flow; no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 132 ft^3/s, Mar. 30, gage height, 2.68 ft; maximum gage height, 3.23 ft, Apr. 1 (backwater from road work on ford); minimum daily discharge, 1.4 ft^3/s, July 26, 28.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				125	61	65	5.6	2.2	14			
2				118	55	56	8.6	33	13			
3				112	50	37	11	26	13			
4				119	53	28	12	14	14			
5				122	50	26	14	9.1	9.7			
6				107	48	27	13	5.8	8.6			
7				101	52	25	13	4.5	7.3			
8				108	54	28	14	11	6.0			
9				114	52	27	13	14	5.6			
10				119	46	23	12	14	4.8			
11				99	40	19	11	10	4.3			
12				93	35	17	11	7.2	3.5			
13				87	30	15	11	5.6	3.1			
14				83	28	12	10	5.8	3.0			
15				84	45	10	11	6.7	e2.9			
16				84	41	12	9.8	7.2	e2.8			
17				80	32	17	9.6	8.6	2.8			
18				74	26	12	11	8.1	3.0			
19				69	29	18	5.6	6.6	2.8			
20				65	22	25	1.5	6.3	2.4			
21				66	17	30	1.5	5.6	2.0			
22				54	17	26	2.0	4.5	2.0			
23				42	20	18	2.0	4.2	2.0			
24				44	26	14	1.7	3.8	2.0			
25				43	26	11	1.6	3.8	1.8			
26				40	24	12	1.4	3.8	1.8			
27				41	25	10	1.6	12	1.5			
28				48	26	11	1.4	19	1.5			
29				62	17	13	1.8	16	1.6			
30				63	19	8.0	2.0	15	e1.6			
31				---	48	---	2.0	13	---			
TOTAL				2466	1114	652.0	226.7	306.4	144.4			
MEAN				82.2	35.9	21.7	7.31	9.88	4.81			
MAX				125	61	65	14	33	14			
MIN				40	17	8.0	1.4	2.2	1.5			
AC-FT				4890	2210	1290	450	608	286			

e Estimated

06154000 MILK RIVER "A" CANAL, NEAR HARLEM, MT

LOCATION.--(Revised).--Lat 48°29'10", long 108°45'52", in SE¼NW¼SE¼ sec. 32, T.32 N., R.23 E., Blaine County, Hydrologic Unit 10050004, on left bank at Fork Belknap Agency, Fort Belknap Indian Reservation, 200 feet downstream from headgate on Milk River, and 4.0 miles south of Harlem.

PERIOD OF RECORD.--July 1905 to September 1910 (gage heights and discharge measurements only), Apr. 13, 1911, to May 24, 1920, staff gage at site 0.75 mi downstream below wasteway at different datum. May 25, to July 31, 1920 staff gage 500 feet downstream from headgate at different datum, June to September 1986 at site 150 feet upstream at same datum (seasonal records only). Seasonal records only collected 1910-1920. Miscellaneous measurements obtained 1914, 1921, 1934, 1958. Prior to Apr. 30, 1986 published at Agency Ditch near Harlem.

GAGE.--Water-stage recorder and electromagnetic flow meter. Datum of gage is 2,330.055 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Indian Affairs).

REMARKS.--Estimated daily discharges: May 1-17, Aug. 25-31. Records fair. Canal diverts water from right bank of Milk River in SE¼NW¼SE¼ sec.32, T.32 N., R.23 E., for irrigation of about 10,000 acres on the Fort Belknap Indian Reservation.

EXTREMES FOR PERIOD OF RECORD.--1905, 1910-20: Maximum discharge, 128 ft^3/s May 28, 1916, during irrigation season.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1								e.00	39	83	68	
2								e.00	41	78	65	
3								e.00	43	79	61	
4								e.00	67	81	59	
5								e.00	74	81	68	
6								e.00	68	73	68	
7								e.00	83	68	59	
8								e.00	89	76	62	
9								e.00	83	73	60	
10								e.00	76	60	56	
11								e.00	68	40	57	
12								e.00	60	38	51	
13								e.00	53	68	52	
14								e.00	57	63	52	
15								e.00	64	59	50	
16								e.00	56	60	51	
17								e.00	55	52	45	
18								18	58	.00	43	
19								30	55	.00	54	
20								36	77	.00	51	
21								37	90	.00	49	
22								36	91	.00	49	
23								33	93	.00	48	
24								34	92	.00	35	
25								34	107	27	e.00	
26								36	91	69	e.00	
27								37	92	62	e.00	
28								36	90	62	e.00	
29								34	92	59	e.00	
30								33	89	63	e.00	
31								33	---	68	e.00	
TOTAL								467.00	2193	1542.00	1313.00	
MEAN								15.1	73.1	49.7	42.4	
MAX								37	107	83	68	
MIN								.00	39	.00	.00	
AC-FT								926	4350	3060	2600	

e Estimated

MILK RIVER BASIN

06154100 MILK RIVER NEAR HARLEM, MT

LOCATION.--Lat 48°29'22", long 108°45'28", in NE¼SE¼NE¼ sec.32, T.32 N., R.23 E., Blaine County, Hydrologic Unit 10050004, Fort Belknap Indian Reservation, on right bank 30 ft downstream from U.S. Highway 2 bridge, 0.6 mi northeast of unincorporated community of Fort Belknap Agency, 3.5 mi southeast of Harlem, and at mile 332.2.

DRAINAGE AREA.--9,822 mi^2.

PERIOD OF RECORD.--October 1959 to September 1969, October 1982 to current year. Gage heights only for period Apr. 3-25, 1952, published as "at Fort Belknap" in 1260-B.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,319.48 ft above National Geodetic Vertical Datum of 1929. Apr. 3-25, 1952, nonrecording gage on old bridge 200 ft downstream at different datum. Nov. 1, 1959, to Mar. 12, 1968, nonrecording gage or water-stage recorder at several sites within 0.5 mi of present site at different datum.

REMARKS.--Estimated daily discharges: Nov. 11 to Mar. 2. Records fair except those for estimated daily discharges, which are poor. Flow increased during irrigation season by water from St. Mary Canal (station number 05018500). Flow mainly regulated by Fresno Reservoir (station number 06136500) since 1939. Diversions for irrigation of about 60,000 acres of which about 13,000 acres lie downstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--15 years (1960-69, 1983-87), 374 ft^3/s, 271,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,900 ft^3/s, Sept. 29, 1986, gage height, 25.73 ft; minimum daily, 0.44 ft^3/s, July 24, 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 1952 reached a stage of about 23.5 ft, present site and datum.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,800 ft^3/s, Oct. 1, gage height, 25.61 ft; minimum daily, 78 ft^3/s, Sept. 27.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6390	384	e350	e160	e120	e180	545	517	421	356	408	279
2	4510	376	e330	e150	e120	e180	579	496	517	405	357	279
3	2230	375	e310	e150	e130	195	563	501	471	527	357	270
4	1440	375	e250	e150	e130	195	517	950	423	511	368	262
5	1020	371	e230	e150	e130	217	511	1140	378	658	355	269
6	874	377	e220	e150	e130	265	560	954	285	337	339	274
7	763	379	e210	e140	e130	406	537	524	205	95	322	272
8	683	352	e210	e120	e140	471	535	215	183	346	305	263
9	619	146	e200	e120	e140	614	566	224	187	450	303	246
10	596	146	e200	e120	e140	1060	571	208	242	424	302	248
11	603	e150	e190	e120	e150	1320	582	176	379	410	284	249
12	598	e150	e180	e130	e150	1260	539	167	397	407	275	262
13	581	e170	e190	e150	e150	887	499	148	411	417	297	270
14	557	e200	e190	e150	e190	681	473	157	357	401	320	267
15	561	e230	e190	e130	e250	596	433	184	301	385	316	271
16	560	e230	e190	e100	e290	497	407	537	351	367	340	278
17	571	e230	e190	e100	e290	437	407	668	337	388	344	284
18	533	e230	e180	e110	e300	386	446	785	334	545	341	334
19	510	e230	e170	e110	e300	465	464	763	321	681	320	235
20	488	e230	e150	e110	e300	501	465	750	420	728	275	163
21	473	e230	e150	e110	e300	458	519	679	687	670	265	146
22	456	e230	e150	e110	e290	427	529	637	1000	641	258	144
23	447	e250	e150	e110	e270	400	481	670	985	683	229	106
24	439	e300	e170	e110	e250	389	493	754	951	656	247	81
25	429	e350	e170	e110	e230	363	522	764	696	665	316	87
26	437	e400	e170	e110	e210	357	528	742	506	585	326	82
27	436	e400	e170	e110	e180	356	543	768	445	464	301	78
28	425	e400	e170	e110	e180	410	548	851	412	441	294	100
29	412	e400	e170	e120	---	382	530	747	383	435	308	109
30	397	e370	e170	e120	---	360	534	568	367	428	302	115
31	387	---	e160	e120	---	460	---	392	---	412	292	---
TOTAL	29425	8661	6130	3860	5590	15175	15426	17636	13352	14918	9666	6323
MEAN	949	289	198	125	200	490	514	569	445	481	312	211
MAX	6390	400	350	160	300	1320	582	1140	1000	728	408	334
MIN	387	146	150	100	120	180	407	148	183	95	229	78
AC-FT	58360	17180	12160	7660	11090	30100	30600	34980	26480	29590	19170	12540

CAL YR 1986 TOTAL 243908 MEAN 668 MAX 12900 MIN 85 AC-FT 483800
WTR YR 1987 TOTAL 146162 MEAN 400 MAX 6390 MIN 78 AC-FT 289900

e Estimated

MILK RIVER BASIN

06154140 FIFTEENMILE CREEK TRIBUTARY NEAR HARLEM, MT

LOCATION.--Lat 48°19'29", long 108°42'49", in SW¼NW¼SW¼ sec.26, T.30 N., R.23 E., Blaine County, Hydrologic Unit 10050004, just downstream of culvert on State Highway 66, 1.7 mi upstream of mouth, and 15.5 mi south of Harlem.

DRAINAGE AREA.--2.31 mi^2.

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

GAGE.--Water-stage recorder. Elevation of gage is 2,650 ft, from topographic map.

REMARKS.--Estimated daily discharges: Apr. 4-6. Records fair. No known regulation or diversion upstream of station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 180 ft^3/s, Feb. 25, 1986, gage height, 3.61 ft; no flow most days each year.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 0.50 ft^3/s, Apr. 5; maximum gage height unknown; no flow most days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.38	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	e.20	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	e.50	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	e.10	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.33	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	.00	.00	.00	.00	.00	.00	1.51	.00	.00	.00	.00	.00
MEAN	.00	.00	.00	.00	.00	.00	.050	.00	.00	.00	.00	.00
MAX	.00	.00	.00	.00	.00	.00	.50	.00	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	.0	3.0	.0	.0	.0	.0	.0

CAL YR 1986 TOTAL 199.67 MEAN .55 MAX 90 MIN .00 AC-FT 396
WTR YR 1987 TOTAL 1.51 MEAN .004 MAX .50 MIN .00 AC-FT 3.0

e Estimated

MILK RIVER BASIN

06154400 PEOPLES CREEK NEAR HAYS, MT

LOCATION.--Lat 48°13'25", long 108°42'48", in SW¼ sec.35, T.29 N., R.23 E., Blaine County, Hydrologic Unit 1005009, on right bank 45 ft downstream from bridge on State Highway 66, 2.5 mi downstream from Myrtle Creek, 16.4 mi north of Hays, and at mile 47.2.

DRAINAGE AREA.--220 mi^2.

PERIOD OF RECORD.--December 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,714.10 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Nov. 8 to Mar. 14 and Mar. 21-31. Records good except those for estimated daily discharges, which are poor. Some storage in numerous stock and beaver ponds and diversions for irrigation of about 1,300 acres upstream of station. Several observations of water temperature and specific conductance were made during the water year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--20 years (water years 1968-87), 16.2 ft^3/s, 11,740 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,460 ft^3/s, June 8, 1972, gage height, 15.03 ft, from floodmark, from rating curve extended above 490 ft^3/s on basis of slope-area measurement of peak flow; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 100 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 1	0015	*69	4.48	Jan. 24	1200	ice jam	*4.72

Minimum daily discharge, 0.03 ft^3/s, on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	67	22	e20	e6.5	e8.0	e6.0	47	19	12	.29	2.0	.05
2	65	24	e18	e6.5	e8.0	e7.0	59	18	12	.16	2.3	.05
3	63	24	e20	e6.5	e7.0	e8.0	52	18	11	.07	3.1	.05
4	60	24	e18	e7.5	e6.0	e9.0	44	17	11	.04	2.8	.04
5	58	24	e17	e7.0	e7.0	e10	46	18	9.5	.04	2.5	.04
6	57	25	e17	e6.5	e7.0	e10	48	18	6.2	.04	1.7	.05
7	53	25	e17	e6.0	e8.0	e12	46	16	3.8	.03	1.5	.05
8	52	e15	e17	e5.0	e8.0	e12	41	14	4.0	.03	1.0	.06
9	49	e10	e15	e4.5	e8.0	e10	36	9.0	3.9	.03	.61	.06
10	47	e10	e17	e4.5	e9.0	e7.0	32	7.1	5.8	.03	.24	.06
11	38	e13	e20	e4.5	e10	e7.0	29	5.8	3.5	.03	.07	.06
12	36	e13	e20	e4.5	e10	e6.0	28	4.9	3.8	.03	.04	.06
13	34	e15	e18	e4.0	e10	e7.0	26	4.4	3.6	.03	.03	.06
14	32	e18	e15	e3.5	e9.0	e8.0	24	3.8	3.1	.03	.03	.06
15	31	e22	e15	e2.5	e9.0	25	23	3.5	2.8	.03	.03	.06
16	29	e25	e14	e2.0	e8.0	27	21	3.4	2.3	.03	.03	.06
17	28	e22	e13	e2.5	e15	24	20	3.7	1.6	.04	.03	.07
18	28	e20	e13	e4.0	e15	21	20	7.1	1.1	.05	.03	.06
19	27	e20	e13	e3.5	e12	20	20	7.6	.97	.03	.04	.06
20	27	e20	e10	e3.5	e9.0	21	20	8.5	1.5	.03	.03	.07
21	26	e20	e8.0	e4.0	e9.0	e15	20	9.4	1.5	.05	.03	.06
22	26	e23	e6.0	e3.5	e10	e7.0	19	11	2.5	.16	.04	.06
23	25	e25	e6.0	e3.0	e9.0	e8.0	20	9.7	7.3	.77	.05	.06
24	25	e25	e6.5	e3.5	e8.0	e9.0	21	7.4	5.8	.48	.05	.08
25	25	e25	e6.5	e4.0	e7.0	e10	20	5.9	3.8	.74	.05	.08
26	25	e23	e6.5	e5.0	e6.0	e15	21	4.2	3.5	1.0	.05	.07
27	24	e21	e6.5	e5.0	e5.0	e15	20	5.3	4.0	.83	.05	.06
28	24	e21	e7.0	e5.0	e5.0	e15	19	7.3	2.1	.86	.05	.08
29	24	e20	e6.5	e7.0	---	e10	19	8.4	1.1	.82	.05	.11
30	23	e20	e6.5	e8.0	---	e15	19	12	.57	2.1	.04	.10
31	23	---	e6.0	e8.0	---	e25	---	12	---	2.6	.05	---
TOTAL	1151	614	399.0	151.0	242.0	401.0	880	299.4	135.64	11.50	18.62	1.89
MEAN	37.1	20.5	12.9	4.87	8.64	12.9	29.3	9.66	4.52	.37	.60	.063
MAX	67	25	20	8.0	15	27	59	19	12	2.6	3.1	.11
MIN	23	10	6.0	2.0	5.0	6.0	19	3.4	.57	.03	.03	.04
AC-FT	2280	1220	791	300	480	795	1750	594	269	23	37	3.7

CAL YR 1986 TOTAL 11518.86 MEAN 31.6 MAX 600 MIN .00 AC-FT 22850
WTR YR 1987 TOTAL 4304.99 MEAN 11.8 MAX 67 MIN .03 AC-FT 8540

e Estimated

06154410 LITTLE PEOPLES CREEK NEAR HAYS, MT

LOCATION (REVISED).--Lat 47°57'58", long 108°39'36", in SE¼SE¼NW¼ sec.32, T.26 N., R.24 E., Blaine County, Hydrologic Unit 10050009, on right bank 0.5 mi upstream from west entrance to Mission Canyon, 2 mi southeast of Hays, and at mile 23.1.

DRAINAGE AREA.--13.0 mi^2.

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WDR MT-81-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,770 ft, revised, from topographic map. August 1972 to June 24, 1976, gage at former site at datum 10.00 ft higher. Prior to Apr. 22, 1987, gage located 330 ft downstream.

REMARKS.--Water discharge records fair except those for estimated periods, Nov. 8-16, Nov. 23 to Dec. 16, June 11 to July 19, which are poor. No known regulation or diversion upstream from station.

AVERAGE DISCHARGE.--15 years, 4.87 ft^3/s, 3,530 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 576 ft^3/s, May 25, 1974, gage height, 4.57 ft, from floodmark, at site and datum then in use, from rating curve extended above 44 ft^3/s on basis of slope-area measurement of peak flow; minimum, 0.92 ft^3/s, Mar. 21, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 50 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 28	1100	20	1.17	No peaks greater than base discharge this year.			

Minimum daily discharge, 2.4 ft^3/s, Sept. 7-9, 11-13, 17-24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	5.1	e4.0	3.0	2.8	2.9	4.4	13	9.6	e4.5	3.0	2.5
2	10	5.1	e4.0	3.0	2.7	2.9	4.6	12	8.4	e4.5	2.9	2.5
3	10	5.1	e4.0	3.0	2.7	2.9	4.7	11	8.0	e4.5	2.9	2.5
4	9.4	5.1	e4.0	3.0	2.7	2.9	5.7	11	6.6	e4.5	2.9	2.5
5	9.1	5.1	e4.0	3.0	2.7	3.0	9.6	11	7.2	e4.5	2.9	2.5
6	8.9	5.1	e3.5	3.0	2.7	2.9	15	11	6.9	e4.0	2.8	2.5
7	8.1	5.1	e3.5	3.0	2.7	3.0	16	9.6	6.6	e4.0	2.6	2.4
8	7.9	e5.0	e3.5	3.0	2.7	3.0	16	9.6	6.2	e4.0	2.5	2.4
9	7.7	e5.0	e3.5	3.0	2.7	3.0	16	8.8	5.9	e4.0	2.5	2.4
10	7.5	e5.0	e3.5	3.0	2.7	3.0	14	8.4	6.2	e4.0	2.6	2.5
11	7.2	e4.5	e3.5	3.0	2.6	3.0	15	8.0	e6.0	e3.5	2.6	2.4
12	6.8	e4.5	e3.5	3.0	2.6	3.0	13	7.6	e6.0	e3.5	2.5	2.4
13	6.6	e4.5	e3.5	3.0	2.6	3.0	12	6.9	e6.0	e3.5	2.5	2.4
14	6.6	e4.5	e3.5	2.9	2.6	3.0	11	6.6	e6.0	e3.5	2.5	2.5
15	6.4	e4.5	e3.5	2.9	2.7	3.2	12	6.5	e6.0	e3.5	2.5	2.5
16	6.2	e4.5	e3.5	2.7	2.6	3.0	12	6.2	e5.5	e3.5	2.5	2.5
17	6.4	4.2	3.2	2.7	2.6	3.0	12	5.6	e5.5	e3.5	2.5	2.4
18	6.4	4.5	3.0	2.7	2.6	3.3	12	5.6	e5.5	e3.5	2.5	2.4
19	6.2	4.6	3.0	2.7	2.6	3.3	12	5.6	e5.5	e3.5	2.5	2.4
20	5.9	4.6	3.0	2.7	2.7	3.3	11	5.6	e5.5	3.5	2.5	2.4
21	5.9	4.4	3.0	2.7	2.7	3.3	12	5.6	e5.0	3.5	2.5	2.4
22	5.5	4.4	3.0	2.7	2.7	3.6	13	5.6	e5.0	3.2	2.5	2.4
23	5.5	e4.5	3.0	2.7	2.7	3.5	17	5.6	e5.0	3.3	2.5	2.4
24	5.5	e4.5	3.0	2.8	2.8	3.6	17	5.6	e5.0	3.4	2.5	2.4
25	5.5	e4.5	3.0	2.7	2.7	3.6	15	5.6	e5.0	3.4	2.5	2.5
26	5.5	e4.0	3.0	2.7	2.8	3.6	14	5.6	e4.5	3.4	2.5	2.5
27	5.5	e4.0	3.0	2.7	2.9	3.6	14	5.9	e4.5	3.4	2.5	2.5
28	5.5	e4.0	3.0	2.7	2.9	3.6	13	17	e4.5	3.3	2.5	2.5
29	5.3	e4.0	3.0	2.7	---	3.6	13	16	e4.5	3.3	2.5	2.5
30	5.3	e4.0	3.0	2.7	---	3.8	13	13	e4.5	3.2	2.5	2.5
31	5.1	---	3.0	2.7	---	4.0	---	11	---	3.1	2.5	---
TOTAL	214.4	137.9	103.7	88.1	75.5	100.4	369.0	266.1	176.6	114.0	80.2	73.6
MEAN	6.92	4.60	3.35	2.84	2.70	3.24	12.3	8.58	5.89	3.68	2.59	2.45
MAX	11	5.1	4.0	3.0	2.9	4.0	17	17	9.6	4.5	3.0	2.5
MIN	5.1	4.0	3.0	2.7	2.6	2.9	4.4	5.6	4.5	3.1	2.5	2.4
AC-FT	425	274	206	175	150	199	732	528	350	226	159	146

CAL YR 1986 TOTAL 2369.0 MEAN 6.49 MAX 46 MIN 1.9 AC-FT 4700
WTR YR 1987 TOTAL 1799.5 MEAN 4.93 MAX 17 MIN 2.4 AC-FT 3570

e Estimated

06154410 LITTLE PEOPLES CREEK NEAR HAYS, MT--Continued

WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
NOV 17...	1520	4.2	100	77	420	-9.0	5.0	--	--	--
DEC 17...	0935	3.6	--	--	500	-2.0	4.5	--	--	--
JAN 12...	1215	3.0	--	--	390	8.0	6.0	--	--	--
MAR 16...	1400	3.0	--	--	587	3.0	6.5	--	--	--
APR 28...	1405	13	0	0	420	27.0	11.0	667	9.2	96
JUL 14...	1330	3.8	--	--	--	27.0	14.5	667	9.6	109
AUG 31...	1230	2.4	0	0	510	21.0	11.0	674	9.6	99

DATE	TIME	PH (STAND-ARD UNITS) (00400)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV 17...	1520	--	260	41	66	22	3.6	0.1	1.7
APR 28...	1405	7.90	230	21	61	18	4.2	0.1	2.0
JUL 14...	1330	8.30	250	47	65	21	4.0	0.1	3.4
AUG 31...	1230	8.20	250	76	62	23	3.0	0.1	1.8

DATE	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)
NOV 17...	214	28	0.90	0.40	11	260	0.36	3.0
APR 28...	205	32	1.0	0.30	11	250	0.34	9.1
JUL 14...	202	31	0.90	0.40	11	260	0.35	2.7
AUG 31...	174	29	0.30	0.30	11	230	0.32	1.5

DATE	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, 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)
NOV 17...	--	<0.100	--	--	--	--	20	5
APR 28...	<0.100	--	<0.010	--	--	0.020	20	7
JUL 14...	<0.100	--	0.020	0.38	0.40	0.050	30	6
AUG 31...	<0.100	--	<0.010	--	<0.20	0.060	30	3

06154410 LITTLE PEOPLES CREEK NEAR HAYS, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)
APR 28...	1405	<1	<10	<1	<10	5	30
JUL 14...	1330	1	<10	<1	--	1	20
AUG 31...	1230	1	<10	<1	40	2	30

DATE	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	SELENIUM, TOTAL (UG/L AS SE) (01147)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)
APR 28...	<5	10	0.10	<1	<1	10
JUL 14...	<5	<10	<0.10	<1	<1	<10
AUG 31...	<5	10	<0.10	<1	<1	<10

06154430 LODGE POLE CREEK AT LODGE POLE, MT

LOCATION.--Lat 48°01'52", long 108°01'55", in SE¼SE¼SW¼ sec. 5, T.26 N., R.25 E., Blaine County, Hydrologic Unit 10050009, Fort Belknap Indian Reservation, 10 ft upstream of culvert in county road just south of Lodge Pole and 8 mi northeast of Hays.

DRAINAGE AREA.--19.5 mi^2.

PERIOD OF RECORD.--March 1987 to September 1987. Miscellaneous measurements made at this site 1972, 1978, 1982-84, and 1985 water years.

GAGE.--Water-stage recorder. Elevation of gage is 3,420 ft, from topographic map.

REMARKS.--Estimated daily discharges: Mar. 1-10. Records good. No known diversion for irrigation upstream of station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 390 ft^3/s, Sept. 25, 1986, gage height, 6.84 ft, from floodmark, by computation of peak flow through culvert.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10 ft^3/s, Mar. 31, 1987, gage height, 1.65 ft; minimum daily, 1.9 ft^3/s, on many days in 1987.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 10 ft^3/s, Mar. 31, gage height, 1.65 ft, minimum daily, 1.9 ft^3/s, on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	e2.0	3.5	2.4	4.0	4.0	3.3	2.7
2	---	---	---	---	---	e2.0	2.6	2.4	4.0	4.0	3.3	2.6
3	---	---	---	---	---	e2.0	2.6	2.2	4.3	4.0	3.3	2.6
4	---	---	---	---	---	e2.0	2.4	2.1	4.3	4.0	3.3	2.7
5	---	---	---	---	---	e2.0	2.2	2.1	4.5	4.0	3.1	2.7
6	---	---	---	---	---	e2.0	2.2	2.1	4.5	4.0	3.1	2.8
7	---	---	---	---	---	e2.0	2.2	2.1	4.5	4.0	3.1	2.6
8	---	---	---	---	---	e2.0	2.2	2.1	4.5	4.3	3.1	2.6
9	---	---	---	---	---	e2.0	2.2	2.1	4.5	4.0	2.8	2.6
10	---	---	---	---	---	e2.0	2.4	2.1	4.8	4.0	2.8	2.4
11	---	---	---	---	---	2.1	2.4	2.2	4.5	4.0	3.1	2.4
12	---	---	---	---	---	2.1	2.2	2.2	4.3	3.8	3.1	2.4
13	---	---	---	---	---	1.9	2.2	2.4	4.3	3.8	2.8	2.2
14	---	---	---	---	---	1.9	2.2	2.4	4.3	3.8	2.8	2.2
15	---	---	---	---	---	1.9	2.2	2.4	4.0	3.5	2.7	2.2
16	---	---	---	---	---	1.9	2.3	2.6	4.3	3.5	2.8	2.6
17	---	---	---	---	---	1.9	2.4	2.8	4.5	3.5	2.7	2.9
18	---	---	---	---	---	1.9	2.4	3.1	4.3	5.1	2.5	2.8
19	---	---	---	---	---	1.9	2.8	3.1	5.7	3.8	2.4	2.6
20	---	---	---	---	---	1.9	2.6	3.1	5.4	3.5	2.2	2.6
21	---	---	---	---	---	1.9	2.4	3.1	4.8	3.5	2.2	2.6
22	---	---	---	---	---	1.9	2.4	3.3	5.1	3.5	2.2	2.5
23	---	---	---	---	---	2.0	2.4	3.2	4.3	3.5	2.2	2.5
24	---	---	---	---	---	2.1	2.4	3.1	4.0	3.3	2.8	2.4
25	---	---	---	---	---	2.1	2.4	3.3	4.0	3.3	3.0	2.2
26	---	---	---	---	---	2.2	2.4	3.5	4.0	3.3	3.1	2.4
27	---	---	---	---	---	2.2	2.4	4.5	4.0	3.3	2.8	2.6
28	---	---	---	---	---	2.2	2.4	4.0	4.3	3.3	2.9	2.6
29	---	---	---	---	---	2.2	2.4	3.5	4.0	4.0	2.9	2.6
30	---	---	---	---	---	2.2	2.4	3.5	4.0	4.7	2.7	2.6
31	---	---	---	---	---	5.0	---	3.8	---	3.3	2.7	---
TOTAL	---	---	---	---	---	65.4	72.2	86.8	132.0	117.6	87.8	76.2
MEAN	---	---	---	---	---	2.11	2.41	2.80	4.40	3.79	2.83	2.54
MAX	---	---	---	---	---	5.0	3.5	4.5	5.7	5.1	3.3	2.9
MIN	---	---	---	---	---	1.9	2.2	2.1	4.0	3.3	2.2	2.2
AC-FT	---	---	---	---	---	130	143	172	262	233	174	151

e Estimated

06154490 WILLOW COULEE NEAR DODSON, MT

LOCATION.--Lat 48°19'31", long 108°24'52", in SW¼NE¼SE¼ sec.25, T.30 N., R.25 E., Blaine County, Hydrologic Unit 10050009, just below culvert on county road 1.1 mi upstream of mouth and 9.5 mi southwest of Dodson.

DRAINAGE AREA.--5.16 mi^2.

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

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 2,450 ft, from topographic map.

REMARKS.--Estimated daily discharges: Oct. 1-7, Nov. 23 to Dec. 4, Jan. 8-11, Feb. 11 to Mar. 30, Apr. 1-20. Records fair except those for estimated daily discharges, which are poor. No known diversion for irrigation upstream of station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,310 ft^3/s, Sept. 25, 1986, gage height, 7.84 ft, from floodmark by computation of peak flow through culvert and over road; no flow periods most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 240 ft^3/s, Apr. 1, gage height, 3.54 ft; no flow most days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.20	.00	e.00	.00	.00	e.00	e69	.00	.00	.00	.00	.00
2	e.20	.00	e.00	.00	.00	e.00	e.66	.00	.00	.00	.00	.00
3	e.18	.00	e.00	.00	.00	e.00	e.57	.00	.00	.00	.00	.00
4	e.18	.00	e.00	.00	.00	e.05	e.52	.00	.00	.00	.00	.00
5	e.16	.00	.00	.00	.00	e.10	e.40	.00	.00	.00	.00	.00
6	e.16	.00	.00	.00	.00	e.25	e.27	.00	.00	.00	.00	.00
7	e.16	.00	.00	.00	.00	e.35	e.18	.00	.00	.00	.00	.00
8	.11	.00	.00	e.00	.00	e.30	e.06	.00	.00	.00	.00	.00
9	.04	.00	.00	e.05	.00	e.20	e.00	.00	.00	.00	.00	.00
10	.00	.00	.00	e.50	.00	e.05	e.00	.00	.00	.00	.00	.00
11	.00	.00	.00	e.10	e.00	e.05	e.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	e.00	e.20	e.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	e.00	e.15	e.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	e.00	e.10	e.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	e.00	e.10	e.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	e.00	e.10	e.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	e.00	e.05	e.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	e.00	e.10	e.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	e.00	e.10	e.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	e.00	e.10	e.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	e.00	e.10	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	e.00	e.10	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	e.00	e.10	.00	.00	.00	.00	.00	.00
24	.00	e.05	.00	.00	e.00	e.10	.00	.00	.00	.00	.00	.00
25	.00	e.50	.00	.00	e.00	e.05	.00	.00	.00	.00	.00	.00
26	.00	e.10	.00	.00	e.00	e.05	.00	.00	.00	.00	.00	.00
27	.00	e.04	.00	.00	e.00	e.05	.00	.00	.00	.00	.00	.00
28	.00	e.00	.00	.00	e.00	e.00	.00	.00	.00	.00	.00	.00
29	.00	e.00	.00	.00	---	e.00	.00	.00	.00	.00	.00	.00
30	.00	e.00	.00	.00	---	e.30	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	16	---	.00	---	.00	.00	---
TOTAL	1.39	.69	.00	.65	.00	19.20	71.66	.00	.00	.00	.00	.00
MEAN	.045	.023	.00	.021	.00	.62	2.39	.00	.00	.00	.00	.00
MAX	.20	.50	.00	.50	.00	16	69	.00	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	2.8	1.4	.0	1.3	.0	38	142	.0	.0	.0	.0	.0

CAL YR 1986 TOTAL 1514.97 MEAN 4.15 MAX 775 MIN .00 AC-FT 3000
WTR YR 1987 TOTAL 93.59 MEAN .26 MAX 69 MIN .00 AC-FT 186

e Estimated

06154500 PEOPLES CREEK NEAR DODSON, MT

LOCATION.--Lat 48°20'34", long 108°21'32", in SE¼SE¼NW¼ sec.21, T.30 N., R.26 E., Phillips County, Hydrologic Unit 10050009, on right bank 0.8 mi upstream of Indian Service diversions, 6.5 mi southwest of Dodson, and at mile 7.

DRAINAGE AREA.--670 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1918 to November 1921 (fragmentary), June 1951 to September 1973, October 1981 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,310 ft, by barometer. Prior to June 1951, nonrecording gage at site 2 mi downstream at different datum. June 1, 1951, to Aug. 11, 1956, water-stage recorder at site 300 ft downstream at present datum.

REMARKS.--Estimated daily discharges: Nov. 8 to Mar. 13, Mar. 21-31. Water-discharge records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 3,300 acres upstream from station.

AVERAGE DISCHARGE.--28 years (1951-73, 1982-87), 34.2 ft^3/s, 24,780 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,590 ft^3/s, Sept. 25, 1986, gage height, 15.67 ft, from floodmark; maximum gage height, 17.05 ft, Mar. 29, 1952 (backwater from ice), from floodmark in gage house; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 1	0015	*664	*7.59	No other peak greater than base discharge.			

Minimum discharge, 1.9 ft^3/s, Sept. 7, 8, gage height, 3.07 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	632	47	e75	e45	e15	e15	205	43	34	13	17	4.0
2	551	47	e80	e45	e15	e15	136	41	30	11	15	3.4
3	511	48	e75	e45	e10	e20	124	41	28	9.4	11	2.9
4	458	48	e75	e45	e10	e25	111	40	26	8.0	9.9	2.5
5	417	47	e65	e40	e10	e35	103	36	25	6.7	8.7	2.5
6	358	48	e70	e35	e15	e40	101	35	23	6.0	7.4	2.2
7	316	49	e70	e30	e20	e60	97	34	22	5.1	6.7	1.9
8	272	e35	e70	e25	e20	e50	90	33	19	4.8	6.0	2.1
9	252	e30	e60	e20	e20	e35	86	30	18	4.5	5.3	2.5
10	227	e30	e65	e30	e25	e40	80	26	37	3.9	4.6	2.8
11	201	e35	e65	e30	e25	e45	79	23	29	3.8	4.2	3.0
12	181	e35	e60	e35	e25	e45	73	20	19	3.8	3.2	3.3
13	158	e40	e60	e30	e25	e50	69	18	16	3.9	2.9	3.4
14	142	e35	e65	e25	e25	51	67	17	15	3.6	3.0	3.1
15	130	e50	e65	e15	e25	51	63	16	13	3.5	2.9	3.1
16	120	e100	e65	e10	e20	52	59	16	11	2.6	3.3	3.2
17	113	e90	e65	e10	e20	51	56	15	11	2.2	3.3	3.7
18	104	e80	e60	e15	e25	46	55	16	10	3.9	3.5	3.9
19	96	e80	e55	e15	e25	45	56	18	11	5.6	3.9	4.8
20	91	e80	e50	e15	e25	44	56	20	11	7.2	4.3	5.8
21	86	e80	e50	e15	e25	e35	57	21	10	7.7	4.2	6.1
22	79	e85	e50	e15	e25	e30	57	22	18	7.8	3.6	6.0
23	75	e85	e55	e10	e20	e30	53	22	22	6.5	3.0	5.2
24	72	e90	e55	e10	e20	e35	51	22	27	5.7	2.6	4.9
25	66	e90	e55	e10	e20	e40	52	21	27	5.1	2.7	4.5
26	62	e90	e55	e10	e15	e45	50	21	23	4.6	3.4	4.4
27	60	e90	e55	e15	e10	e50	51	23	19	3.9	4.1	4.4
28	56	e90	e55	e15	e10	e45	49	37	17	3.7	4.1	4.1
29	53	e80	e55	e15	---	e40	46	43	16	3.2	5.0	4.1
30	52	e75	e55	e15	---	e45	44	42	14	95	4.4	4.3
31	48	---	e50	e15	---	e100	---	38	---	35	4.2	---
TOTAL	6039	1909	1905	705	545	1310	2276	850	601	290.7	167.4	112.1
MEAN	195	63.6	61.5	22.7	19.5	42.3	75.9	27.4	20.0	9.38	5.40	3.74
MAX	632	100	80	45	25	100	205	43	37	95	17	6.1
MIN	48	30	50	10	10	15	44	15	10	2.2	2.6	1.9
AC-FT	11980	3790	3780	1400	1080	2600	4510	1690	1190	577	332	222

CAL YR 1986 TOTAL 56885.5 MEAN 156 MAX 5070 MIN .53 AC-FT 112800
WTR YR 1987 TOTAL 16710.1 MEAN 45.8 MAX 632 MIN 1.9 AC-FT 33140

e Estimated

06154500 PEOPLES CREEK NEAR DODSON, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1982 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
NOV 18...	1340	84	0	0	1110	-12.0	0.0
JAN 13...	1100	31	--	--	1480	1.0	0.0
MAR 17...	1445	51	--	--	1180	4.0	2.0
APR 02...	0830	139	0	0	1040	2.0	3.0
07...	0825	93	--	--	1090	5.5	10.0
AUG 13...	0830	2.8	0	0	1350	15.0	17.0
SEP 01...	0900	3.9	0	0	1360	20.0	17.0

DATE	TIME	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV 18...	1340	8.20	440	130	99	48	92	2	6.3
APR 02...	0830	8.70	400	180	83	46	94	2	6.0
AUG 13...	0830	8.40	380	110	70	50	170	4	8.4
SEP 01...	0900	8.40	350	160	59	49	190	5	7.0

DATE	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, 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)
NOV 18...	315	320	8.3	0.50	11	770	1.1	175	0.120
APR 02...	218	400	7.7	0.30	8.2	780	1.1	291	<0.100
AUG 13...	271	460	13	0.50	5.9	940	1.3	7.1	<0.100
SEP 01...	194	470	14	0.50	1.9	910	1.2	9.6	<0.100

DATE	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)
NOV 18...	--	190	--	--	35	--	--	--	--
APR 02...	--	140	--	--	120	--	--	--	--
AUG 13...	2	370	<1	<10	7	<5	44	0.2	<1
SEP 01...	--	340	--	--	6	--	--	--	--

06154510 KUHR COULEE TRIBUTARY NEAR DODSON, MT

LOCATION.--Lat 48°20'21", long 108°23'17", in SW¼NW¼SW¼ sec. 20, T.30 N., R.26 E., Phillips County, at culvert in county road 0.5 mi upstream of Kuhr Coulee and 8.5 mi southwest of Dodson.

DRAINAGE AREA.--1.25 mi^2.

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

GAGE.--Water-stage recorder. Elevation of gage is 2,430 ft, from topographic map.

REMARKS.--No estimated daily discharge this year. Records poor. No known diversions for irrigation upstream from station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 436 ft^3/s, Sept. 25, 1986, gage height, 15.82 ft, from floodmark, based on rating curve developed on basis of culvert computation of peak flow; no flow most days each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 42 ft^3/s, Mar. 31, gage height, 2.21 ft; no flow most days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.02	.00	.00	.00	.00	.00	.93	.00	.00	.00	.00	.00
2	.02	.00	.00	.00	.00	.00	.30	.00	.00	.00	.00	.00
3	.02	.00	.00	.00	.00	.00	.27	.00	.00	.00	.00	.00
4	.01	.00	.00	.00	.00	.00	.25	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.13	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.03	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	---	.04	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	8.2	---	.00	---	.00	.00	---
TOTAL	.07	.00	.00	.00	.00	8.24	1.91	.00	.00	.00	.00	.00
MEAN	.002	.00	.00	.00	.00	.27	.064	.00	.00	.00	.00	.00
MAX	.02	.00	.00	.00	.00	8.2	.93	.00	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.1	.0	.0	.0	.0	16	3.8	.0	.0	.0	.0	.0

CAL YR 1986 TOTAL 368.78 MEAN 1.01 MAX 200 MIN .00 AC-FT 731
WTR YR 1987 TOTAL 10.22 MEAN .028 MAX 8.2 MIN .00 AC-FT 20

MILK RIVER BASIN

06155030 MILK RIVER NEAR DODSON, MT

LOCATION.--Lat 48°24'11", long 108°17'35", in NE¼SE¼NW¼ sec.36, T.31 N., R.26 E., Phillips County, Hydrologic Unit 10050004, on left bank 30 ft downstream from U.S. Highway 2 bridge, 0.95 mi downstream from Dodson Dam, 1.9 mi west of Dodson, and at mile 273.2.

DRAINAGE AREA.--11,192 mi^2.

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

GAGE.--Water-stage recorder. Elevation of gage is 2,250 ft, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 7 to Mar. 13. Records good except those for estimated daily discharges, which are poor. Numerous diversions for irrigation upstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,200 ft^3/s, Sept. 26, 1986, gage height, 29.79 ft; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 11,300 ft^3/s, Oct. 2, gage height, 29.44 ft; minimum daily, 3.2 ft^3/s, Aug. 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8450	610	e440	e220	e140	e210	312	288	88	35	104	7.0
2	10700	612	e430	e210	e140	e210	146	285	48	33	82	7.1
3	10500	615	e400	e200	e150	e240	166	270	41	33	72	6.4
4	9260	607	e350	e200	e150	e240	230	258	39	34	66	5.7
5	7830	603	e310	e200	e150	e270	323	351	42	35	67	6.2
6	6560	605	e300	e190	e150	e330	306	577	41	41	65	6.5
7	4870	e500	e290	e190	e160	e400	289	693	35	55	64	6.2
8	2980	e500	e290	e160	e170	e450	287	570	30	47	49	6.1
9	2040	e500	e280	e150	e170	e600	286	329	28	42	36	5.8
10	1610	e300	e290	e160	e180	e550	232	199	29	41	24	5.7
11	1450	e200	e280	e160	e180	e640	249	182	28	42	9.3	5.8
12	1340	e210	e260	e180	e190	e900	251	169	31	41	9.3	6.4
13	1260	e230	e260	e190	e190	e1000	242	141	32	42	6.3	7.5
14	1190	e250	e270	e180	e220	1030	219	80	35	42	4.9	7.4
15	1130	e300	e270	e170	e290	963	203	26	38	43	4.0	6.8
16	1030	e350	e270	e120	e320	791	169	5.8	41	43	3.9	6.1
17	952	e340	e270	e120	e320	669	155	6.6	40	43	4.0	5.9
18	897	e325	e260	e130	e330	546	147	13	39	43	4.1	9.6
19	856	e325	e240	e130	e330	452	143	30	28	45	4.2	13
20	811	e325	e220	e130	e330	406	140	36	26	57	4.8	13
21	780	e325	e210	e130	e330	480	141	39	26	145	4.8	12
22	750	e330	e210	e130	e330	501	142	42	36	212	4.6	11
23	726	e340	e210	e130	e300	460	144	45	192	207	4.4	12
24	709	e410	e240	e130	e280	440	146	47	366	213	4.1	12
25	695	e460	e240	e130	e260	426	148	79	370	220	3.2	11
26	681	e500	e240	e130	e230	424	150	153	287	256	3.3	10
27	677	e500	e240	e140	e210	429	151	178	133	234	3.9	8.1
28	669	e500	e240	e140	e210	439	161	190	60	166	4.7	6.7
29	656	e500	e240	e140	---	437	210	223	42	118	4.3	6.5
30	652	e470	e240	e140	---	443	263	237	38	119	5.0	6.2
31	626	---	e230	e140	---	406	---	173	---	152	6.2	---
TOTAL	83337	12642	8520	4870	6410	15782	6151	5915.4	2309	2879	732.3	239.7
MEAN	2688	421	275	157	229	509	205	191	77.0	92.9	23.6	7.99
MAX	10700	615	440	220	330	1030	323	693	370	256	104	13
MIN	626	200	210	120	140	210	140	5.8	26	33	3.2	5.7
AC-FT	165300	25080	16900	9660	12710	31300	12200	11730	4580	5710	1450	475

CAL YR 1986	TOTAL	292301.0	MEAN	801	MAX	11500	MIN	10	AC-FT	579800
WTR YR 1987	TOTAL	149786.8	MEAN	410	MAX	10700	MIN	3.2	AC-FT	297100

e Estimated

MILK RIVER BASIN

06156500 BELANGER CREEK DIVERSION CANAL NEAR VIDORA, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°29'39", long 109°21'54", in NW¼ sec.19, T.6, R.25 W., third meridian, Hydrologic Unit 10050013, on left bank 0.3 mi downstream from diversion weir and 12 mi north of Vidora.

PERIOD OF RECORD.--March 1946 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Elevation of gage is 3,200 ft, from Cypress Lake elevation.

REMARKS.--Estimated daily discharges: Mar. 1-16, 22-24, 27-29, and Oct. 28-31. Records good. Canal diverts water from right bank of Belanger Creek in SW¼ sec.30, T.6, R.25 W., third meridian, for storage in Cypress Lake.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 598 ft^3/s, May 7, 1975; no flow at times each season.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e.00	80	.00	.00	.00	.00	.00	.00		
2			e.00	111	.00	.00	.00	.00	.00	.00		
3			e.00	141	.39	.00	.00	.00	.00	.00		
4			e.00	208	1.4	.00	.00	.00	.00	.00		
5			e18	237	1.3	.00	.00	.00	.00	.00		
6			e67	221	1.2	.00	.00	.00	.00	.00		
7			e103	156	1.1	.00	.00	.00	.00	.00		
8			e54	115	.95	.00	.00	.00	.00	.00		
9			e58	84	.78	.00	.00	.00	.00	.00		
10			e61	62	.53	.00	.00	.00	.00	.00		
11			e46	57	.39	.00	.00	.00	.00	.00		
12			e38	48	.18	.00	.00	.00	.00	.00		
13			e32	44	.14	.00	.00	.00	.00	.00		
14			e37	39	.04	.00	.00	.00	.00	.00		
15			e61	37	.00	.00	.00	.00	.00	.00		
16			e43	35	.00	.00	.00	.00	.00	.00		
17			40	33	.00	.00	.00	.00	.00	.00		
18			53	32	.00	.00	.00	.00	.00	.00		
19			54	29	9.4	.00	.00	.00	.00	.00		
20			42	28	9.0	.00	.00	.00	.00	.00		
21			40	21	.57	.00	.00	.00	.00	.00		
22			e42	13	.00	.00	.00	.00	.00	.00		
23			e22	11	.00	.00	.00	.00	.00	.00		
24			e22	11	.00	.00	.00	.00	.00	.00		
25			26	.00	.00	.00	.00	.00	.00	.00		
26			42	.00	.00	.00	.00	.00	.00	.00		
27			e36	.00	.00	.00	.00	.00	.00	.00		
28			e33	.00	.00	.00	.00	.00	.00	e.00		
29			e27	.00	.00	.00	.00	.00	.00	e.00		
30			29	.00	.00	.00	.00	.00	.00	e.00		
31			58	---	.00	---	.00	.00	---	e.00		
TOTAL			1184.00	1853.00	27.37	.00	.00	.00	.00	.00		
MEAN			38.2	61.8	.88	.00	.00	.00	.00	.00		
MAX			103	237	9.4	.00	.00	.00	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			2350	3680	54	.0	.0	.0	.0	.0		

e Estimated

06157500 CYPRESS LAKE EAST OUTFLOW CANAL NEAR VIDORA, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°29'12", long 109°21'08", in SE¼ sec.19, T.6, R.25 W., third meridian, Hydrologic Unit 10050013, on right bank 500 ft upstream from Belanger Creek, and 12.3 mi north of Vidora.

PERIOD OF RECORD.--April to October 1940, April 1943 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Elevation of gage is 3,180 ft, from topographic map. Prior to Sept. 26, 1946, at datum 2.24 ft higher and Sept. 26, 1946, to May 18, 1950, at datum 1.54 ft higher.

REMARKS.--Estimated daily discharges: Feb. 1 to Apr. 7, Oct. 10-31. Records poor. Canal diverts water from Cypress Lake for irrigation in Frenchman River basin in Saskatchewan.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 202 ft^3/s, Apr. 19, 1952; no flow at times most seasons.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1		e.00	e1.9	e4.1	.46	.14	5.0	1.3	.28	.18		
2		e.00	e1.9	e3.6	.49	.14	3.0	.78	.28	.18		
3		e.00	e2.2	e6.7	.53	.11	1.8	.67	.25	.18		
4		e.00	e4.2	e15	.49	.11	1.3	.67	.21	.18		
5		e.00	e8.0	e9.6	.42	.07	.85	.64	.25	.18		
6		e.00	e11	e8.1	.42	.07	.78	.60	.32	.21		
7		e.00	e8.2	e6.4	.42	.07	.67	.53	.35	.25		
8		e.00	e3.6	2.9	.39	.07	.71	.53	.35	.28		
9		e.00	e6.5	1.5	.39	.14	.57	.49	.32	.28		
10		e.00	e1.1	1.3	.39	.71	.53	.42	.32	e.28		
11		e.00	e.00	.67	.42	1.6	.64	.46	.28	e.28		
12		e.11	e.00	.60	.42	.88	.53	.39	.25	e.28		
13		e.60	e.78	.57	.35	.46	.32	.42	.21	e.25		
14		e1.2	e8.9	.49	.35	.32	.11	.53	.18	e.25		
15		e2.2	e19	.53	.35	.21	.00	.64	.14	e.25		
16		e2.6	e7.3	.46	.35	.14	.00	.64	.18	e.25		
17		e2.1	e3.0	.35	.35	.11	.00	.64	.18	e.25		
18		e2.1	e2.1	.32	.42	.11	.00	.57	.21	e.25		
19		e2.5	e1.8	.35	1.1	.07	.00	.49	.21	e.25		
20		e2.7	e3.6	.25	.14	.18	.00	.53	.21	e.25		
21		e3.5	e2.6	.25	.11	.28	.00	.42	.21	e.25		
22		e4.4	e.00	.32	.14	.21	.00	.39	.18	e.25		
23		e4.0	e.00	.42	.07	1.4	.00	.39	.18	e.25		
24		e1.8	e.04	.53	.07	14	.04	.46	.14	e.25		
25		e2.0	e5.9	.53	.04	14	.04	.57	.18	e.25		
26		e1.1	e22	.39	.14	12	.57	.60	.18	e.25		
27		e.67	e8.2	.35	.14	9.6	1.1	.53	.21	e.25		
28		e1.6	e1.2	.35	.18	8.0	.74	.46	.21	e.25		
29		---	e.46	.35	.14	6.9	.95	.39	.21	e.25		
30		---	e5.7	.35	.11	5.3	1.0	.35	.21	e.25		
31		---	e13	---	.11	---	.78	.35	---	e.25		
TOTAL		35.18	154.18	67.63	9.90	77.40	22.03	16.85	6.89	7.51		
MEAN		1.26	4.97	2.25	.32	2.58	.71	.54	.23	.24		
MAX		4.4	22	15	1.1	14	5.0	1.3	.35	.28		
MIN		.00	.00	.25	.04	.07	.00	.35	.14	.18		
AC-FT		70	306	134	20	154	44	33	14	15		

e Estimated

06158500 EASTEND CANAL AT EASTEND, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°30'21", long 108°50'54", in NW¼ sec.25, T.6, R.22 W., third meridian, Hydrologic Unit 10050013, on left bank 600 ft downstream from headgate, 1.5 mi west of Eastend.

PERIOD OF RECORD.--March 1937 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 2,998.58 ft above mean sea level (Geodetic Survey of Canada datum). Prior to June 1973, at sites within 1 mi, at different datums.

REMARKS.--No estimated daily discharges this year. Records good. Canal diverts water from Eastend Reservoir in NW¼ sec.25, T.6, R.22 W., third meridian, on right bank for irrigation of about 3,100 acres in the Frenchman River basin in Saskatchewan.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 86 ft^3/s, June 4, 1986; no flow at times each season.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	.00	.00	.00	.00	.00		
2			.00	.00	.00	.00	.00	.00	.00	.00		
3			.00	.00	.00	.00	.00	.00	.00	.00		
4			.00	.00	.00	.00	.00	.00	.00	.00		
5			.00	.00	.00	.00	.00	.00	.00	.00		
6			.00	.00	.00	.00	46	.00	.00	.00		
7			.00	.00	.00	.00	69	.00	.00	.00		
8			.00	.00	.00	.00	70	.00	.00	.00		
9			.00	.00	.00	.00	69	.00	.00	.00		
10			.00	.00	.00	.00	68	.00	.00	.00		
11			.00	.00	.00	.00	69	.00	.00	.00		
12			.00	.00	.00	.00	67	.00	.00	.00		
13			.00	.00	29	.00	66	.00	.00	.00		
14			.00	.00	57	.00	64	.00	.00	.00		
15			.00	.00	67	.00	56	.00	.00	.00		
16			.00	.00	70	.00	53	.00	.00	.00		
17			.00	.00	71	.00	41	.00	.00	.00		
18			.00	.00	72	.00	11	.00	.00	.00		
19			.00	.00	72	.00	6.2	.00	.00	.00		
20			.00	.00	73	.00	4.0	.00	.00	.00		
21			.00	.00	72	.00	.00	.00	.00	.00		
22			.00	.00	74	.00	.00	.00	.00	.00		
23			.00	.00	74	.00	.00	.00	.00	.00		
24			.00	.00	73	.00	.00	.00	.00	.00		
25			.00	.00	73	.00	.00	.00	.00	.00		
26			.00	.00	73	.00	.00	.00	.00	.00		
27			.00	.00	67	.00	.00	.00	.00	.00		
28			.00	.00	53	.00	.00	.00	.00	.00		
29			.00	.00	27	.00	.00	.00	.00	.00		
30			.00	.00	15	.00	.00	.00	.00	.00		
31			.00	---	1.9	---	.00	.00	---	.00		
TOTAL			.00	.00	1113.90	.00	759.20	.00	.00	.00		
MEAN			.00	.00	35.9	.00	24.5	.00	.00	.00		
MAX			.00	.00	74	.00	70	.00	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.0	.0	2210	.0	1510	.0	.0	.0		

06159500 FRENCHMAN RIVER BELOW EASTEND RESERVOIR, NEAR EASTEND, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°30'54", long 108°50'16", in SE¼ sec.36, T.6, R.22 W., third meridian, Hydrologic Unit 10050013, on left bank 0.8 mi west of Eastend, 1.7 mi downstream from Eastend Reservoir, and at mile 298.8.

DRAINAGE AREA.--619 mi^2.

PERIOD OF RECORD.--April 1909 to October 1916, March 1918 to May 1931, September 1935, March to July 1936, and April 1939 to current season (seasonal records only). Monthly discharge only for some periods, published in WSP 1309. Published as "at East End" 1909-16. Records prior to April 1939, not equivalent owing to diversion in Eastend Canal since 1937.

REVISED RECORDS.--WSP 1729: 1919, 1941 (monthly figures only). W 1983: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,960 ft, from topographic map. Prior to July 1941, non-recording gages at several sites within 1.5 mi of present site at various datums.

REMARKS.--Estimated daily discharges: Mar. 1-14 and Oct. 28-31. Records fair except those for estimated daily discharges, which are poor. Natural flow of stream affected by storage reservoirs, diversions for irrigation, and return flow from irrigated areas. Water may be diverted into or from Battle Creek basin through Cypress Lake.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,500 ft^3/s, Apr. 16, 1952, gage height, 19.10 ft, from flood-mark in gage house; no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, about 1,100 ft^3/s, Mar. 8, gage height, 10.97 ft, backwater from ice; minimum daily, 0.32 ft^3/s, July 27.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e61	208	41	2.7	1.9	2.8	4.7	8.2		
2			e57	357	42	2.9	.74	1.2	4.2	2.6		
3			e54	385	43	2.4	1.2	1.5	4.1	2.8		
4			e68	310	28	2.0	2.9	1.7	1.6	2.1		
5			e112	371	17	2.0	2.2	3.2	4.5	1.9		
6			e243	367	17	3.3	2.9	2.9	5.5	1.6		
7			e650	276	17	3.7	1.6	3.7	1.0	2.1		
8			e932	245	17	3.1	1.7	2.3	30	2.7		
9			e251	205	17	2.8	2.0	2.9	45	1.9		
10			e170	97	16	4.6	2.1	3.6	42	1.6		
11			e162	46	16	4.2	2.4	4.4	41	1.4		
12			e148	46	15	3.5	2.4	3.5	38	1.5		
13			e124	52	11	2.6	2.1	2.0	37	2.1		
14			e113	76	7.3	3.7	2.5	4.4	36	3.6		
15			188	75	6.6	4.7	2.8	3.0	35	.99		
16			325	73	5.4	4.8	1.8	2.4	33	11		
17			211	72	4.3	3.8	.92	7.7	37	6.1		
18			183	73	4.0	2.4	2.4	12	39	1.9		
19			222	73	3.8	2.6	.74	13	37	2.1		
20			195	61	3.5	5.5	1.8	9.3	36	.35		
21			128	48	3.1	4.9	1.6	5.2	35	.42		
22			96	39	2.9	4.7	.81	5.2	34	.39		
23			96	21	2.7	3.1	.67	5.5	32	.64		
24			95	13	2.6	3.5	1.2	7.0	32	1.7		
25			79	13	3.4	3.1	.92	4.8	30	2.6		
26			42	18	3.7	1.8	.46	4.6	29	2.9		
27			69	41	2.5	3.1	.32	5.1	27	.78		
28			100	41	2.2	4.1	1.6	5.7	25	e.78		
29			93	41	2.1	2.4	20	5.2	23	e.74		
30			94	40	2.0	1.6	43	4.6	21	e.74		
31			123	---	2.4	---	7.0	4.6	---	e.74		
TOTAL			5484	3783	361.5	99.6	116.68	145.0	799.6	70.97		
MEAN			177	126	11.7	3.32	3.76	4.68	26.7	2.29		
MAX			932	385	43	5.5	43	13	45	11		
MIN			42	13	2.0	1.6	.32	1.2	1.0	.35		
AC-FT			10880	7500	717	198	231	288	1590	141		

e Estimated

MILK RIVER BASIN

06161300 HUFF LAKE PUMPING CANAL NEAR VAL MARIE, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°22'20", long 107°53'05", in NW¼ sec.7, T.5, R.14 W., third meridian, Hydrologic Unit 10050013, on right bank 50 ft downstream from pump discharge outlet, and 11 mi northwest of Val Marie.

PERIOD OF RECORD.--March 1963 to current season (seasonal records only). Published as Val Marie West Pumping Canal near Val Marie, Saskatchewan, March 1963 to October 1980. July 1950 to current season in reports of Department of the Environment, Canada.

GAGE.--Water-stage recorder. Prior to 1956 and subsequent to 1960, records obtained from occasional discharge measurements and records of pump operation.

REMARKS.--Estimated daily discharges: Oct. 29-31. Records fair. Canal diverts water from Huff Lake for irrigation of about 2,100 acres in the Frenchman River basin in Saskatchewan.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 31 ft^3/s, May 30 to June 2, 7-10, 1975, May 5, 6, 7, 9, 1977; no flow at times each season.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	19	.00	12	.00	.00		
2			.00	.00	.00	18	.00	5.5	.00	.00		
3			.00	.00	.00	18	.00	9.9	.00	.00		
4			.00	.00	.00	18	.00	15	.00	.00		
5			.00	.00	.00	14	.00	18	.00	.00		
6			.00	.00	4.1	15	.00	3.6	.00	.00		
7			.00	.00	9.5	14	.00	.00	.00	.00		
8			.00	.00	11	13	.00	.00	.00	.00		
9			.00	.00	11	4.9	.00	.00	.00	.00		
10			.00	.00	11	.00	.00	.00	.00	.00		
11			.00	.00	10	.00	.00	.00	.00	.00		
12			.00	.00	6.6	.00	.00	.00	.00	.00		
13			.00	.00	9.9	.00	.00	.00	.00	.00		
14			.00	.00	9.5	.00	.00	.00	.00	.00		
15			.00	.00	10	.00	.00	.00	.00	.00		
16			.00	.00	13	.00	.00	.00	.00	.00		
17			.00	.00	13	.00	9.9	.00	.00	.00		
18			.00	.00	12	.00	7.1	.00	.00	.00		
19			.00	.00	11	.00	2.9	.00	.00	.00		
20			.00	.00	12	.00	28	.00	.00	.00		
21			.00	.00	11	.00	28	.00	.00	.00		
22			.00	.00	13	.00	27	.00	.00	.00		
23			.00	.00	19	.00	27	.00	.00	.00		
24			.00	.00	19	.00	27	.00	.00	.00		
25			.00	.00	19	.00	27	.00	.00	.00		
26			.00	.00	17	.00	27	.00	.00	.00		
27			.00	.00	18	.00	27	.00	.00	.00		
28			.00	.00	19	.00	26	.00	.00	.00		
29			.00	.00	18	.00	25	.00	.00	e.00		
30			.00	.00	19	.00	26	.00	.00	e.00		
31			.00	---	19	---	26	.00	---	e.00		
TOTAL			.00	.00	344.60	133.90	340.90	64.00	.00	.00		
MEAN			.00	.00	11.1	4.46	11.0	2.06	.00	.00		
MAX			.00	.00	19	19	28	18	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.0	.0	684	266	676	127	.0	.0		

e Estimated

06161500 HUFF LAKE GRAVITY CANAL NEAR VAL MARIE, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°22'10", long 107°53'06", in SW¼ sec.7, T.5, R.14 W., third meridian, Hydrologic Unit 10050013, on right bank at outlet of Huff Lake, and 11 mi northwest of Val Marie.

PERIOD OF RECORD.--March 1946 to current season (seasonal records only). Published as Val Marie West Gravity Canal near Val Marie, Saskatchewan, March 1946 to October 1980. Monthly figures only prior to March 1947, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 2,662.88 ft above mean sea level (Geodetic Survey of Canada datum). Prior to Sept. 27, 1949, at site 0.5 mi downstream at different datum.

REMARKS.--No estimated daily discharges this year. Records fair. Canal diverts water from Huff Lake for irrigation of about 1,900 acres in the Frenchman River basin in Saskatchewan. Since 1962, records have been based on gate openings in Huff Lake Dam.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 55 ft^3/s, July 14, 1972; no flow at times each season.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	.00	.00	.00	.00	.00		
2			.00	.00	.00	.00	.00	.00	.00	.00		
3			.00	.00	.00	.00	.00	.00	.00	.00		
4			.00	.00	.00	.00	.00	.00	.00	.00		
5			.00	.00	.00	.00	.00	.00	.00	.00		
6			.00	.00	.00	.00	.00	1.9	.00	.00		
7			.00	.00	25	.00	.00	5.0	.00	.00		
8			.00	.00	32	.00	.00	5.1	.00	.00		
9			.00	.00	25	.00	.00	4.3	.00	.00		
10			.00	.00	19	.00	.00	.00	.00	.00		
11			.00	.00	25	.00	.00	.00	.00	.00		
12			.00	.00	28	.00	7.8	.00	.00	.00		
13			.00	.00	32	.00	31	.00	.00	.00		
14			.00	.00	35	.00	44	.00	.00	.00		
15			.00	.00	36	.00	51	.00	.00	.00		
16			.00	.00	40	.00	51	.00	.00	.00		
17			.00	.00	40	.00	49	.00	.00	.00		
18			.00	.00	39	.00	37	.00	.00	.00		
19			.00	.00	39	.00	31	.00	.00	.00		
20			.00	.00	39	.00	37	.00	.00	.00		
21			.00	.00	42	.00	40	.00	.00	.00		
22			.00	.00	36	.00	36	.00	.00	.00		
23			.00	.00	28	.00	33	.00	.00	.00		
24			.00	.00	27	.00	29	.00	.00	.00		
25			.00	.00	19	.00	25	.00	.00	.00		
26			.00	.00	12	.00	21	.00	.00	.00		
27			.00	.00	9.9	.00	12	.00	.00	.00		
28			.00	.00	1.9	.00	.00	.00	.00	.00		
29			.00	.00	.00	.00	.00	.00	.00	.00		
30			.00	.00	.00	.00	.00	.00	.00	.00		
31			.00	---	.00	---	.00	.00	---	.00		
TOTAL			.00	.00	629.80	.00	534.80	16.30	.00	.00		
MEAN			.00	.00	20.3	.00	17.3	.53	.00	.00		
MAX			.00	.00	42	.00	51	5.1	.00	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.0	.0	1250	.0	1060	32	.0	.0		

MILK RIVER BASIN

06162500 NEWTON LAKE MAIN CANAL NEAR VAL MARIE, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°18'18", long 107°48'05", in NE¼ sec.15, T.4, R.14 W., third meridian, Hydrologic Unit 10050013, on right bank about 500 ft downstream from Newton Lake, and 5.4 mi northwest of Val Marie.

PERIOD OF RECORD.--April 1937 to current season (seasonal records only). Published as Val Marie Main Canal near Val Marie, Saskatchewan, March 1962 to October 1980. Prior to April 1947 monthly discharge only, published in WSP 1309. Prior to March 1962, published as Val Marie Canal near Val Marie.

GAGE.--Water-stage recorder. Datum of gage is 2,622.03 ft above mean sea level (Geodetic Surveys of Canada datum). Prior to May 21, 1963, at several sites within 2 mi of present site at different datums.

REMARKS.--No estimated daily discharges this year. Records good. Canal diverts water from Newton Lake for irrigation of about 4,700 acres in the Frenchman River basin in Saskatchewan.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 122 ft^3/s, May 26, 27, 1976; no flow at times each season.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			.00	.00	.00	28	.00	.00	2.3	.00		
2			.00	.00	.00	33	.00	.00	2.3	.00		
3			.00	.00	.00	34	.00	.00	1.2	.00		
4			.00	.00	.00	16	.00	.00	.00	.00		
5			.00	.00	.00	1.9	.00	.00	.00	.00		
6			.00	.00	.00	.00	105	.00	.00	.00		
7			.00	.00	.00	.00	107	1.6	.00	.00		
8			.00	.00	.00	.00	110	3.7	.00	.00		
9			.00	.00	.00	.00	111	3.7	.00	.00		
10			.00	.00	.00	.00	102	3.7	.00	.00		
11			.00	.00	62	.00	101	3.7	.00	.00		
12			.00	.00	87	.00	100	1.1	.00	.00		
13			.00	.00	104	.00	99	1.5	.00	.00		
14			.00	.00	108	.00	101	2.0	.00	.00		
15			.00	.00	105	.00	103	1.9	.00	.00		
16			.00	.00	103	.00	101	1.8	.00	.00		
17			.00	.00	100	.00	100	1.8	.00	.00		
18			.00	.00	91	.00	66	1.9	.00	.00		
19			.00	.00	87	.00	43	2.1	.00	.00		
20			.00	.00	89	.00	41	2.1	.00	.00		
21			.00	.00	86	.00	37	2.1	.00	.00		
22			.00	.00	78	.00	33	2.0	.00	.00		
23			.00	.00	78	.00	22	2.0	.00	.00		
24			.00	.00	78	.00	11	2.0	.00	.00		
25			.00	.00	76	.00	9.1	2.0	.00	.00		
26			.00	.00	65	.00	20	2.0	.00	.00		
27			.00	.00	52	.00	17	2.0	.00	.00		
28			.00	.00	32	.00	11	2.0	.00	.00		
29			.00	.00	38	.00	.00	2.2	.00	.00		
30			.00	.00	28	.00	.00	2.3	.00	.00		
31			.00	---	18	---	.00	2.3	---	.00		
TOTAL			.00	.00	1565.00	112.90	1550.10	55.50	5.80	.00		
MEAN			.00	.00	50.5	3.76	50.0	1.79	.19	.00		
MAX			.00	.00	108	34	111	3.7	2.3	.00		
MIN			.00	.00	.00	.00	.00	.00	.00	.00		
AC-FT			.0	.0	3100	224	3070	110	12	.0		

MILK RIVER BASIN

06163050 FRENCHMAN RIVER BELOW NEWTON LAKE, NEAR VAL MARIE, SASKATCHEWAN

(International gaging station)

LOCATION.--Lat 49°18'07", long 107°48'20", in NE¼ sec.15, T.4, R.14 W., third meridian, Hydrologic Unit 10050013, on left bank about 200 ft downstream from spillway for Newton Lake, about 5.4 mi northwest of Val Marie, and at mile 156.1.

DRAINAGE AREA.--1,349 mi^2, of which 210 mi^2 probably is noncontributing.

PERIOD OF RECORD.--May 1976 to current season. Seasonal records only. Published as Frenchman River below Val Marie Reservoir, near Val Marie, Saskatchewan, May 1976 to October 1979. June to October 1939, July to October 1965, and May 1966 to current season in reports of Department of the Environment, Canada.

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,606.11 ft above mean sea level (Geodetic Survey of Canada datum).

REMARKS.--Estimated daily discharges: Mar. 13-18, July 9-20, and Oct. 29-31. Records fair except those for estimated daily discharges, which are poor. Natural flow of stream affected by storage reservoirs, diversions for irrigation, and return flow from irrigated areas. Water may be diverted into or from Battle Creek basin through Cypress Lake.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,350 ft^3/s, Apr. 19, 1979, gage height, 12.87 ft; no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, about 555 ft^3/s, Mar. 15, gage height, 6.74 ft, backwater from ice; minimum daily, 0.04 ft^3/s, Aug. 8, 17, 21.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			107	220	6.5	3.3	2.8	3.0	.07	5.7		
2			107	203	6.0	3.2	2.8	2.8	.07	5.7		
3			107	202	5.5	2.3	2.9	2.8	7.6	5.5		
4			66	203	5.2	2.3	3.1	2.6	9.9	5.8		
5			13	205	4.7	2.2	3.0	2.4	9.0	5.2		
6			14	209	4.6	2.2	3.0	1.7	7.7	5.0		
7			14	228	4.6	2.2	2.9	.57	7.5	5.1		
8			13	259	4.4	2.3	2.9	.04	7.2	5.0		
9			136	268	4.3	2.4	e2.8	.11	7.1	4.6		
10			339	258	4.3	2.4	e2.7	.14	6.6	4.5		
11			378	262	4.4	2.3	e2.6	.11	6.6	4.6		
12			413	268	4.6	2.5	e2.5	.07	6.6	4.7		
13			e480	267	4.2	2.8	e2.4	.07	6.4	4.5		
14			e519	272	3.9	2.9	e2.3	.07	6.2	4.4		
15			e551	209	4.0	3.1	e2.2	.07	6.1	4.6		
16			e544	96	3.9	3.2	e2.0	.07	6.0	4.2		
17			e533	53	3.9	3.2	e1.9	.04	6.7	4.2		
18			e434	53	3.9	3.2	e1.8	.07	7.2	3.9		
19			288	54	3.9	3.2	e1.7	.07	6.9	4.0		
20			280	54	3.5	3.2	e1.6	.07	7.1	7.2		
21			252	42	3.4	3.2	1.5	.04	7.2	8.7		
22			234	36	3.4	3.1	1.3	.11	7.1	7.7		
23			233	36	3.4	3.0	1.4	.14	6.6	7.9		
24			232	36	3.4	3.0	1.3	.21	6.4	8.0		
25			232	36	3.4	3.0	1.3	.14	6.3	7.7		
26			233	37	3.4	2.9	1.4	.14	6.3	7.3		
27			233	37	3.2	2.8	1.3	.18	6.1	7.1		
28			234	37	3.2	2.6	1.4	.14	5.7	7.0		
29			234	37	3.2	2.6	1.4	.11	5.9	e6.9		
30			233	18	3.2	2.7	2.4	.11	5.9	e6.8		
31			231	---	3.1	---	3.0	.07	---	e6.7		
TOTAL			7917	4195	126.6	83.3	67.6	18.26	192.04	180.2		
MEAN			255	140	4.08	2.78	2.18	.59	6.40	5.81		
MAX			551	272	6.5	3.3	3.1	3.0	9.9	8.7		
MIN			13	18	3.1	2.2	1.3	.04	.07	3.9		
AC-FT			15700	8320	251	165	134	36	381	357		

e Estimated

MILK RIVER BASIN

06164000 FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 49°00'00", long 107°18'06", in SE¼ sec.5, T.1, R.10 W., third meridian, in Saskatchewan, Hydrologic Unit 10050013, on left bank 50 ft north of international boundary, 22 mi northeast of Whitewater, MT, and at mile 76.4.

DRAINAGE AREA.--2,120 mi^2, of which 343 mi^2 probably is noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1917 to current season (seasonal records only for most seasons).

REVISED RECORDS.--WSP 1389: 1938(M), 1939-41, 1942(M), 1943, 1950(M). W 1983: Drainage area.

GAGE.--Water-stage recorder and concrete control since August 1949. Elevation of gage is 2,420 ft, from topographic map. Prior to June 23, 1937, water-stage recorder at site 0.5 mi upstream at different datum. June 23, 1937, to October 1952, water-stage recorder at site 100 ft downstream at present datum.

REMARKS.--Estimated daily discharges: Mar. 1-22, 27, 28 and Oct. 30, 31. Records good. Natural flow of stream affected by several storage reservoirs, diversions for irrigation o about 14,500 acres, and return flow from irrigated areas. Water may be diverted into or from Battle Creek basin through Cypress Lake. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,700 ft^3/s, Apr. 15, 1952, gage height, 19.90 ft, from floodmark, from rating curve extended above 2,300 ft^3/s on basis of slope-area measurement of peak flow; no flow at times most seasons.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, about 1,140 ft^3/s, Mar. 8, gage height, 11.91 ft, backwater from ice; minimum daily, 0.18 ft^3/s, July 12.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e82	727	46	19	1.7	185	1.4	1.4		
2			e64	830	52	17	1.5	57	1.1	1.3		
3			e67	618	29	16	1.3	22	1.1	1.2		
4			e91	480	13	13	1.1	12	1.0	1.4		
5			e244	371	3.4	9.8	.95	7.8	.99	1.1		
6			e583	290	1.3	7.2	.78	5.6	.95	1.1		
7			e957	248	13	12	.64	4.3	.95	1.1		
8			e1070	226	8.3	14	.57	3.7	.95	1.1		
9			e604	207	7.8	9.3	.39	3.3	.95	1.3		
10			e360	236	7.2	7.7	.28	2.8	.67	1.2		
11			e266	256	6.7	5.9	.25	2.7	.74	1.2		
12			e298	249	6.6	4.7	.18	2.4	.67	1.3		
13			e498	230	6.3	4.3	.71	2.2	.95	1.3		
14			e413	235	6.1	4.0	28	2.2	1.3	1.3		
15			e385	229	8.5	3.7	27	2.2	1.3	1.3		
16			e427	242	26	3.6	16	38	2.3	1.6		
17			e498	238	29	3.3	28	34	3.0	1.6		
18			e597	103	35	2.9	57	16	2.0	1.7		
19			e636	74	36	2.4	71	10	2.0	1.6		
20			e664	84	36	2.6	74	7.9	2.1	1.7		
21			e657	79	32	2.4	48	6.2	2.2	1.7		
22			e417	78	31	2.2	28	4.4	2.4	1.7		
23			385	65	34	2.1	20	3.6	2.3	1.8		
24			328	56	33	1.7	18	3.2	2.0	1.9		
25			304	54	35	1.9	17	2.9	1.9	3.8		
26			360	53	39	2.0	14	7.3	1.9	7.2		
27			e629	52	36	2.0	13	3.7	1.8	6.2		
28			e675	52	41	2.2	11	2.2	1.6	6.0		
29			463	50	42	2.2	501	1.9	1.5	6.0		
30			501	48	37	1.9	632	1.8	1.6	e5.8		
31			607	---	26	---	298	1.6	---	e5.7		
TOTAL			14130	6760	763.2	183.0	1911.35	459.9	45.62	74.6		
MEAN			456	225	24.6	6.10	61.7	14.8	1.52	2.41		
MAX			1070	830	52	19	632	185	3.0	7.2		
MIN			64	48	1.3	1.7	.18	1.6	.67	1.1		
AC-FT			28030	13410	1510	363	3790	912	90	148		

e Estimated

MILK RIVER BASIN

06164000 FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1964, 1972-73, February to July 1987.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
FEB							
25...	1010	242	--	--	520	-7.0	0.0
MAR							
07...	1430	936	100	3	235	7.0	0.0
09...	1025	659	--	--	456	-14.0	0.0
19...	1245	704	--	--	431	2.0	0.0
APR							
09...	1105	220	--	--	387	8.0	8.0
23...	1115	66	100	3	538	9.0	11.0
JUL							
20...	1530	77	10	1	704	25.0	19.0

DATE	TIME	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
MAR											
07...	1430	7.00	58	3	12	6.7	21	1	6.0	55	54
APR											
23...	1115	8.10	170	24	37	20	44	1	6.3	151	100
JUL											
20...	1530	7.80	210	49	41	25	70	2	7.6	156	190

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P) (00666)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	BORON, DIS-SOLVED (UG/L AS B) (01020)
MAR											
07...	8.9	<0.10	7.1	150	0.20	377	0.100	0.040	1	<0.5	30
APR											
23...	3.5	0.20	9.3	310	0.42	55	0.160	--	2	0.5	40
JUL											
20...	6.5	0.30	7.9	440	0.60	92	<0.100	--	3	<0.5	70

DATE	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
MAR										
07...	<1	<10	2	260	<5	72	<0.1	6	<1	6
APR										
23...	<1	<10	<1	53	<5	7	0.2	3	<1	4
JUL										
20...	<1	<10	3	170	<5	23	0.1	3	<1	24

RESERVOIRS IN FRENCHMAN RIVER BASIN IN SASKATCHEWAN

(International gaging stations)

06157000 CYPRESS LAKE.--Lat 49°27'30", long 109°30'25", in SE¼ sec.12, T.6, R.27 W., third meridian, Hydrologic Unit 10050013, on south shore, and 12 mi north of Consul. DRAINAGE AREA, 107 mi^2. PERIOD OF RECORD, February 1939 to current season (seasonal records only). Records prior to October 1946, published only in WSP 1309. March to May 1952 daily elevations and contents, published in WSP 1260-B. Water-stage recorder. Datum of gage is at mean sea level (Geodetic Survey of Canada datum; subtract 33.67 ft to obtain Reclamation Service datum). Prior to 1969 season, at Reclamation Service datum. Prior to 1940, nonrecording gage on natural lake at "South" station. February 1940 to Apr. 28, 1955, elevation obtained from average of nonrecording gage readings at west and east dams. Apr. 29, 1955, to Aug. 21, 1984, gage located at east dam.

This is an offstream reservoir formed by two earthfill dams on a natural lake of the same name which was, at one time, the head of the Frenchman River. There are concrete control works at both dams. The following capacity figures are from capacity table effective February 1970; see previous reports for superseded figures. Usable capacity, 79,400 acre-ft between elevation 3,187.0 ft, bottom of west outlet works, and 3,201.9 ft, maximum design level. Dead storage, 24,300 acre-ft. Water is diverted from Battle Creek on west, 12 mi northwest of Consul, and from Belanger Creek, head of Frenchman River, on the east, 12 mi north of Vidora. Water is released to the same streams for irrigation. Figures given herein represent total contents. This is one of a number of stations which are maintained jointly by Canada and the United States. REVISED RECORDS, W 1983: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents, 117,300 acre-ft, Apr. 21, 1955, elevation, 3,203.36 ft; minimum observed since first filling, 21,100 acre-ft, Sept. 5, 1985, elevation, 3,186.27 ft.

EXTREMES FOR CURRENT SEASON: Maximum contents, 57,600 acre-ft, May 1, elevation, 3,193.63 ft; minimum, 38,600 acre-ft, Feb. 13, elevation, 3,189.96 ft.

06159000 EASTEND RESERVOIR.--Lat 49°30'26", long 108°51'08", in NW¼ sec.25, T.6, R.22 W., third meridian Hydrologic Unit 10050013, at dam on Frenchman River, 1.6 mi west of Eastend, and at mile 300.5. DRAINAGE AREA, 619 mi^2. PERIOD OF RECORD, February 1937 to current season (seasonal records only). Prior to 1958, published as East End Reservoir at East End. Nonrecording gages read about once a day during irrigation season and twice a day during high stages February 1937 to July 1979. Water-stage recorder. Datum of gage is at mean sea level (Geodetic Survey of Canada datum).

Reservoir is formed by earthfill dam completed in 1939, breached during flood in 1952 and rebuilt the same year with a concrete spillway and control works. The following capacity figures are from revised capacity table put into use Jan. 1, 1983. Usable capacity, 1,690 acre-ft between elevation 2,993.5 ft, bottom of outlet works, and 3,012.0 ft, maximum design level. No dead storage. Water is used for irrigation. This is one of a number of stations which are maintained jointly by Canada and the United States. REVISED RECORDS (SEASONS), WSP 1309: 1948(M). WSP 1729: Drainage area. WSP 2116: 1937-65. W 1983: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents, about 3,700 acre-ft, Apr. 15, 1952, elevation, about 3,015 ft, dam overtopped; no contents at various times.

EXTREMES FOR CURRENT SEASON: Maximum contents, 2,270 acre-ft, May 13, elevation, 3,013.44 ft; minimum observed, 87 acre-ft, Feb. 10, elevation, 3,003.75 ft.

06162000 HUFF LAKE.--Lat 49°22'16", long 107°53'07", in SW¼ sec.7, T.5, R.14 W., third meridian, Hydrologic Unit 10050013, near dam on Frenchman River, 11 mi northwest of Val Marie, and at mile 169.7. DRAINAGE AREA, 1,274 mi^2. PERIOD OF RECORD, February 1940 to current season (seasonal records only). February 1940 to October 1979, published as Val Marie West Reservoir. Records prior to October 1946, published only in WSP 1309. April to May 1952 daily elevations and contents, published in WSP 1260-B. Water-stage recorder. Datum of gage is at mean sea level (Geodetic Survey of Canada datum). May 1952 to May 1954, reference point on control structure. May 1954 to May 10, 1966, nonrecording gages. May 11, 1966, to Oct. 31, 1979, recording gage on riparian gatewell.

Reservoir is formed by earthfill dam with concrete control works completed in 1939. The following capacity figures are from revised capacity table put into use Jan. 1, 1983. Usable capacity, 3,620 acre-ft between elevation 2,663.2 ft, bottom of outlet works, and 2,676.5 ft, maximum design level. Dead storage, 10 acre-ft. Water is used for irrigation. This is one of a number of stations which are maintained jointly by Canada and the United States. REVISED RECORDS (SEASONS), WSP 1309: 1947-50.

EXTREMES FOR PERIOD OF RECORD: Maximum contents, 4,360 acre-ft, May 20, 1967, elevation, 2,677.83 ft; no contents Feb. 28, Mar. 31, 1950, Oct. 22-31, 1984, Mar. 1-7 and Aug. 6 to Sept. 14, 1985.

EXTREMES FOR CURRENT SEASON: Maximum contents, 4,020 acre-ft, Mar. 7, elevation, 2,677.12 ft; minimum, about 70 acre-ft, Oct. 20.

06163000 NEWTON LAKE.--Lat 49°18'12", long 107°48'20", in NE¼ sec.15, T.4, R.14 W., third meridian, Hydrologic Unit 10050013, at dam on Frenchman River, 5.4 mi northwest of Val Marie, and at mile 156.2. DRAINAGE AREA, 1,349 mi^2. PERIOD OF RECORD, February 1937 to current season (seasonal records only). February 1937 to October 1979, published as Val Marie Reservoir. Water-stage recorder. Datum of gage is at mean sea level (Geodetic Survey of Canada datum). Prior to May 11, 1966, nonrecording gages.

Reservoir is formed by earthfill dam with concrete control works; construction began in 1936; storage began in 1937; construction completed in 1938. The following capacity figures are from revised capacity table put into use Jan. 1, 1983. Usable capacity, 9,950 acre-ft between elevation 2,616.1 ft, bottom of outlet works, and 2,635.4 ft maximum design level. No dead storage. Water is used for irrigation. This is one of a number of stations which are maintained jointly by Canada and the United States. REVISED RECORDS (SEASONS), WSP 2116: 1937-65. WSP 1729: 1949.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 18,920 acre-ft, Apr. 19, 1952, elevation, 2,638.80 ft; no contents at times.

EXTREMES FOR CURRENT SEASON: Maximum contents, 12,100 acre-ft, Apr. 10, elevation, 2,636.79 ft; minimum, observed, 4,250 acre-ft, Sept. 9, elevation 2,630.40 ft.

Monthend contents, in acre-feet, October 1986 to October 1987

Date	Cypress Lake	Eastend Reservoir	Huff Lake	Newton Lake
Oct. 31	38,000	79	3,700	4,650
Nov. 30	-	-	-	-
Dec. 31	-	-	-	-
Jan. 31	-	-	-	-
Feb. 28	39,300	91	2,700	8,430
Mar. 31	49,000	1,480	3,580	10,300
Apr. 30	57,600	2,010	3,530	11,200
May 31	52,400	773	2,380	8,510
June 30	50,100	1,410	2,250	7,630
July 31	49,200	773	418	4,930
Aug. 31	48,300	1,220	571	4,360
Sept. 30	46,900	183	584	4,650
Oct. 31	45,800	811	112	4,920

06164510 MILK RIVER AT JUNEBERG BRIDGE, NEAR SACO, MT

LOCATION.--Lat 48°30'32", long 107°13'02", in NE¼NE¼ sec.30, T.32 N., R.35 E., Phillips County, Hydrologic Unit 10050014, on left bank 25 ft upstream from Juneberg bridge on Phillips County road, 1.5 mi downstream from Frenchman River, 6.9 mi northeast of Saco, and at mile 152.3.

DRAINAGE AREA. --17,670 mi^2.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Elevation of gage is 2,130 ft, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 9-20, Dec. 1 to Mar. 9. Water-discharge records good except those for estimated daily discharges, which are poor. Flow increased during irrigation season by water from St. Mary Canal which diverts from the St. Mary River near Babb (station number 05017500). Flow regulated by Fresno Reservoir (station number 06136500), two reservoirs in Lodge Creek basin in Saskatchewan (station numbers 06144260 and 06144360 and four reservoirs in Frenchman River basin in Saskatchewan. There are many small dams for the diversion of irrigation canals upstream.

AVERAGE DISCHARGE.--10 years, 491 ft^3/s, 356,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,400 ft^3/s, Apr. 3, 1978, gage height, 24.20 ft; maximum gage height, 26.70 ft, Mar. 4, 1986 (backwater from ice jam); minimum daily discharge, 2.1 ft^3/s, Aug. 20, 1984.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 11,400 ft^3/s, Oct. 1, gage height, 24.45 ft; minimum daily, 91 ft^3/s, May. 22.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11200	848	e600	e300	e200	e500	1050	212	332	166	299	139
2	10700	834	e600	e300	e200	e400	1150	241	339	138	449	145
3	9670	817	e550	e300	e200	e400	1340	302	299	223	487	149
4	8940	802	e550	e300	e200	e400	1220	327	250	235	372	139
5	8610	801	e600	e300	e200	e400	987	325	210	246	293	127
6	8800	804	e550	e300	e200	e500	831	285	179	243	260	127
7	9010	793	e500	e300	e250	e700	784	262	178	246	250	125
8	8910	782	e450	e300	e300	e900	744	398	174	253	243	127
9	8450	e500	e400	e300	e350	e1000	655	652	171	257	233	129
10	7500	e450	e450	e300	e350	1320	587	691	145	257	222	129
11	5210	e450	e450	e300	e300	1360	559	525	161	249	199	130
12	3090	e450	e450	e300	e300	1400	554	314	152	250	168	137
13	2370	e500	e400	e350	e300	1230	466	211	149	270	152	140
14	2120	e450	e400	e300	e300	1180	480	205	140	244	148	142
15	1990	e400	e350	e250	e300	1410	486	190	118	235	139	142
16	1790	e450	e350	e250	e350	1680	516	178	114	206	143	142
17	1640	e500	e350	e250	e450	1820	492	160	117	167	150	151
18	1500	e500	e350	e300	e600	1740	495	126	131	184	147	159
19	1370	e500	e350	e300	e700	1610	471	110	309	231	150	162
20	1270	e500	e350	e300	e600	1490	371	103	329	281	148	155
21	1220	515	e350	e300	e600	1410	282	93	344	256	148	149
22	1170	519	e350	e250	e600	1370	252	91	345	230	145	145
23	1120	515	e350	e250	e600	1350	233	98	189	226	145	146
24	1070	525	e350	e250	e600	1320	231	116	152	296	137	151
25	1030	543	e350	e250	e600	1190	241	126	147	374	130	144
26	995	549	e300	e200	e600	1070	233	171	249	380	137	135
27	975	573	e300	e200	e500	1000	207	222	445	375	146	123
28	943	642	e300	e200	e500	1100	208	263	452	385	150	126
29	913	678	e300	e200	---	1170	206	307	359	438	150	154
30	894	710	e300	e200	---	1150	199	321	235	429	144	136
31	870	---	e300	e200	---	1060	---	328	---	356	143	---
TOTAL	125340	17900	12600	8400	11250	34630	16530	7953	6914	8326	6227	4205
MEAN	4043	597	406	271	402	1117	551	257	230	269	201	140
MAX	11200	848	600	350	700	1820	1340	691	452	438	487	162
MIN	870	400	300	200	200	400	199	91	114	138	130	123
AC-FT	248600	35500	24990	16660	22310	68690	32790	15770	13710	16510	12350	8340

CAL YR 1986 TOTAL 460136 MEAN 1261 MAX 11200 MIN 50 AC-FT 912700
WTR YR 1987 TOTAL 260275 MEAN 713 MAX 11200 MIN 91 AC-FT 516300

e Estimated

MILK RIVER BASIN

06164510 MILK RIVER AT JUNEBERG BRIDGE, NEAR SACO, MT--Continued

WATER-QUALITY RECORDS

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

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1977 to current year.
WATER TEMPERATURE: October 1977 to September 1979.

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

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 2,220 microsiemens, Jan. 7, 8, 1978; minimum daily, 263 microsiemens, Mar. 17, 1982.

WATER TEMPERATURE (water years 1978-79): Maximum daily, 26.5°C, July 20, 22, Aug. 2, 1979; 0.0°C on many days during winter.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum daily, 1,770 microsiemens, Dec. 20; minimum daily, 356 microsiemens, Oct. 2.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	DISCHARGE, IN CUBIC FEET PER SECOND (00060)	STREAMFLOW, INSTANTANEOUS (CFS) (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	PH LAB (STANDARD UNITS) (00403)
NOV									
24...	1050	--	530	0	0	1460	4.0	1.0	7.90
JAN									
15...	1115	--	237	0	0	1550	-20.0	0.0	7.90
MAR									
19...	1030	--	1630	100	3	630	1.0	2.0	7.40
31...	1110	--	1060	0	0	772	9.0	2.5	7.83
JUN									
18...	1030	--	134	0	0	1100	25.0	23.5	8.20
AUG									
18...	1030	--	141	0	0	1020	19.0	18.0	8.20
SEP									
02...	1100	--	142	0	0	980	25.0	19.0	8.20
17...	1115	--	149	--	--	1210	10.0	15.0	8.20

DATE	HARDNESS (MG/L AS CACO3) (00900)	HARDNESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)
NOV									
24...	490	120	110	53	210	4	7.5	377	570
JAN									
15...	430	93	96	47	180	4	6.8	340	480
MAR									
19...	180	35	39	20	61	2	6.0	145	170
31...	210	53	43	24	84	3	6.0	153	240
JUN									
18...	300	39	66	33	130	3	5.9	262	320
AUG									
18...	280	59	63	31	130	3	5.0	226	280
SEP									
02...	300	52	66	33	130	3	5.3	249	300
17...	320	140	70	36	160	4	5.5	187	360

06164510 MILK RIVER AT JUNEBERG BRIDGE, NEAR SACO, MT--Continued

WATER-QUALITY RECORDS

DATE	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	PHOSPHORUS, DISSOLVED (MG/L AS P) (00666)
NOV								
24...	38	0.30	9.9	1200	1.7	1750	0.740	--
JAN								
15...	30	0.30	9.1	1100	1.4	674	0.480	0.010
MAR								
19...	2.7	0.20	7.7	390	0.54	1730	0.110	0.040
31...	11	0.20	9.2	510	0.69	1460	0.190	0.020
JUN								
18...	21	0.30	4.9	740	1.0	267	<0.100	0.010
AUG								
18...	17	0.30	6.6	670	0.91	254	<0.100	0.010
SEP								
02...	18	0.30	6.3	710	0.96	272	<0.100	<0.010
17...	20	0.30	6.3	770	1.0	310	--	--

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	1380	1530	1660	1670	1230	774	1280	1210	1180	791	1110
2	356	1400	1570	1690	1680	1120	778	1310	1280	1150	1020	1100
3	401	1410	1550	1700	1690	1290	824	1270	1240	966	845	1110
4	381	1410	1550	1730	1710	1050	---	1290	1150	960	830	1140
5	375	1410	1560	1720	1730	1090	706	1260	1040	876	806	1150
6	385	1440	1570	1720	1720	1120	1340	1260	1050	871	810	1160
7	392	1390	1670	---	1730	1000	1070	1220	---	884	842	1150
8	678	1450	1630	1700	1700	935	898	1190	1040	886	860	1150
9	485	1440	1630	1690	1620	882	899	1140	1040	872	900	1170
10	552	1470	1680	1680	1480	862	932	1080	1030	887	912	1170
11	598	1480	1620	1660	1500	767	1000	1040	1050	902	910	1170
12	676	1540	1610	1640	1610	795	1060	989	1060	910	927	1170
13	742	1550	1630	1620	1580	920	1000	1010	1060	925	939	1180
14	790	1560	1620	1550	1560	1070	1000	1010	1070	938	935	1180
15	855	1590	1650	1550	---	1020	1030	1030	1110	944	955	1210
16	897	1560	1650	1650	1350	1000	1030	1050	1130	1010	1020	1260
17	920	1610	1680	1640	1330	905	1050	---	1140	1040	995	1230
18	974	1610	1700	1640	1290	747	1040	1040	1150	1050	1070	1230
19	1020	1620	1750	1690	1320	643	1040	1050	1140	1060	1070	1220
20	1060	1640	1770	1720	1270	618	1150	1050	996	1060	1060	1210
21	1120	1690	1720	1730	1250	614	1200	1100	1040	1060	1090	---
22	1210	1730	1740	1700	1220	632	1200	1130	1000	1050	1090	1160
23	1210	1710	1700	1700	1230	645	1210	1160	1030	1060	1110	1140
24	1250	1750	1700	1690	1230	674	1220	1200	1050	1050	1090	1170
25	1280	1760	1670	1690	1220	727	1230	1210	1060	1050	1080	1210
26	1300	1630	1640	1720	---	758	1230	1210	1240	1020	1080	1300
27	1300	1630	1690	1720	---	786	1250	1210	1260	968	1100	1290
28	1340	1610	1670	1700	1190	784	1250	1170	1170	899	1080	1270
29	1360	1570	1680	1720	---	784	1280	1240	1120	944	1080	1230
30	1370	1600	1700	1740	---	777	1310	1260	1140	852	1100	1260
31	1400	---	1690	1690	---	767	---	1230	---	779	1110	---
MEAN	---	1555	1652	---	---	871	---	---	---	971	984	---

06164590 BEAVER CREEK NEAR ZORTMAN, MT

LOCATION.--Lat 47°56'19", long 108°23'26", in NE¼SE¼NE¼ sec.8, T.25 N., R.26 E., Phillips County, Hydrologic Unit 10050014, on right bank, at Baker Creek School, 3.3 mi southeast of Blaine-Phillips County line, 4.7 mi east of Fort Belknap Indian Reservation boundary, and 6 mi northeast of Zortman.

DRAINAGE AREA.--10.1 mi^2.

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

GAGE.--Water-stage recorder. Elevation of gage is 3,320 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Oct. 13, Nov. 8 to Mar. 2, Mar. 20-23, 26-29. Records fair except those for estimated daily discharges, which are poor. No known diversions for irrigation upstream from station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 57.0 ft^3/s, May 23, 1986, gage height, 2.29 ft; maximum gage height, 3.38 ft, Dec. 31, 1983 (backwater from ice); no flow many days 1985.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7.6 ft^3/s, July 29, gage height, 1.07 ft; maximum gage height, 1.73 ft, Dec. 9 (backwater from ice); no flow on part of June 2.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.9	2.6	e2.0	e.70	e.80	e.60	1.4	1.1	.40	3.0	1.4	1.7
2	2.7	2.7	e2.0	e.70	e.80	e1.0	1.0	1.2	.20	2.8	1.4	1.1
3	2.5	3.0	e2.0	e.70	e.70	2.2	1.2	1.4	1.1	2.7	1.3	1.3
4	2.3	3.0	e1.5	e.80	e.80	2.8	1.5	1.8	1.5	2.7	1.5	1.3
5	2.5	2.5	e1.2	e.70	e.90	2.9	1.5	1.8	1.4	2.5	1.6	1.1
6	3.4	2.4	e1.0	e.70	e.90	2.7	1.5	2.4	1.3	2.9	1.8	.94
7	3.6	2.4	e.90	e.60	e1.0	2.5	1.2	2.7	1.1	2.7	1.9	1.2
8	3.6	e3.0	e.80	e.50	e.90	1.8	.97	2.7	.99	2.5	1.5	1.1
9	3.9	e3.5	e.60	e.60	e.90	1.4	.95	2.9	1.6	2.6	1.5	1.1
10	3.9	e3.0	e.70	e1.0	e.90	1.5	.98	2.5	2.2	2.7	1.8	.95
11	4.2	e2.5	e.70	e1.5	e.90	1.7	.94	2.4	1.9	2.7	1.2	1.0
12	4.0	e2.0	e.80	e2.0	e.80	2.1	.82	2.5	1.9	2.8	1.3	1.1
13	e5.0	e2.5	e.80	e2.0	e.80	2.6	.86	2.1	2.0	2.7	1.5	1.0
14	5.7	e3.0	e.80	e1.5	e.70	2.8	.92	2.3	2.1	2.7	2.2	1.2
15	5.2	e4.0	e.90	e1.0	e.60	2.1	1.0	2.0	2.3	2.7	2.3	1.1
16	5.4	e4.0	e.90	e.80	e.60	1.7	.85	2.4	2.2	2.4	2.5	1.3
17	5.3	e3.5	e.80	e.90	e.60	1.7	.94	3.1	2.1	2.7	2.5	1.2
18	5.3	e3.0	e.80	e1.0	e.60	1.7	.86	2.8	2.2	4.0	2.2	1.0
19	5.3	e3.5	e.70	e1.0	e.60	1.7	1.0	1.7	2.9	2.9	2.3	.96
20	5.5	e3.5	e.60	e1.0	e.55	e1.6	1.0	2.0	2.6	2.6	2.3	.92
21	5.4	e3.5	e.70	e1.0	e.55	e1.5	.85	2.4	2.6	2.7	2.3	1.0
22	5.1	e3.5	e.70	e.90	e.50	e1.5	.91	2.4	2.5	2.7	2.4	1.2
23	5.1	e3.0	e.80	e.80	e.50	e1.4	.77	2.1	2.3	2.3	2.4	1.3
24	5.1	e3.5	e.90	e.90	e.45	1.5	.91	2.0	2.2	2.1	2.6	1.1
25	5.1	e3.5	e.80	e.90	e.45	1.6	.79	2.1	2.6	2.1	2.7	1.1
26	5.1	e3.0	e.80	e.80	e.40	e1.5	.74	2.5	2.7	2.1	2.9	1.0
27	4.3	e3.5	e.80	e.70	e.40	e1.4	.76	3.4	2.8	2.2	2.3	.89
28	3.4	e3.0	e.80	e.80	e.45	e1.2	.99	1.1	2.9	2.0	2.4	1.1
29	3.1	e3.0	e.90	e.80	---	e1.3	1.3	.89	2.7	2.1	2.0	.98
30	3.1	e2.5	e.90	e.70	---	1.5	1.5	.85	2.7	4.0	1.6	.98
31	2.8	---	e.80	e.80	---	2.4	---	.53	---	1.9	1.8	---
TOTAL	129.8	91.6	29.40	28.80	19.05	55.90	30.91	64.07	59.99	81.5	61.4	33.22
MEAN	4.19	3.05	.95	.93	.68	1.80	1.03	2.07	2.00	2.63	1.98	1.11
MAX	5.7	4.0	2.0	2.0	1.0	2.9	1.5	3.4	2.9	4.0	2.9	1.7
MIN	2.3	2.0	.60	.50	.40	.60	.74	.53	.20	1.9	1.2	.89
AC-FT	257	182	58	57	38	111	61	127	119	162	122	66

CAL YR 1986 TOTAL 1189.67 MEAN 3.26 MAX 37 MIN .05 AC-FT 2360
WTR YR 1987 TOTAL 685.63 MEAN 1.88 MAX 5.7 MIN .20 AC-FT 1360

e Estimated

06164615 LITTLE WARM CREEK AT RESERVATION BOUNDARY, NEAR ZORTMAN, MT

LOCATION.--Lat 47°59'04", long 108°21'15", in SE¼SW¼SW¼ sec.27, T.26 N., R.26 E., Phillips County, Hydrologic Unit 10050014, 0.2 mi upstream from Fort Belknap Indian Reservation boundary, 2.5 mi northwest of U.S. Highway 191, and 15 mi northeast of Zortman.

DRAINAGE AREA.--6.31 mi^2.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 3,070 ft, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 9 to Jan. 10, Jan. 15 to Mar. 3. Water-discharge records fair except those for estimated daily discharges, which are poor. Diversions for irrigation upstream from station can, at times, dry up stream.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 300 ft^3/s, Sept. 25, 1986, gage height, 6.93 ft; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 19.0 ft^3/s, Mar. 31, gage height, 4.90 ft; no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.3	5.2	e4.0	e3.5	e3.0	e2.0	4.6	3.0	2.7	2.2	.96	2.8
2	6.0	5.4	e4.0	e3.5	e3.0	e2.5	3.2	3.0	2.8	2.1	1.3	2.8
3	5.4	5.4	e3.5	e3.5	e3.0	e3.5	3.2	3.0	2.8	2.3	1.5	2.3
4	5.7	5.3	e3.5	e3.5	e3.0	5.3	3.2	3.1	2.8	2.5	1.9	2.0
5	2.8	5.4	e3.5	e3.5	e3.0	4.7	3.2	3.1	2.8	1.6	1.5	2.5
6	3.1	5.3	e3.5	e3.0	e3.0	4.4	3.2	3.1	2.8	.35	1.9	2.8
7	3.0	5.2	e3.5	e3.0	e3.5	3.9	3.2	3.1	2.7	.00	1.4	2.8
8	4.8	4.5	e3.5	e3.0	e3.5	3.5	3.3	3.1	2.9	.07	.00	2.8
9	5.2	e4.0	e3.5	e2.5	e3.5	3.4	3.3	3.0	2.9	.11	.00	2.8
10	5.8	e3.5	e3.0	e2.5	e3.5	3.4	3.3	3.0	2.7	.17	1.1	2.8
11	6.9	e3.5	e3.0	4.5	e3.5	3.4	3.3	3.0	2.5	.18	2.0	2.8
12	7.1	e3.0	e3.0	4.4	e3.5	3.7	3.2	3.0	2.1	.20	2.4	2.8
13	7.0	e3.5	e3.0	3.9	e3.5	3.9	3.2	3.0	1.8	.32	1.7	2.7
14	7.2	e4.0	e3.0	3.4	e3.5	4.6	3.2	3.0	1.9	.43	2.7	2.8
15	7.0	e4.0	e3.5	e2.5	e3.5	3.6	3.2	3.0	2.5	.20	2.8	2.8
16	6.9	e4.0	e3.5	e2.0	e3.0	3.4	3.2	3.0	2.8	.11	2.8	2.8
17	6.8	e3.5	e3.5	e2.0	e3.0	3.4	3.2	2.9	2.8	.37	2.7	2.8
18	6.5	e3.5	e3.5	e2.0	e3.0	3.3	3.2	2.9	2.6	2.1	2.8	2.8
19	6.4	e4.5	e3.0	e2.5	e3.0	3.3	3.2	2.9	2.7	.90	2.1	2.8
20	6.4	e4.5	e3.0	e2.5	e3.0	3.3	3.2	2.9	2.8	.30	1.4	2.8
21	6.3	e5.0	e3.0	e2.5	e3.0	3.3	3.2	3.0	2.6	.15	.00	2.8
22	6.0	e4.5	e3.5	e2.5	e3.0	3.3	3.2	3.0	2.7	.62	2.0	2.8
23	5.8	e4.5	e3.5	e2.0	e2.5	3.3	3.2	3.0	2.5	1.5	2.8	2.8
24	6.0	e5.0	e3.5	e2.0	e2.5	3.3	3.2	3.0	2.2	1.7	2.8	2.8
25	5.9	e4.5	e3.5	e2.5	e2.5	3.5	3.2	1.7	2.2	1.8	2.9	2.8
26	5.9	e4.5	e3.5	e2.5	e2.5	4.8	3.2	2.7	2.0	2.4	2.8	3.0
27	5.7	e4.5	e3.5	e2.5	e2.5	5.1	3.2	2.9	1.8	2.5	2.8	3.0
28	5.6	e4.5	e3.5	e2.5	e2.0	3.5	3.2	2.9	2.3	1.6	2.8	3.2
29	5.3	e4.0	e3.5	e2.5	---	3.4	3.1	2.8	2.4	.01	2.8	3.3
30	5.4	e4.0	e3.5	e2.5	---	4.7	3.0	2.6	2.3	1.3	2.8	3.5
31	5.4	---	e3.5	e2.5	---	9.6	---	2.8	---	.75	2.8	---
TOTAL	178.6	132.2	105.5	87.7	85.0	120.3	97.5	90.5	75.4	30.84	62.26	84.3
MEAN	5.76	4.41	3.40	2.83	3.04	3.88	3.25	2.92	2.51	.99	2.01	2.81
MAX	7.2	5.4	4.0	4.5	3.5	9.6	4.6	3.1	2.9	2.5	2.9	3.5
MIN	2.8	3.0	3.0	2.0	2.0	2.0	3.0	1.7	1.8	.00	.00	2.0
AC-FT	354	262	209	174	169	239	193	180	150	61	123	167

CAL YR 1986 TOTAL 1796.56 MEAN 4.92 MAX 137 MIN .11 AC-FT 3560
WTR YR 1987 TOTAL 1150.08 MEAN 3.15 MAX 9.6 MIN .00 AC-FT 2280

e Estimated

06164615 LITTLE WARM CREEK AT RESERVATION BOUNDRY, NEAR ZORTMAN, MT--Continued

WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
NOV 19...	1515	4.6	0	0	1940	-6.0	3.0
JAN 13...	1445	3.7	--	--	2000	1.0	4.0
MAR 18...	1345	3.4	--	--	1920	3.0	6.5
APR 29...	1220	3.6	0	0	1890	27.0	17.5
JUN 16...	1500	2.8	--	--	1740	27.0	23.0
AUG 12...	1500	2.9	0	0	1920	20.0	16.5
31...	1500	E3.5	0	0	1850	26.0	18.5

DATE	TIME	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV 19...	1515	8.10	1000	840	260	93	74	1	11	194	980
APR 29...	1220	8.10	920	860	220	90	80	1	10	57	960
AUG 12...	1500	8.10	1000	900	260	94	67	0.9	13	140	970
31...	1500	8.10	1000	860	260	90	63	0.9	12	161	920

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS, TOTAL (MG/L AS P) (00665)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)
NOV 19...	42	1.3	14	1600	2.2	20	<0.100	--	330	11
APR 29...	52	1.1	12	1500	2.0	14	<0.100	--	380	20
AUG 12...	45	1.4	14	1500	2.1	12	<0.100	--	380	9
31...	47	1.5	14	1500	2.0	E14	<0.100	0.030	390	7

DATE	TIME	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)
AUG 12...	1500	2	<1	<10	<5	40	0.2	<1

06164623 LITTLE WARM CREEK TRIBUTARY NEAR LODGE POLE, MT

LOCATION.--Lat 47°59'43", long 108°19'09", in SW¼SE¼NW¼ sec.24, T.26 N., R.26 E., Phillips County, Hydrologic Unit 10050014, at culvert on county road 0.3 mi northeast of Little Warm Creek, 1.3 mi east of Fort Belknap Indian Reservation boundary, 2.3 mi northeast of State Highway 191, and 10 mi southeast of Lodge Pole.

DRAINAGE AREA.--2.42 mi^2.

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

REVISED RECORDS.--WDR MT-86-1: 1983-85(M).

GAGE.--Water-stage recorder. Elevation of gage is 2,910 ft, from topographic map.

REMARKS.--Estimated daily discharges: Mar. 21-24, Mar. 27, Mar. 30 to Apr. 1. Records fair. No known diversions for irrigation upstream from station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 460 ft^3/s, Sept. 25, 1986, gage height, 4.83 ft, from floodmarks, on basis of culvert computations and flow-over-road measurement of peak flow; no flow most days.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 3.0 ft^3/s, Mar. 22, but may have been more during period of no gage-height record, Mar. 21 to Apr. 1; maximum gage height, 1.32 ft, backwater from ice, date unknown; no flow most days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 to SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	e.50	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.28	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.31	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.34	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.20	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.09	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.04	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	e1.0	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	e3.0	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	e1.0	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	e.50	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	e1.0	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	---	e.50	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	e1.0	---	.00	---	.00	.00	---
TOTAL	.00	.00	.00	.00	.00	8.00	1.82	.00	.00	.00	.00	.00
MEAN	.00	.00	.00	.00	.00	.26	.061	.00	.00	.00	.00	.00
MAX	.00	.00	.00	.00	.00	3.0	.50	.00	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	16	3.6	.0	.0	.0	.0	.0

CAL YR 1986 TOTAL 299.57 MEAN .82 MAX 100 MIN .00 AC-FT 594
WTR YR 1987 TOTAL 9.82 MEAN .027 MAX 3.0 MIN .00 AC-FT 19

e Estimated

MILK RIVER BASIN

06164630 BIG WARM CREEK NEAR ZORTMAN, MT

LOCATION.--Lat 48°00'52", long 108°27'02", in NE¼NW¼NW¼ sec.13, T.26 N., R.25 E., Blaine County, Hydrologic Unit 10050014, on left bank, 0.75 mi west of Blaine-Phillips County line, 4 mi east of Lodgepole, and 8.5 mi northeast of Zortman.

DRAINAGE AREA.--8.58 mi^2.

PERIOD OF RECORD.--May 1983 to September 1987 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 2,660 ft, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, June 5 to Sept. 30, which are poor. Numerous diversions for irrigation upstream of station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 630 ft^3/s, Sept. 25, 1986, gage height, 6.49 ft; minimum daily, 3.2 ft^3/s, Sept. 9, 1983, Oct. 3, 4, 29, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, unknown; maximum recorded gage height, 1.80 ft, Dec. 18; minimum daily discharge, 5.0 ft^3/s, on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	8.0	7.3	7.5	7.4	6.5	12	6.3	5.5	e5.5	e6.5	e5.5
2	13	8.3	7.2	7.5	7.6	6.4	8.9	5.8	5.4	e5.5	e6.5	e5.5
3	13	8.3	6.8	7.7	7.4	7.2	10	5.8	5.4	e5.5	e6.5	e5.0
4	12	8.3	6.9	7.8	7.3	8.3	11	5.8	5.4	e6.0	e6.5	e5.0
5	11	8.3	7.0	7.5	7.4	7.6	9.4	5.8	e5.0	e6.5	e6.5	e5.0
6	11	8.4	6.7	7.3	7.5	7.1	8.5	5.8	e5.0	e7.0	e7.0	e5.0
7	11	7.8	6.8	7.2	7.9	6.6	7.9	6.1	e5.0	e6.5	e7.0	e5.0
8	11	7.5	6.7	7.4	7.5	6.1	7.3	5.9	e5.0	e6.0	e7.0	e5.0
9	10	7.2	6.6	7.3	7.7	6.0	7.3	6.0	e5.0	e5.5	e6.5	e5.0
10	10	7.4	6.8	7.7	7.3	5.7	7.2	6.0	e5.5	e6.0	e7.0	e5.0
11	9.6	7.4	6.9	8.2	7.5	5.8	7.1	6.0	e5.0	e5.5	e7.0	e5.0
12	9.6	7.3	6.6	8.4	7.6	6.1	6.8	6.0	e5.0	e5.5	e7.0	e5.0
13	9.4	7.7	6.8	7.9	7.9	6.8	6.8	6.0	e5.0	e5.5	e7.0	e5.0
14	9.5	7.8	6.9	7.7	7.1	6.6	6.8	6.0	e5.0	e5.5	e7.0	e5.0
15	9.3	7.7	7.0	7.4	6.7	6.3	6.8	5.9	e5.0	e5.5	e7.0	e5.0
16	9.4	7.8	6.9	7.3	6.6	6.3	6.8	5.8	e5.0	e5.5	e7.5	e6.0
17	9.4	7.6	7.2	7.5	6.6	6.3	6.9	5.9	e5.0	e6.0	e7.5	e5.5
18	9.3	7.6	8.6	7.8	6.4	6.4	6.8	6.4	e5.0	e8.0	e7.5	e5.0
19	9.2	8.0	7.7	7.5	6.6	6.3	7.2	5.8	e7.0	e7.0	e7.0	e5.0
20	9.0	9.6	7.6	7.6	6.3	6.1	7.1	5.7	e6.0	e6.0	e6.5	e5.0
21	9.2	12	7.8	7.8	6.4	6.2	6.9	5.5	e5.5	e7.0	e6.5	e5.0
22	9.0	9.1	7.8	7.6	6.5	6.4	6.9	5.5	e6.0	e6.5	e6.5	e5.0
23	8.8	8.6	7.9	7.5	6.4	6.0	6.6	5.6	e5.5	e6.0	e6.5	e5.0
24	9.0	10	7.8	7.5	6.4	5.9	6.6	5.5	e5.5	e6.0	e7.5	e5.0
25	8.8	9.0	7.8	7.4	6.3	6.5	6.5	5.4	e5.5	e6.0	e7.0	e5.0
26	8.8	8.8	7.8	7.4	6.3	7.3	6.3	5.7	e5.5	e6.0	e8.0	e5.0
27	8.8	8.4	7.6	7.4	6.4	7.4	6.3	7.6	e5.5	e6.0	e7.5	e6.5
28	8.7	8.4	7.5	7.4	6.3	6.7	6.4	7.9	e5.5	e6.0	e6.5	e6.0
29	8.1	7.9	7.6	7.6	---	6.3	6.3	5.7	e5.5	e6.5	e6.5	e5.5
30	8.4	7.3	7.7	7.5	---	8.4	6.4	5.3	e5.5	e7.0	e6.0	e5.5
31	8.4	---	7.4	7.5	---	15	---	5.4	---	e6.5	e6.0	---
TOTAL	306.7	247.5	225.7	234.8	195.3	212.6	223.8	183.9	160.7	189.5	212.5	156.0
MEAN	9.89	8.25	7.28	7.57	6.97	6.86	7.46	5.93	5.36	6.11	6.85	5.20
MAX	15	12	8.6	8.4	7.9	15	12	7.9	7.0	8.0	8.0	6.5
MIN	8.1	7.2	6.6	7.2	6.3	5.7	6.3	5.3	5.0	5.5	6.0	5.0
AC-FT	608	491	448	466	387	422	444	365	319	376	421	309

CAL YR 1986 TOTAL 3236.5 MEAN 8.87 MAX 323 MIN 3.5 AC-FT 6420
WTR YR 1987 TOTAL 2549.0 MEAN 6.98 MAX 15 MIN 5.0 AC-FT 5060

e Estimated

06166000 BEAVER CREEK BELOW GUSTON COULEE, NEAR SACO, MT

LOCATION.--Lat 48°21'25", long 107°34'48", in SE¼SW¼NW¼ sec.16, T.30 N., R.32 E., Phillips County, Hydrologic Unit 10050014, on right bank, 25 ft upstream from bridge on county road, 13 mi southwest of Saco, 22.5 river miles downstream from Guston Coulee, and at mile 61.1.

DRAINAGE AREA.--1,208 mi^2.

PERIOD OF RECORD.--April 1981 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 2,215 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Oct. 22-31, Mar. 1-30, June 2-16, and Sept. 11-30. Records fair except those for estimated daily discharges, which are poor. Some regulation by numerous small reservoirs on tributary streams. Diversions for irrigation upstream from gage.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 23,500 ft^3/s, Sept. 26, 1986, gage height, 14.68 ft, from slope-area determination of peak flow; no flow at times each year.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 2,590 ft^3/s, Oct. 1, gage height, 11.47 ft; no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2220	---	---	---	---	e.00	332	9.8	e35	5.4	8.7	19
2	1640	---	---	---	---	e.00	539	8.2	e25	.49	8.2	13
3	1350	---	---	---	---	e.00	686	7.7	e20	.05	9.2	6.2
4	929	---	---	---	---	e.00	550	6.1	e15	.0	11	13
5	604	---	---	---	---	e5.0	452	7.3	e10	.00	13	22
6	466	---	---	---	---	e10	411	6.5	e6.0	.00	11	20
7	347	---	---	---	---	e10	279	5.2	e4.5	.03	15	14
8	282	---	---	---	---	e8.0	172	4.8	e3.5	.0	13	13
9	247	---	---	---	---	e5.0	128	7.2	e2.5	.00	12	14
10	216	---	---	---	---	e5.0	102	14	e2.0	.00	13	22
11	194	---	---	---	---	e5.0	82	10	e1.0	.00	14	e15
12	182	---	---	---	---	e10	66	10	e.50	.00	10	e14
13	166	---	---	---	---	e15	57	8.7	e.50	.00	9.3	e12
14	151	---	---	---	---	e15	47	4.8	e.50	.00	9.4	e10
15	144	---	---	---	---	e15	42	4.4	e1.0	.00	11	e10
16	134	---	---	---	---	e15	34	5.2	e.50	.00	12	e9.0
17	122	---	---	---	---	e20	28	7.7	.48	.00	11	e9.0
18	117	---	---	---	---	e30	25	4.8	.43	.00	12	e8.0
19	110	---	---	---	---	e25	21	9.8	.29	.07	16	e8.0
20	104	---	---	---	---	e15	21	5.3	.23	1.1	14	e7.0
21	103	---	---	---	---	e15	20	6.1	.17	11	13	e7.0
22	e100	---	---	---	---	e15	20	10	.10	12	18	e6.5
23	e95	---	---	---	---	e17	9.9	4.8	.12	13	20	e6.5
24	e90	---	---	---	---	e20	14	9.8	115	13	15	e6.0
25	e84	---	---	---	---	e15	13	25	123	13	13	e6.0
26	e78	---	---	---	---	e10	16	13	67	13	18	e5.5
27	e74	---	---	---	---	e10	9.3	28	53	12	21	e5.5
28	e70	---	---	---	---	e20	14	105	41	14	24	e5.5
29	e67	---	---	---	---	e35	12	75	32	14	26	e5.0
30	e64	---	---	---	---	e80	9.8	22	19	12	24	e5.0
31	e60	---	---	---	---	158	---	48	---	9.3	16	---
TOTAL	10610	---	---	---	---	603.00	4212.0	494.2	579.32	143.44	440.8	316.7
MEAN	342	---	---	---	---	19.5	140	15.9	19.3	4.63	14.2	10.6
MAX	2220	---	---	---	---	158	686	105	123	14	26	22
MIN	60	---	---	---	---	.00	9.3	4.4	.10	.00	8.2	5.0
AC-FT	21040	---	---	---	---	1200	8350	980	1150	285	874	628

e Estimated

06169500 ROCK CREEK BELOW HORSE CREEK, NEAR INTERNATIONAL BOUNDARY

(Hydrologic bench-mark station)

LOCATION.--Lat 48°58'10", long 106°50'20", in NE¼NW¼ sec.15, T.37 N., R.37 E., Valley County, Hydrologic Unit 10050015, on right bank 2 mi south of international boundary, 3 mi downstream from Horse Creek, 21 mi northwest of Opheim, MT, and at mile 82.0.
DRAINAGE AREA.--328 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1916 to October 1926, September 1956 to current year (seasonal records only prior to October 1978). Monthly discharge only for some periods, published in WSP 1309. Published as Rock Creek near Barnard, Mt. 1916-17. Prior to September 1956, records were collected at both Horse Creek (1914-56) and Rock Creek above Horse Creek (1914-56). Summations are equivalent to records at this site.
REVISED RECORDS.--WSP 1509: 1925(M), WSP 1729: Drainage area.
GAGE.--Water-stage recorder. Elevation of gage is 2,530 ft, from topographic map. March 1916 to October 1926, nonrecording gages at several sites within 500 ft upstream at different datum.
REMARKS.--Estimated daily discharges: Oct. 11 to Apr. 3, Apr. 12 to June 11. Water-discharge records good except those for estimated daily discharges, which are poor. Several small diversions for irrigation upstream from station.
AVERAGE DISCHARGE.--9 years (1979-87), 17.1 ft^3/s, 12,390 acre-ft/yr.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,420 ft^3/s, Apr. 7, 1969, gage height, 12.03 ft; maximum gage height, 13.40 ft, Mar. 29, 1978 (backwater from ice); no flow at times most years.
EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 15, 1952, reached a stage of 12.6 ft, from floodmarks, discharge, 5,110 ft^3/s, by slope-area measurement of peak flow.
EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 250 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 5	---	ice jam	*8.52	Apr. 1	---	450	ice jam
Mar. 7	---	*1,100	ice jam	July 29	1530	323	5.01
Mar. 27	---	350	ice jam				

No flow July 16.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.8	e2.8	e2.3	e1.4	e1.0	e7.0	e330	e3.0	e3.0	.27	88	.83
2	49	e2.8	e2.3	e1.4	e1.1	e7.0	e320	e3.0	e2.5	.24	30	.66
3	59	e2.8	e2.0	e1.4	e1.1	e9.0	e250	e2.5	e2.0	.18	15	.67
4	33	e2.8	e1.7	e1.4	e1.1	e70	159	e2.5	e2.2	.14	9.3	.67
5	18	e2.8	e1.8	e1.4	e1.1	e500	107	e3.0	e1.8	.13	6.8	.66
6	11	e2.8	e1.8	e1.3	e1.1	e700	81	e3.5	e1.5	.13	5.0	.64
7	8.6	e2.8	e1.8	e1.2	e1.5	e900	57	e4.0	e1.3	.09	3.8	.55
8	6.2	e2.6	e1.8	e1.2	e2.0	e450	42	e3.5	e1.1	.08	2.9	.56
9	7.3	e2.4	e1.6	e1.2	e3.0	e200	34	e3.0	e1.0	.05	2.4	.54
10	11	e2.2	e1.4	e1.2	e10	e100	31	e2.5	e1.1	.08	1.8	.56
11	e8.0	e2.0	e1.5	e1.3	e30	e60	34	e2.0	e1.0	.08	1.5	.66
12	e6.0	e2.0	e1.5	e1.4	e40	e40	e27	e1.5	.77	.05	1.1	.61
13	e5.0	e2.1	e1.5	e1.4	e50	e35	e20	e1.5	.68	.04	1.0	.59
14	e4.5	e2.2	e1.5	e1.3	e50	e45	e15	e1.5	.64	.03	1.5	.58
15	e4.0	e2.2	e1.5	e1.0	e35	e50	e12	e1.5	.53	.02	1.6	.58
16	e3.8	e2.2	e1.5	e.90	e25	e60	e10	e1.5	.43	.00	1.3	.76
17	e3.6	e2.1	e1.5	e.80	e30	e55	e9.0	e1.5	.37	.06	1.4	.75
18	e3.4	e2.0	e1.5	e1.0	e25	e50	e8.0	e1.5	.30	.68	1.6	.73
19	e3.4	e2.0	e1.5	e1.0	e28	e45	e8.0	e1.5	.27	1.2	1.5	.74
20	e3.2	e2.0	e1.4	e1.0	e25	e40	e7.0	e1.5	.28	5.5	2.8	.78
21	e3.2	e2.1	e1.4	e1.0	e25	e35	e6.0	e1.3	.28	5.6	3.9	.79
22	e3.2	e2.2	e1.5	e1.0	e20	e32	e6.0	e1.1	.28	2.8	2.7	.68
23	e3.0	e2.3	e1.5	e.90	e16	e29	e6.0	e1.0	.27	2.2	1.9	.67
24	e3.0	e2.4	e1.5	e.90	e13	e26	e5.0	e1.0	.21	2.4	1.5	.68
25	e3.0	e2.4	e1.5	e.90	e12	e24	e4.5	e1.0	.18	1.8	1.3	.64
26	e3.0	e2.4	e1.5	e1.0	e10	e50	e4.0	e2.0	.19	1.4	1.3	.67
27	e3.0	e2.4	e1.5	e1.0	e9.0	e220	e3.5	e3.0	.21	1.0	1.2	.68
28	e3.0	e2.4	e1.5	e1.0	e8.0	e200	e3.0	e2.5	.31	.85	1.1	.66
29	e3.0	e2.4	e1.5	e1.0	---	e120	e3.0	e2.0	.34	233	1.0	.65
30	e3.0	e2.3	e1.5	e1.1	---	e90	e3.0	e2.0	.31	181	.98	.65
31	e3.0	---	e1.5	e1.0	---	e130	---	e2.5	---	76	.98	---
TOTAL	289.2	70.9	49.8	35.00	474.0	4379.0	1605.0	65.4	25.35	517.10	198.16	19.89
MEAN	9.33	2.36	1.61	1.13	16.9	141	53.5	2.11	.84	16.7	6.39	.66
MAX	59	2.8	2.3	1.4	50	900	330	4.0	3.0	233	88	.83
MIN	3.0	2.0	1.4	.80	1.0	7.0	3.0	1.0	.18	.00	.98	.54
AC-FT	574	141	99	69	940	8690	3180	130	50	1030	393	39

CAL YR 1986 TOTAL 11467.86 MEAN 31.4 MAX 1000 MIN .00 AC-FT 22750
WTR YR 1987 TOTAL 7728.75 MEAN 21.2 MAX 900 MIN .00 AC-FT 15330

e Estimated

MILK RIVER BASIN

06169500 ROCK CREEK BELOW HORSE CREEK, NEAR INTERNATIONAL BOUNDARY--Continued
(Hydrologic bench-mark station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1964-65, 1977 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)
NOV								
25...	1230	2.4	0	0	1580	-2.0	0.0	705
JAN								
13...	1000	1.4	--	--	1390	2.0	0.0	--
FEB								
20...	1015	22	--	--	370	-1.0	0.0	--
MAR								
05...	1030	498	--	--	162	5.0	0.5	--
25...	1145	23	--	--	410	2.0	0.5	--
APR								
07...	1430	55	0	0	325	11.0	10.5	704
JUN								
11...	1400	0.91	0	0	1280	23.0	19.0	698
AUG								
17...	1300	1.4	100	1	750	18.0	15.0	703

DATE	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BICAR-BONATE WATER WHOLE IT-FLD (MG/L) (00450)	CAR-BONATE WATER WHOLE IT-FLD (MG/L) (00447)	ALKA-LINITY WH WAT TOTAL FIELD MG/L AS CACO3 (00410)
NOV							
25...	10.4	77	85	120	--	--	--
JAN							
13...	--	--	--	--	--	--	--
FEB							
20...	--	--	--	--	--	--	--
MAR							
05...	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--
APR							
07...	8.6	84	<1	K4	162	0	135
JUN							
11...	9.3	110	K1	K3	478	37	455
AUG							
17...	8.0	86	K70	K80	--	--	--

DATE	TIME	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV										
25...	1230	8.50	9.6	320	0	55	45	270	7	8.8
APR										
07...	1430	8.00	43	85	0	18	9.6	39	2	5.8
JUN										
11...	1400	9.00	10	180	0	19	31	210	7	8.0
AUG										
17...	1300	8.70	83	120	0	26	14	130	5	7.0

06169500 ROCK CREEK BELOW HORSE CREEK, NEAR INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 to SEPTEMBER 1987

DATE	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUORIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITROGEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
NOV 25...	728	240	6.3	0.40	17	947	1100	1.3	6.1	<0.010
APR 07...	144	31	1.6	0.10	11	212	200	0.29	31	0.010
JUN 11...	466	180	3.4	0.30	1.0	757	730	1.0	1.9	<0.010
AUG 17...	313	95	3.8	0.20	15	485	480	0.66	1.8	<0.010

DATE	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHORUS, TOTAL (MG/L AS P) (00665)	PHOSPHORUS, DIS-SOLVED (MG/L AS P) (00666)	PHOSPHORUS, ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUMINUM, DIS-SOLVED (UG/L AS AL) (01106)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)
NOV 25...	<0.100	<0.010	<0.010	0.60	0.020	0.040	<0.010	<10	3	90
APR 07...	<0.100	0.080	0.060	1.9	0.160	0.080	0.040	440	2	44
JUN 11...	<0.100	0.020	<0.010	1.0	0.090	0.010	<0.010	40	2	51
AUG 17...	<0.100	0.060	0.040	1.7	0.220	0.030	0.010	90	5	67

DATE	BERYLLIUM, DIS-SOLVED (UG/L AS BE) (01010)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHROMIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGANESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)
NOV 25...	<0.5	<1	<1	<3	2	16	<5	180	19	0.2
APR 07...	<0.5	<1	<1	<3	4	390	<5	30	12	0.1
JUN 11...	<0.5	2	<1	<3	8	12	<5	140	6	0.4
AUG 17...	<0.5	<1	<1	<3	4	83	<5	73	10	<0.1

DATE	MOLYBDENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELENIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRONTIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANADIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	SEDIMENT, SUS-PENDED (MG/L) (80154)	SEDIMENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 25...	<10	5	<1	<1	550	<6	9	116	0.75	70
APR 07...	<10	4	<1	<1	140	<6	15	116	17	96
JUN 11...	10	<1	<1	<1	300	<6	11	35	0.09	84
AUG 17...	<10	9	<1	<1	240	<6	4	118	0.45	92

DATE	TIME	GROSS ALPHA, DIS-SOLVED (UG/L AS U-NAT) (80030)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT) (80040)	GROSS BETA, DIS-SOLVED (PCI/L AS CS-137) (03515)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137) (03516)	GROSS BETA, DIS-SOLVED (PCI/L AS SR/YT-90) (80050)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/YT-90) (80060)	RADIUM 226, DIS-SOLVED, RADON METHOD (PCI/L) (09511)	URANIUM DIS-SOLVED, EXTRACTION (UG/L) (80020)
JUN 11...	1400	<0.4	<0.4	13	1.4	8.5	1.3	0.09	2.2
AUG 17...	1300	5.6	4.2	12	3.6	8.4	3.2	0.08	--

06169600 SOUTH CREEK TRIBUTARY NEAR OPHEIM, MT

LOCATION.--Lat 48°52'31", long 106°38'17", in NW¼SE¼ sec.17, T.36 N., R.39 E., Valley County, Hydrologic Unit 10050015, at culvert on county road 0.8 mi upstream of South Creek, 2.1 mi east of Wagon Reservoir, and 10.5 mi west of Opheim.

DRAINAGE AREA.--2.15 mi^2.

PERIOD OR RECORD.--May 1983 to September 1987 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 2,730 ft, from topographic map.

REMARKS.--Estimated daily discharges: Feb. 15 to Mar. 3 and Mar. 8-30. Records good except those for estimated discharges, which are poor. No known diversions for irrigation upstream from station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 56 ft^3/s, Aug. 28, 1985, gage height, 5.96 ft, on basis of indirect culvert computation; no flow most days most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7.3 ft^3/s, Mar. 4, gage height, 3.08 ft; no flow most days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00
2	.01	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00
3	.01	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	3.5	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	1.9	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.06	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	2.7	e.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	4.1	e.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	2.8	e.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	3.2	e.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	3.9	e.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	3.4	e.00	.00	.00	.00	.00	1.0	.00
15	.00	.00	.00	.00	e1.0	e.00	.00	.00	.00	.00	.06	.00
16	.00	.00	.00	.00	e.50	e.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	e.20	e.00	.00	.00	.00	.00	.01	.00
18	.00	.00	.00	.00	e1.0	e.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	e.50	e.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	e.10	e.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	e.00	e.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	e.00	e.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	e.00	e.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	e.00	e.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	e.00	e.50	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	e.00	e1.5	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	e.00	e.50	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	e.00	e.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	e.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	---	e.00	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	.02	.00	.00	.00	23.40	7.97	.00	.00	.00	.00	1.07	.00
MEAN	.001	.00	.00	.00	.84	.26	.00	.00	.00	.00	.035	.00
MAX	.01	.00	.00	.00	4.1	3.5	.00	.00	.00	.00	1.0	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.04	.0	.0	.0	46	16	.0	.0	.0	.0	2.1	.0

CAL YR 1986 TOTAL 91.94 MEAN .25 MAX 10 MIN .00 AC-FT 182
WTR YR 1987 TOTAL 32.46 MEAN .089 MAX 4.1 MIN .00 AC-FT 64

e Estimated

06169700 SOUTH CREEK TRIBUTARY NO. 2 NEAR OPHEIM, MT

LOCATION.--Lat 48°53'19", long 106°39'35", in NW¼SE¼ sec.7, T.36 N., R.39 E., Valley County, Hydrologic Unit 10050015, just upstream of county road, 1.4 mi northeast of Wagon Reservoir, 1.6 mi upstream of South Creek, and 12 mi west of Opheim.

DRAINAGE AREA.--1.62 mi^2.

PERIOD OF RECROD.--May 1983 to September 1987 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 2,680 ft, from topographic map.

REMARKS.--Estimated daily discharge: Oct. 1 to Nov. 27, Jan. 20 to Mar. 2, Mar. 6 to Apr. 6. Records poor. No known diversions for irrigation upstream of station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 459 ft^3/s, Aug. 28, 1985, gage height, 5.17 ft, rating then in use; maximum gage height, 6.81 ft, Sept. 25, 1986; no flow most days most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 46 ft^3/s, July 29, gage height, 6.27 ft, rating then in use; maximum gage height, 6.81 ft, Sept. 25; no flow most days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e1.5	e.00	.00	.00	e.00	e.00	e.00	.00	.00	37	.00	.00
2	e1.0	e.00	.00	.00	e.00	e.50	e.00	.00	.00	48	.00	.00
3	e.20	e.00	.00	.00	e.00	1.1	e.00	.00	.00	.00	1.4	.00
4	e.00	e.00	.00	.00	e.00	11	e.00	.00	.00	.00	.11	.00
5	e.00	e.00	.00	.00	e.00	2.3	e.00	.00	.00	.00	.00	.00
6	e.00	e.00	.00	.00	e.00	e.00	e.00	.00	.00	.00	.00	.00
7	e.00	e.00	.00	.00	e.00	e.00	.00	.00	.00	4.3	.00	.00
8	e.00	e.00	.00	.00	e.00	e.00	.00	.00	.00	.00	.00	.00
9	e.00	e.00	.00	.00	e.50	e.00	.00	.00	.00	.00	.00	.00
10	e.00	e.00	.00	.00	e1.0	e.00	.00	.00	.00	.79	.00	.00
11	e.00	e.00	.00	.00	e2.0	e.00	.00	.00	.00	.00	.00	.00
12	e.00	e.00	.00	.00	e4.0	e.00	.00	.00	.00	.32	.00	.00
13	e.00	e.00	.00	.00	e2.0	e.00	.00	.00	.00	.00	.00	.00
14	e.00	e.00	.00	.00	e2.0	e.00	.00	.00	.00	.00	.00	.00
15	e.00	e.00	.00	.00	e2.0	e.00	.00	.00	.00	.00	.00	.00
16	e.00	e.00	.00	.00	e1.0	e.00	.00	.00	.00	.00	.00	.00
17	e.00	e.00	.00	.00	e2.0	e.00	.00	.00	.00	.00	.00	.00
18	e.00	e.00	.00	.00	e5.0	e.00	.00	.00	.00	65	.00	.00
19	e.00	e.00	.00	.00	e3.0	e.00	.00	.00	.00	.00	.00	.00
20	e.00	e.00	.00	e.00	e.10	e.00	.00	.00	.00	.00	.00	.00
21	e.00	e.00	.00	e.00	e.00	e.00	.00	.00	.00	.00	.00	.00
22	e.00	e.00	.00	e.00	e.00	e.00	.00	.00	.00	.00	.00	.00
23	e.00	e.00	.00	e.00	e.00	e.00	.00	.00	.00	.00	.00	.00
24	e.00	e.00	.00	e.00	e.00	e.00	.00	.00	.00	.00	.00	.00
25	e.00	e.00	.00	e.00	e.00	e1.0	.00	.00	.00	.00	.00	.00
26	e.00	e.00	.00	e.00	e.00	e2.0	.00	.00	.00	.00	.00	.00
27	e.00	e.00	.00	e.00	e.00	e1.0	.00	.00	.00	.00	.00	.00
28	e.00	.00	.00	e.00	e.00	e.00	.00	.00	.00	.00	.00	.00
29	e.00	.00	.00	e.00	---	e.00	.00	.00	.00	8.7	.00	.00
30	e.00	.00	.00	e.00	---	e.00	.00	.00	.00	.13	.00	.00
31	e.00	---	.00	e.00	---	e.00	---	.00	---	.03	.00	---
TOTAL	2.70	.00	.00	.00	24.60	18.90	.00	.00	.00	164.27	1.51	.00
MEAN	.087	.00	.00	.00	.88	.61	.00	.00	.00	5.30	.049	.00
MAX	1.5	.00	.00	.00	5.0	11	.00	.00	.00	65	1.4	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	5.4	.0	.0	.0	49	37	.0	.0	.0	326	3.0	.0

CAL YR 1986 TOTAL 211.63 MEAN .58 MAX 31 MIN .00 AC-FT 420
WTR YR 1987 TOTAL 211.98 MEAN .58 MAX 65 MIN .00 AC-FT 420

e Estimated

06169800 SOUTH CREEK TRIBUTARY NO.3 NEAR INTERNATIONAL BOUNDARY

LOCATION.--Lat 48°56'24", long 106°48'58", in NE¼SW¼ sec.23, T.37 N., R.37 E., Valley County, Hydrologic Unit 10050015, at upstream end of culvert on county road, 2.2 mi upstream of mouth, 3.7 mi south of international boundary, and 20 mi west of Opheim.

DRAINAGE AREA.--0.32 mi^2.

PERIOD OF RECORD.--May 1983 to September 1987 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 2,590 ft, from topographic map.

REMARKS.--Estimated daily discharge: Oct. 1-2, Feb. 9 to Apr. 5, July 29, 30. Records poor. No known diversions for irrigation upstream of station. No observations of specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16 ft^3/s, July 29, 1987, gage height, 5.34 ft, from highwater mark; no flow most days each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 16 ft^3/s, July 29, gage height, 5.34 ft, from highwater mark; no flow most days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.40	.00	.00	.00	.00	e.10	e.00	.00	.00	.00	e.00	.00
2	e.01	.00	.00	.00	.00	e.50	e.00	.00	.00	.00	e.00	.00
3	.00	.00	.00	.00	.00	e1.0	e.00	.00	.00	.00	e.00	.00
4	.00	.00	.00	.00	.00	e2.0	e.00	.00	.00	.00	e.00	.00
5	.00	.00	.00	.00	.00	e.10	e.00	.00	.00	.00	e.00	.00
6	.00	.00	.00	.00	.00	e.00	.00	.00	.00	.00	e.00	.00
7	.00	.00	.00	.00	.00	e.00	.00	.00	.00	.00	e.00	.00
8	.00	.00	.00	.00	.00	e.00	.00	.00	.00	.00	e.00	.00
9	.00	.00	.00	.00	e.00	e.00	.00	.00	.00	.00	e.00	.00
10	.00	.00	.00	.00	e.20	e.00	.00	.00	.00	.00	e.00	.00
11	.00	.00	.00	.00	e.30	e.00	.00	.00	.00	.00	e.00	.00
12	.00	.00	.00	.00	e.50	e.00	.00	.00	.00	.00	e.00	.00
13	.00	.00	.00	.00	e.20	e.00	.00	.00	.00	.00	e.00	.00
14	.00	.00	.00	.00	e.20	e.00	.00	.00	.00	.00	e.00	.00
15	.00	.00	.00	.00	e.20	e.00	.00	.00	.00	.00	e.00	.00
16	.00	.00	.00	.00	e.10	e.00	.00	.00	.00	.00	e.00	.00
17	.00	.00	.00	.00	e.50	e.00	.00	.00	.00	.00	e.00	.00
18	.00	.00	.00	.00	e1.0	e.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	e.50	e.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	e.00	e.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	e.00	e.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	e.00	e.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	e.00	e.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	e.00	e.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	e.00	e.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	e.00	e.20	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	e.00	e.10	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	e.00	e.05	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	e.00	.00	.00	.00	e2.9	.00	.00
30	.00	.00	.00	.00	---	e.00	.00	.00	.00	e.00	.00	.00
31	.00	---	.00	.00	---	e.00	---	.00	---	.00	.00	---
TOTAL	.41	.00	.00	.00	3.70	4.05	.00	.00	.00	2.90	.00	.00
MEAN	.013	.00	.00	.00	.13	.13	.00	.00	.00	.094	.00	.00
MAX	.40	.00	.00	.00	1.0	2.0	.00	.00	.00	2.9	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.8	.0	.0	.0	7.3	8.0	.0	.0	.0	5.8	.0	.0

CAL YR 1986 TOTAL 5.28 MEAN .014 MAX 1.3 MIN .00 AC-FT 10
WTR YR 1987 TOTAL 11.06 MEAN .030 MAX 2.9 MIN .00 AC-FT 22

e Estimated

06170050 ROCK CREEK BELOW McEACHERN CREEK, NEAR INTERNATIONAL BOUNDARY

LOCATION.--Lat 48°52'53", long 106°53'54", in SE¼SE¼NE¼ sec.17, T.36 N., R.37 E., Valley County, Hydrologic Unit 10050015, on left bank 300 ft north of county road, 1 mi east of old townsite of Thoeny, 3.2 mi downstream of McEachern Creek, 8 mi south of international boundary, and 23 mi west of Opheim.

DRAINAGE AREA.--650 mi^2.

PERIOD OF RECORD.--May 1983 to September 1987 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 2,460 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 6 to Mar. 7, 12-26, 30. Records fair except those for estimated daily discharges, which are poor. Numerous diversions for irrigation upstream of 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.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 2,000 ft^3/s, Mar. 5, 1986, backwater from ice; no flow on many days each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,840 ft^3/s, Mar. 7, gage height, 6.12 ft; maximum gage height unknown, but probably occurred Mar. 6; no flow July 13, 14, 16.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	3.4	e2.2	e1.0	e.75	e20	398	5.5	4.4	.43	282	1.5
2	37	3.4	e2.2	e1.0	e.80	e20	495	5.5	3.8	.30	133	1.3
3	110	3.4	e2.0	e1.0	e.80	e20	365	5.5	3.5	.22	82	1.2
4	62	3.4	e1.6	e1.0	e.80	e60	220	4.7	3.7	.20	54	1.0
5	26	3.4	e1.6	e1.0	e.85	e800	154	4.7	3.7	.16	41	.91
6	15	e3.4	e1.6	e.95	e.90	e1200	125	5.5	3.3	.13	32	.91
7	13	e3.4	e1.4	e.90	e1.0	e1400	98	5.9	2.6	.16	26	.91
8	10	e3.0	e1.3	e.85	e1.5	1110	82	6.7	1.8	.17	18	.91
9	7.8	e2.5	e1.2	e.80	e2.5	523	61	5.5	1.6	.20	8.8	.99
10	8.8	e2.3	e1.1	e.75	e5.0	333	49	4.1	1.7	.11	6.7	.96
11	9.5	e2.2	e1.2	e.75	e10	189	48	3.3	1.7	.09	3.7	1.0
12	7.8	e2.1	e1.2	e.80	e30	e120	40	2.9	1.6	.04	2.6	1.0
13	6.8	e2.0	e1.2	e.80	e70	e100	28	2.4	1.3	.00	2.4	.80
14	5.5	e2.2	e1.2	e.75	e120	e90	23	2.4	1.1	.00	2.4	.75
15	5.1	e2.2	e1.2	e.70	e100	e100	21	2.4	.88	.02	2.7	.84
16	4.4	e2.2	e1.2	e.65	e90	e115	19	2.4	.91	.00	3.1	1.1
17	4.4	e2.2	e1.2	e.60	e80	e110	16	2.1	.80	.11	3.0	1.2
18	4.1	e2.0	e1.2	e.65	e80	e100	15	2.2	.64	.96	2.8	1.0
19	4.1	e2.0	e1.1	e.70	e80	e90	13	2.5	.76	1.4	2.7	1.0
20	3.7	e2.0	e1.0	e.70	e85	e80	13	2.2	.87	1.1	2.4	1.0
21	3.7	e2.2	e1.0	e.70	e90	e70	12	2.1	.90	3.0	2.1	.78
22	3.7	e2.2	e1.1	e.70	e75	e65	11	1.8	.72	17	3.1	.75
23	3.5	e2.2	e1.1	e.65	e60	e60	11	1.8	.70	11	4.1	.75
24	3.4	e2.2	e1.1	e.60	e50	e55	11	1.9	.61	6.7	3.4	.75
25	3.4	e2.4	e1.1	e.60	e40	e55	10	1.9	.53	4.4	2.7	.75
26	3.4	e2.4	e1.1	e.60	e35	e80	8.9	2.5	.53	3.7	2.6	.93
27	3.7	e2.4	e1.1	e.65	e30	269	7.7	3.9	.51	3.6	2.5	.98
28	3.5	e2.4	e1.1	e.70	e25	583	7.3	4.0	.45	7.6	2.1	.91
29	3.4	e2.4	e1.1	e.70	---	339	5.9	3.7	.42	1060	1.8	1.0
30	3.7	e2.4	e1.1	e.70	---	e200	5.5	3.1	.42	568	1.6	1.2
31	3.5	---	e1.1	e.70	---	178	---	3.7	---	222	1.5	---
TOTAL	393.9	75.9	39.9	23.65	1164.90	8534	2373.3	108.8	46.45	1912.80	738.8	29.08
MEAN	12.7	2.53	1.29	.76	41.6	275	79.1	3.51	1.55	61.7	23.8	.97
MAX	110	3.4	2.2	1.0	120	1400	495	6.7	4.4	1060	282	1.5
MIN	3.4	2.0	1.0	.60	.75	20	5.5	1.8	.42	.00	1.5	.75
AC-FT	781	151	79	47	2310	16930	4710	216	92	3790	1470	58

CAL YR 1986 TOTAL 21284.28 MEAN 58.3 MAX 2000 MIN .00 AC-FT 42220
WTR YR 1987 TOTAL 15441.37 MEAN 42.3 MAX 1400 MIN .00 AC-FT 30630

e Estimated

MILK RIVER BASIN

06170080 STARBUCK COULEE NEAR INTERNATIONAL BOUNDARY

LOCATION.--Lat 48°51'39", long 106°53'56", in SW¼SE¼SE¼ sec.20, T.36 N., R.37 E., Valley County, at the upstream end of culvert on old road, 0.4 mi upstream of mouth, 1.6 mi south of county road, and 22 mi west of Opheim.

DRAINAGE AREA.--4.16 mi^2.

PERIOD OF RECORD.--May 1983 to September 1987 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 2,460 ft, from topographic map.

REMARKS.--Estimated daily discharges: Feb. 8 to Mar. 2, Mar. 8-30. Records fair except those for estimated daily discharges, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 101 ft^3/s, July 29, 1987, gage height, 5.30 ft; no flow most days each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 101 ft^3/s, July 29, gage height, 5.30 ft; no flow most days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.9	.00	R.00	.00	.00	e.50	.00	.00	.00	.00	.0	.00
2	3.9	.00	.00	.00	.00	e2.0	.00	.00	.00	.00	.00	.00
3	.62	.00	.00	.00	.00	3.9	.00	.00	.00	.00	.00	.00
4	.30	.00	.00	.00	.00	21	.00	.00	.00	.00	.00	.00
5	.22	.00	.00	.00	.00	5.1	.00	.00	.00	.00	.00	.00
6	.15	.00	.00	.00	.00	2.8	.00	.00	.00	.00	.00	.00
7	.10	.00	.00	.00	.00	1.3	.00	.00	.00	.00	.00	.00
8	.09	.00	.00	.00	e.01	e.50	.00	.00	.00	.00	.00	.00
9	.07	.00	.00	.00	e.20	e.10	.00	.00	.00	.00	.00	.00
10	.06	.00	.00	.00	e.50	e.00	.00	.00	.00	.00	.00	.00
11	.05	.00	.00	.00	e1.0	e.00	.00	.00	.00	.00	.00	.00
12	.04	.00	.00	.00	e2.5	e.00	.00	.00	.00	.00	.00	.00
13	.03	.00	.00	.00	e2.0	e.50	.00	.00	.00	.00	.00	.00
14	.01	.00	.00	.00	e2.0	e.40	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	e2.0	e.50	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	e1.0	e.40	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	e2.0	e.25	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	e8.0	e.25	.00	.00	.00	.07	.00	.00
19	.00	.00	.00	.00	e6.0	e.25	.00	.00	.00	.03	.00	.00
20	.00	.00	.00	.00	e2.5	e.30	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	e1.0	e.25	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	e.20	e.20	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	e.00	e.10	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	e.00	e.05	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	e.00	e1.0	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	e.00	e2.5	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	e.00	e1.0	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	e.00	e.50	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	e.30	.00	.00	.00	15	.00	.00
30	.00	.00	.00	.00	---	e.10	.00	.00	.00	.91	.00	.00
31	.00	---	.00	.00	---	.01	---	.00	---	.11	.00	---
TOTAL	9.54	.00	.00	.00	30.91	46.06	.00	.00	.00	16.12	.00	.00
MEAN	.31	.00	.00	.00	1.10	1.49	.00	.00	.00	.52	.00	.00
MAX	3.9	.00	.00	.00	8.0	21	.00	.00	.00	15	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	19	.0	.0	.0	61	91	.0	.0	.0	32	.0	.0

CAL YR 1986 TOTAL 139.04 MEAN .38 MAX 20 MIN .00 AC-FT 276
WTR YR 1987 TOTAL 102.63 MEAN .28 MAX 21 MIN .00 AC-FT 204

e Estimated

06172000 MILK RIVER NEAR VANDALIA, MT

LOCATION.--Lat 48°22'21", long 106°58'25", in SW¼SW¼NE¼ sec.7, T.30 N., R.37 E., Valley County, Hydrologic Unit 10050012, on right bank, just downstream of Vandalia Dam, 3.0 mi upstream of Long Coulee, 3.2 mi northwest of Vandalia, and at mile 117.3

DRAINAGE AREA.--20,926 mi^2. Area at site used October 1969 to September 1973, 20,944 mi^2.

PERIOD OF RECORD.--October 1914 to September 1925, August 1928 to September 1939, October 1969 to September 1973, October 1982 to May 31, 1987 (discontinued). April to May 1952 scattered daily elevations, published in WSP 1260-B. Monthly discharge only for some periods, published in WSP 1309. Published as "at Vandalia" October 1969 to September 1973.

REVISED RECORDS.--WSP 1309: 1920(M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,090.00 ft, from topographic map. October 1969 to September 1973, nonrecording gage 7.1 mi downstream at datum 5.00 ft lower.

REMARKS.--Estimated daily discharges: Oct. 1-16 and Nov. 10 to May 31. Records fair except those for estimated daily discharges, which are poor. Since 1917, flow increased during irrigation season by water from St. Mary Canal which diverts from the St. Mary River near Babb. Flow regulated by Fresno and Nelson Reservoirs, five reservoirs in Lodge Creek basin in Saskatchewan, and four reservoirs in Frenchman River basin in Saskatchewan. Water is diverted at Vandalia Dam by canal, capacity about 300 ft^3/s, for irrigation downstream. Diversions upstream from station for irrigation of about 126,000 acres of which about 18,000 acres lies 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.--30 years (1914-25, 1928-39, 1969-73, 1983-86), 654 ft^3/s, 473,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 27,200 ft^3/s, Apr. 1, 1925, gage height, 35.35 ft; maximum gage height, 36.47 ft, Mar. 25, 1939; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 17, 1952, reached an observed stage of 38.67 ft, furnished by the U.S. Army Corps of Engineers; discharge, about 45,000 ft^3/s.

EXTREMES THROUGH MAY.--Maximum daily discharge, 13,000 ft^3/s, Oct. 1; maximum gage height, 34.61 ft, Oct. 1; minimum daily discharge, 19 ft^3/s, May 22-24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e13000	865	e650	e350	e250	e550	e1400	e250				
2	e12500	869	e650	e350	e250	e450	e1600	e300				
3	e11000	869	e600	e350	e250	e450	e2000	e350				
4	e11000	863	e600	e350	e250	e450	e2200	e345				
5	e11000	865	e650	e350	e250	e450	e2100	e350				
6	e10000	880	e600	e350	e250	e550	e2000	e354				
7	e10000	882	e550	e350	e300	e750	e2000	e356				
8	e10000	880	e500	e350	e350	e950	e1900	e95				
9	e9500	830	e450	e350	e400	e1100	e1700	e86				
10	e8500	e500	e500	e350	e400	e1400	e1500	e400				
11	e6500	e500	e500	e350	e350	e1400	e1500	e597				
12	e4000	e500	e500	e350	e350	e1500	e1300	e543				
13	e3000	e550	e450	e400	e350	e1300	e1100	e218				
14	e2700	e500	e450	e350	e350	e1300	e1000	e143				
15	e2300	e450	e400	e300	e350	e1500	e950	e97				
16	e2000	e500	e400	e300	e400	e1800	e900	e58				
17	1790	e550	e400	e300	e500	e2000	e850	e33				
18	1570	e550	e400	e350	e650	e2000	e800	e25				
19	1390	e550	e400	e350	e750	e2100	e750	e33				
20	1270	e550	e400	e350	e650	e2000	e750	e37				
21	1180	e570	e400	e350	e650	e1900	e650	e21				
22	1110	e570	e400	e300	e650	e1800	e600	e19				
23	1060	e570	e400	e300	e650	e1800	e550	e19				
24	1020	e580	e400	e300	e650	e1800	e500	e19				
25	988	e600	e400	e300	e650	e1700	e450	e22				
26	963	e600	e350	e250	e650	e1600	e400	e36				
27	951	e620	e350	e250	e550	e1500	e350	e94				
28	932	e700	e350	e250	e550	e1400	e300	e439				
29	900	e730	e350	e250	---	e1500	e250	e432				
30	893	e760	e350	e250	---	e1400	e250	e297				
31	877	---	e350	e250	---	e1300	---	e324				
TOTAL	143894	19803	14150	9950	12650	41700	32600	6392				
MEAN	4642	660	456	321	452	1345	1087	206				
MAX	13000	882	650	400	750	2100	2200	597				
MIN	877	450	350	250	250	450	250	19				
AC-FT	285400	39280	28070	19740	25090	82710	64660	12680				

e Estimated

MILK RIVER BASIN

06172310 MILK RIVER AT TAMPICO, MT

LOCATION.--Lat 48°18'29", long 106°49'19", in SW¼SW¼SW¼ sec.32, T.30 N., R.38 E., Valley County, Hydrologic Unit 10050012, on right bank, at county bridge 0.8 miles downstream from Buggy Creek and 0.3 miles northeast of Tampico, and at mile 98.7.

DRAINAGE AREA.--21,078 mi^2.

PERIOD OF RECORD.--October 1973 to September 1977, May to September 1987.

GAGE.--Water-stage recorder. Elevation of gage 2,110 ft, from topographic map.

REMARKS.--Estimated daily discharges: May 1-3, 5. Records good. Flow increased during irrigation season by water from St. Mary Canal which diverts from the St. Mary River near Babb. Flow regulated by Fresno and Nelson Reservoirs, five reservoirs in Lodge Creek basin in Saskatchewan, and four reservoirs in Frenchman River basin in Saskatchewan. Many small dams for the diversion of irrigation canals upstream, the closest being Vandalia Dam 19 mi upstream. Diversions upstream from station for irrigation of about 126,000 acres of which about 17,000 acres lies downstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,210 ft^3/s, May 26, 1974, gage height, 23.65 ft; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 17, 1952 reached an observed stage of 38.67 ft at gage 200 ft downstream from Vandalia Dam, furnished by the U.S. Army Corps of Engineers; discharge about 45,000 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge during period May to September, 3,120 ft^3/s, July 31, gage height, 11.83 ft; minimum daily, 19 ft^3/s, May 22-24 and June 18-20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 to SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1								e250	370	168	2280	132
2								e300	377	90	419	128
3								e350	364	31	96	127
4								345	340	21	397	129
5								e350	292	23	405	124
6								354	107	28	345	115
7								356	88	76	242	103
8								95	94	64	136	70
9								86	79	44	127	67
10								400	110	40	128	72
11								597	115	42	131	97
12								543	97	49	144	101
13								218	77	47	115	102
14								143	61	33	100	102
15								97	47	32	37	94
16								58	30	27	35	72
17								33	24	24	109	67
18								25	19	22	106	69
19								33	19	53	92	72
20								37	19	322	128	75
21								21	86	468	131	79
22								19	164	454	128	104
23								19	181	427	125	90
24								19	100	379	109	80
25								22	50	341	102	59
26								36	28	439	107	58
27								94	25	453	132	64
28								439	190	323	134	65
29								432	322	337	133	67
30								297	333	1440	131	68
31								324		3030	132	
TOTAL								6392	4208	9327	6936	2652
MEAN								206	140	301	224	88.4
MAX								597	377	3030	2280	132
MIN								19	19	21	35	58
AC-FT								12680	8350	18500	13760	5260

e Estimated

06174000 WILLOW CREEK NEAR GLASGOW, MT

LOCATION.--Lat 48°06'52", long 106°40'15", in SW¼NW¼NE¼ sec.10, T.27 N., R.39 E., Valley County, Hydrologic Unit 10050012, on right bank 5.8 mi south of Glasgow, and at mile 12.6.

DRAINAGE AREA.--538 mi^2.

PERIOD OF RECORD.--October 1953 to September 1987 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 2,085.63 ft National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REVISED RECORDS.--WSP 1729: Drainage area. WSP 1916: 1960.

REMARKS.--Estimated daily discharge: Oct. 7-19, Nov. 7 to Mar. 30, Apr. 2-9, Apr. 28 to May 26, June 15, 16, July 21-23, 29-31. Records poor. There are more than 270 storage and detention reservoirs upstream. Water-spreader irrigation of about 5,000 acres of hay or pasture lands to extent of available flow. Several observation 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.--34 years, 56.2 ft^3/s, 40,720 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,400 ft^3/s, July 14, 1962, gage height, 21.70 ft; maximum gage height, 23.0 ft, June 21, 1974; no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,050 ft^3/s, Oct. 2, gage height, 19.68 ft; no flow many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1800	6.9	e4.0	e.00	e4.0	e.00	726	e1.0	16	.08	64	3.0
2	1960	8.1	e3.5	e.00	e3.0	e.00	e500	e.50	14	.08	29	3.5
3	1750	7.9	e3.0	e.00	e2.0	e.10	e350	e.00	11	.02	18	3.4
4	1300	7.6	e2.5	e.00	e1.0	e.50	e250	e.00	8.6	.0	9.7	3.8
5	1060	8.8	e2.0	e.00	e.50	e1.0	e180	e.00	8.1	.00	6.0	4.4
6	1000	10	e1.0	e.00	e1.0	e2.0	e130	e.00	8.0	.00	4.0	4.5
7	e750	e9.0	e.50	e.00	e2.0	e3.0	e90	e.00	9.0	.00	2.6	4.4
8	e550	e8.0	e.10	e.00	e2.0	e2.0	e65	e.00	9.5	.00	2.3	3.9
9	e400	e6.0	e.00	e.00	e2.0	e.50	e45	e.00	9.4	.00	2.1	3.6
10	e300	e5.0	e.00	e.00	e2.5	e.10	33	e.00	8.6	.00	2.0	3.5
11	e250	e4.5	e.00	e.00	e3.0	e.20	27	e.00	7.9	.00	2.5	3.2
12	e200	e3.5	e.00	e.00	e3.0	e.50	18	e.00	6.4	.00	2.6	3.1
13	e150	e4.0	e.00	e.00	e2.5	e1.0	12	e.00	6.1	.00	2.6	2.6
14	e100	e3.5	e.00	e.00	e2.0	e.50	11	e.00	5.6	.00	2.4	2.0
15	e75	e3.5	e.00	e.00	e1.0	e.10	10	e.00	e4.5	.00	2.0	1.7
16	e50	e3.5	e.00	e.00	e.50	e.10	7.0	e.00	e3.5	.00	1.7	1.7
17	e40	e3.0	e.00	e.00	e1.0	e.10	8.3	e.00	2.3	.00	4.3	1.6
18	e30	e2.5	e.00	e.00	e1.0	e.10	7.0	e.00	1.6	.00	6.5	1.3
19	e20	e2.5	e.00	e.00	e1.0	e.10	4.8	e.00	1.6	.00	5.7	.93
20	15	e5.0	e.00	e.00	e.50	e.00	4.7	e.00	1.2	.00	5.5	.75
21	13	e100	e.00	e.00	e.10	e.00	7.4	e.00	1.5	e.52	6.0	.51
22	11	e80	e.00	e.00	e.00	e.00	5.7	e.00	1.1	e33	6.1	.40
23	10	e10	e.00	e.00	e.00	e.00	4.4	e.00	1.0	e229	5.8	.31
24	9.9	e10	e.00	e.00	e.00	e.00	4.4	e.00	.62	54	5.7	.25
25	8.5	e15	e.00	e.00	e.00	e.00	6.4	e.00	.37	14	6.5	.23
26	7.1	e9.0	e.00	e.00	e.00	e.00	5.9	e.00	.21	6.5	46	.22
27	6.5	e8.0	e.00	e.10	e.00	e.00	4.8	18	.19	4.9	61	.23
28	5.8	e7.0	e.00	e.50	e.00	e.00	e3.0	27	.17	4.9	27	.24
29	6.5	e6.0	e.00	e5.0	---	e.00	e2.5	138	.15	e308	7.8	.23
30	6.7	e5.0	e.00	e6.0	---	e5.0	e2.0	54	.08	e518	2.7	.22
31	6.5	---	e.00	e5.0	---	99	---	22	---	e231	2.6	---
TOTAL	11891.5	362.8	16.60	16.60	35.60	115.90	2525.3	260.50	148.29	1404.00	352.7	59.72
MEAN	384	12.1	.54	.54	1.27	3.74	84.2	8.40	4.94	45.3	11.4	1.99
MAX	1960	100	4.0	6.0	4.0	99	726	138	16	518	64	4.5
MIN	5.8	2.5	.00	.00	.00	.00	2.0	.00	.08	.00	1.7	.22
AC-FT	23590	720	33	33	71	230	5010	517	294	2780	700	118

CAL YR 1986 TOTAL 61860.55 MEAN 169 MAX 4500 MIN .00 AC-FT 122700
WTR YR 1987 TOTAL 17189.38 MEAN 47.1 MAX 1960 MIN .00 AC-FT 34100

e Estimated

06174500 MILK RIVER AT NASHUA, MT
(National stream quality accounting network station)

LOCATION.--Lat 48°07'47", long 106°21'50", in NE¼NE¼ sec.1, T.27 N., R.41 E., Valley County, Hydrologic Unit 10050012, on right bank at downstream side of former highway bridge site, 0.6 mi southwest of Nashua, 2.0 mi upstream from Porcupine Creek, and at mile 22.7.

DRAINAGE AREA.--22,332 mi^2.

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,027.75 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Oct. 14-16, Nov. 10 to Mar. 28, Apr. 14 to May 10. Water-discharge records good except those for estimated daily discharges, which are poor. Flow increased during irrigation season by water from St. Mary Canal which diverts from the St. Mary River near Babb. Flow regulated by Fresno Reservoir (station number 06136500), two reservoirs in Lodge Creek basin in Saskatchewan, and four reservoirs in Frenchman River basin in Saskatchewan. Diversions for irrigation of about 140,000 acres upstream from station.

AVERAGE DISCHARGE.--48 years, 703 ft^3/s, 509,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 45,300 ft^3/s, Apr. 18, 1952, gage height, 31.38 ft; no flow July 14, 15, July 17 to Aug. 1, Aug. 15 to Sept. 6, 1984, and May 16-19, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 13,700 ft^3/s, Oct. 8, gage height, 26.11 ft; minimum daily, 83 ft^3/s, May 22.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7530	1020	e700	e350	e300	e550	2160	e300	520	290	1280	209
2	7720	984	e700	e350	e250	e600	3010	e300	440	354	1830	211
3	7920	941	e650	e370	e230	e650	4040	e370	447	301	1710	205
4	8650	923	e600	e370	e230	e700	4590	e370	468	217	1000	195
5	10500	904	e600	e370	e250	e800	4640	e370	473	153	468	195
6	12400	885	e600	e350	e300	e900	4310	e370	450	125	392	176
7	13400	878	e600	e320	e300	e1000	3700	e370	393	130	457	174
8	13600	872	e650	e320	e300	e1100	3010	e250	281	135	445	167
9	13300	862	e550	e350	e300	e1000	2390	e150	182	115	382	157
10	12900	e800	e500	e370	e350	e1300	1900	e150	160	157	294	128
11	12500	e800	e550	e400	e450	e1700	1570	e127	198	163	246	103
12	12100	e700	e600	e370	e500	e2000	1500	238	260	149	241	93
13	11600	e750	e550	e400	e500	e2400	1510	476	301	133	268	101
14	11000	e700	e550	e400	e600	e2500	e1500	535	294	138	313	124
15	10800	e700	e600	e390	e650	e2200	e1300	429	276	151	307	144
16	9710	e750	e550	e400	e600	e2200	e1200	305	253	154	300	160
17	7020	e760	e500	e430	e700	e2300	e1100	180	225	136	288	173
18	5250	e700	e400	e450	e800	e2300	e1000	135	192	126	269	173
19	3960	e600	e350	e470	e800	e2300	e900	116	162	143	291	164
20	3100	e600	e300	e450	e850	e2100	e800	106	131	180	309	163
21	2530	e650	e300	e450	e850	e2100	e700	90	107	213	285	164
22	2150	e700	e350	e400	e850	e2100	e700	83	102	247	254	173
23	1860	e650	e400	e350	e800	e1800	e600	97	124	400	232	177
24	1650	e600	e400	e350	e700	e1700	e600	108	223	556	220	178
25	1510	e700	e370	e320	e600	e1500	e550	112	279	516	204	174
26	1390	e700	e370	e330	e500	e1500	e500	137	262	411	189	173
27	1300	e750	e370	e340	e450	e1500	e450	172	201	338	189	171
28	1230	e750	e350	e340	e500	e1400	e400	204	152	339	203	167
29	1170	e700	e350	e340	---	1460	e350	271	102	433	272	167
30	1130	e700	e370	e350	---	1580	e350	576	124	522	256	182
31	1060	---	e370	e340	---	1750	---	684	---	729	215	---
TOTAL	211940	23029	15100	11590	14510	48990	51330	8181	7782	8154	13609	4941
MEAN	6837	768	487	374	518	1580	1711	264	259	263	439	165
MAX	13600	1020	700	470	850	2500	4640	684	520	729	1830	211
MIN	1060	600	300	320	230	550	350	83	102	115	189	93
AC-FT	420400	45680	29950	22990	28780	97170	101800	16230	15440	16170	26990	9800

CAL YR 1986 TOTAL 686467 MEAN 1881 MAX 18400 MIN 42 AC-FT 1362000
WTR YR 1987 TOTAL 419156 MEAN 1148 MAX 13600 MIN 83 AC-FT 831400

e Estimated

06174500 MILK RIVER AT NASHUA, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950-53, 1960 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE:. January 1974 to September 1981.
WATER TEMPERATURE:. January 1974 to September 1979.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1974-81):. Maximum daily, 2,540 microsiemens, Dec.12, 1977; minimum daily, 246 microsiemens, Apr. 14, 1974.
WATER TEMPERATURE (water years 1974-79):. Maximum, 27.0°C, July 20, 21, 1974; minimum, 0.0°C on many days during winter.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)
NOV								
17...	1030	767	100	74	1550	-5.0	0.5	707
JAN								
15...	1045	391	0	0	1860	-22.0	0.0	726
FEB								
20...	1040	848	--	--	1400	-1.0	0.0	--
MAR								
24...	1000	1690	100	2	698	0.0	0.0	715
31...	1115	1710	--	--	800	3.5	1.0	--
APR								
07...	1205	3730	--	--	1840	15.0	4.5	--
MAY								
29...	1300	271	--	0	1440	20.0	17.0	709
JUL								
08...	0945	139	80	1	1300	22.5	22.5	710
SEP								
18...	1100	176	0	0	1400	13.0	15.0	715

DATE	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BICAR-BONATE WATER WHOLE IT-FLD (MG/L) (00450)	CAR-BONATE WATER WHOLE IT-FLD (MG/L) (00447)	ALKA-LINITY WH WAT TOTAL FIELD MG/L AS CACO3 (00410)
NOV							
17...	11.9	90	K34	K11	433	0	346
JAN							
15...	11.9	86	K12	K5	509	0	411
FEB							
20...	--	--	--	--	--	--	--
MAR							
24...	12.0	88	K77	K43	159	0	132
31...	--	--	--	--	--	--	--
APR							
07...	--	--	--	--	--	--	--
MAY							
29...	8.4	94	K20	K16	354	3	291
JUL							
08...	7.6	94	K11	K9	329	0	266
SEP							
18...	8.8	94	K19	K9	360	0	291

DATE	TIME	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV										
17...	1030	7.80	15	510	160	110	56	230	5	7.7
JAN										
15...	1045	7.80	3.8	570	160	120	66	250	5	7.3
MAR										
24...	1000	7.60	100	200	69	44	22	72	2	5.9
MAY										
29...	1300	8.40	5.1	370	81	83	40	170	4	7.4
JUL										
08...	0945	8.20	25	230	--	75	9.9	170	5	7.3
SEP										
18...	1100	8.10	17	370	74	80	40	180	4	6.7

MILK RIVER BASIN

06174500 MILK RIVER AT NASHUA, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)
NOV 17...	353	570	41	0.30	5.3	1290	1200	1.8	2670	<0.010
JAN 15...	197	780	45	0.40	10	1490	1500	2.0	1570	<0.010
MAR 24...	139	210	10	0.20	7.8	461	450	0.63	2100	<0.010
MAY 29...	309	400	35	0.30	4.6	953	910	1.3	697	<0.010
JUL 08...	284	390	32	0.30	13	890	860	1.2	334	<0.010
SEP 18...	179	390	33	0.30	5.7	933	910	1.3	443	<0.010

DATE	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	NITROGEN,AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHORUS, TOTAL (MG/L AS P) (00665)	PHOSPHORUS, DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P) (00671)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 17...	<0.100	0.030	0.030	0.20	0.040	0.010	<0.010	52	108	72
JAN 15...	0.460	0.190	0.190	0.90	0.030	0.010	<0.010	93	98	58
MAR 24...	0.130	0.160	0.130	1.9	0.260	0.040	0.020	263	1200	96
MAY 29...	<0.100	0.050	0.060	1.5	0.080	0.050	<0.010	53	39	87
JUL 08...	<0.100	0.030	0.050	1.0	0.100	0.020	<0.010	57	21	93
SEP 18...	<0.100	0.010	0.030	1.0	0.060	<0.010	<0.010	--	--	--

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)
NOV 17...	1030	10	4	84	<0.5	<1	<1	<3	3	8	<5
MAR 24...	1000	170	3	33	<0.5	<1	<1	<3	5	160	<5
JUL 08...	0945	<10	3	50	1	<1	<1	<3	4	9	<5
SEP 18...	1100	20	3	51	<0.5	<1	<1	<3	3	10	<5

DATE	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
NOV 17...	120	370	<0.1	<10	5	1	<1	930	<6	6
MAR 24...	55	65	0.4	<10	6	<1	<1	340	<6	5
JUL 08...	<4	5	0.1	<10	6	1	<1	680	<6	4
SEP 18...	81	8	0.1	<10	3	2	<1	720	<6	<3

MILK RIVER BASIN

06175000 PORCUPINE CREEK AT NASHUA, MT

LOCATION.--Lat 48°08'09", long 106°20'52", in SW¼NE¼SE¼ sec.31, T.28 N., R.42 E., Valley County, Hydrologic Unit 10050016, on right bank, 30 ft downstream from U.S. Highway 2 bridge, 0.1 mi downstream from Fort Peck Indian Reservation boundary, 0.3 m east of Nashua, and at mile 3.9.

DRAINAGE AREA.--725 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1908 to September 1924 (no winter records 1912-13, 15-16, 22-24), October 1981 to current year. Flows are equivalent if overflow channel just upstream from the present location is gaged.

GAGE.--Water-stage recorder. Elevation of gage is 2,060 ft, from topographic map. July 12, 1908, to Sept. 30, 1924, nonrecording gage 0.5 mi upstream at different datum.

REMARKS.--Estimated daily discharge: Oct. 1 to Mar. 13, June 9 to July 28, Aug. 7 to Sept. 30. Water-discharge records poor. Diversions for irrigation of about 430 acres upstream from station.

AVERAGE DISCHARGE.--14 years (1909-11, 1913-14, 1916-21, 1982-87), 25.0 ft^3/s, 18,110 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,600 ft^3/s, Apr. 13, 1982, gage height, 15.95 ft; maximum gage height, 18.0 ft, Apr. 11, 1916, from floodmark, at previous site and datum; no flow each year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 24, 1939, computed as 35,000 ft^3/s by U.S. Indian Service (now Bureau of Indian Affairs), caused by failure of Middle Fork dam.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 595 ft^3/s, July 30, maximum gage height, 8.68 ft, date unknown, but probably occurred Oct. 8 (backwater from the Milk River); no flow on many days.

DISCHARGE, IN CUBIC FEET PER SEOND WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e1.0	e.00	e.00	e.00	e.00	e.50	246	6.2	.00	e.00	11	e.00
2	e.00	e.00	e.00	e.00	e.00	e1.0	202	6.4	.00	e.00	3.3	e.00
3	e.00	e.00	e.00	e.00	e.00	e10	190	6.8	.00	e.00	.27	e.00
4	e.00	e.00	e.00	e.00	e.00	e100	185	5.8	.00	e.00	.00	e.00
5	e.00	e.00	e.00	e.00	e15	e500	133	5.1	.00	e.00	.00	e.00
6	e.00	e.00	e.00	e.00	e150	e300	101	4.3	.00	e.00	.00	e.00
7	e.00	e.00	e.00	e.00	e130	e200	79	3.4	.00	e.00	e.00	e.00
8	e.00	e.00	e.00	e.00	e100	e130	64	2.8	.00	e.00	e.00	e.00
9	e.00	e.00	e.00	e.00	e90	e90	53	2.1	e.00	e.00	e.00	e.00
10	e.00	e.00	e.00	e.00	e100	e60	46	1.5	e.00	e.00	e.00	e.00
11	e.00	e.00	e.00	e2.0	e100	e50	42	.65	e.00	e.00	e.00	e.00
12	e.00	e.00	e.00	e1.5	e90	e40	39	.42	e.00	e.00	e.00	e.00
13	e.00	e.00	e.00	e1.0	e60	e35	35	.01	e.00	e.00	e.00	e.00
14	e.00	e.00	e.00	e.50	e70	32	33	.00	e.00	e.00	e.00	e.00
15	e.00	e.00	e.00	e.20	e60	29	31	.00	e.00	e.00	e.00	e.00
16	e.00	e.00	e.00	e.10	e50	28	30	.00	e.00	e.00	e.00	e.00
17	e.00	e.00	e.00	e.05	e60	27	28	.00	e.00	e.00	e.00	e.00
18	e.00	e.00	e.00	e.00	e40	26	26	.10	e.00	e.00	e.00	e.00
19	e.00	e.00	e.00	e.00	e25	27	22	3.6	e.00	e.00	e.00	e.00
20	e.00	e.00	e.00	e.00	e15	27	22	1.3	e.00	e.00	e.00	e.00
21	e.00	e5.0	e.00	e.00	e9.0	28	20	.23	e.00	e.00	e.00	e.00
22	e.00	e10	e.00	e.00	e6.0	29	18	.0	e.00	e.00	e.00	e.00
23	e.00	e7.0	e.00	e.00	e4.0	27	17	.00	e.00	e.00	e.00	e.00
24	e.00	e5.0	e.00	e.00	e3.0	26	15	.00	e.00	e.00	e.00	e.00
25	e.00	e4.0	e.00	e.00	e2.0	36	15	.00	e.00	e.00	e.00	e.00
26	e.00	e3.0	e.00	e.00	e.50	67	13	.00	e.00	e.00	e.00	e.00
27	e.00	e2.0	e.00	e.00	e.50	120	11	.21	e.00	e.00	e.00	e.00
28	e.00	e1.0	e.00	e.00	e.50	167	10	2.3	e.00	e.00	e.00	e.00
29	e.00	e.50	e.00	e.00	---	179	7.0	.25	e.00	14	e.00	e.00
30	e.00	e.00	e.00	e.00	---	153	6.4	.0	e.00	196	e.00	e.00
31	e.00	---	e.00	e.00	---	151	---	.00	---	32	e.00	---
TOTAL	1.00	37.50	.00	5.35	1180.50	2695.50	1739.4	53.47	.00	242.00	14.57	.00
MEAN	.032	1.25	.00	.17	42.2	87.0	58.0	1.72	.00	7.81	.47	.00
MAX	1.0	10	.00	2.0	150	500	246	6.8	.00	196	11	.00
MIN	.00	.00	.00	.00	.00	.50	6.4	.00	.00	.00	.00	.00
AC-FT	2.0	74	.0	11	2340	5350	3450	106	.0	480	29	.0

CAL YR 1986 TOTAL 22164.55 MEAN 60.7 MAX 3000 MIN .00 AC-FT 43960
WTR YR 1987 TOTAL 5969.28 MEAN 16.4 MAX 500 MIN .00 AC-FT 11840

e Estimated

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1982 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
FEB 17...	0915	59	100	--	472	-2.0	0.0	110	0	24	12
MAR 24...	1230	26	100	2	930	1.0	1.0	230	0	52	24
APR 29...	1115	8.6	0	0	1250	19.0	16.0	290	0	67	30

DATE	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)
FEB 17...	51	2	6.9	116	100	6.9	0.20	12	280	0.38	45
MAR 24...	130	4	4.5	238	260	17	0.40	8.2	640	0.87	45
APR 29...	170	4	5.7	301	370	11	0.50	8.6	840	1.1	20

DATE	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)
FEB 17...	0.210	3	80	3	<10	450	<5	32	0.1	<1
MAR 24...	<0.100	--	150	--	--	17	--	--	--	--
APR 29...	<0.100	--	240	--	--	5	--	--	--	--

06176500 WOLF CREEK NEAR WOLF POINT, MT

LOCATION.--Lat 48°05'47", long 105°40'41", in NE¼SE¼NW¼ sec.17, T.27 N., R.47 E., Roosevelt County, Hydrologic Unit 10060001, on right bank 0.5 mi north of U.S. Highway 2, 1.5 mi west of Wolf Point, and at mile 2.3.

DRAINAGE AREA.--251 mi^2.

PERIOD OF RECORD.--August 1908 to July 1914 (no winter records 1909, 1913-14), March 1950 to September 1953, water years 1954, 1956-1973 (annual maximums), October 1981 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,000 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to July 31, 1914, nonrecording gage at site 0.8 mi upstream at different datum. Aug. 1, 1914, to Sept. 30, 1953, water-stage recorder at same site and datum. May 1955 to September 1973, crest-stage gage at same site and datum.

REMARKS.--Estimated daily discharges: Oct. 1-21, Nov. 7 to Mar. 4, Mar. 9, 10, 27-29, and Apr. 24 to May 13. Records poor. Minor diversion for irrigation upstream from station.

AVERAGE DISCHARGE.--12 years (1910-12, 1951-53, 1982-87), 9.21 ft^3/s, 6,670 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,780 ft^3/s, Apr. 4 or 5, 1954, gage height, 12.9 ft, on basis of contracted-opening measurement of peak flow; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of 1938 reached a stage of about 12 ft, at previous site and datum, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,640 ft^3/s, July 30, gage height, 10.12 ft; no flow July 14-17, 19, 20.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e1.0	.80	e1.5	e2.0	e1.5	e5.0	63	e1.5	3.2	.08	64	.95
2	e1.0	.80	e1.0	e1.5	e1.5	e5.0	80	e1.5	3.9	.06	38	.85
3	e1.0	.80	e1.0	e1.5	e2.0	e5.0	42	e1.5	3.9	.06	26	.72
4	e1.0	.84	e.90	e1.5	e2.0	e6.0	25	e1.0	4.2	.07	19	.69
5	e1.0	.96	e.90	e1.0	e2.5	6.2	18	e1.0	3.0	.08	15	.71
6	e1.0	1.1	e1.0	e1.0	e3.5	6.4	13	e.90	2.6	.08	12	.51
7	e1.0	e1.0	e1.0	e.90	e10	7.4	11	e.80	1.9	.08	9.5	.33
8	e1.0	e1.0	e.90	e1.0	e20	7.9	9.3	e.80	1.8	.08	7.9	.28
9	e1.0	e.90	e.90	e1.0	e20	e5.0	9.1	e.70	2.0	.06	6.2	.27
10	e.95	e.80	e.80	e1.0	e15	e6.0	8.2	e.60	1.9	.04	5.3	.27
11	e.95	e.70	e1.0	e1.5	e15	7.1	7.5	e.50	1.6	.03	4.5	.30
12	e.95	e.80	e1.0	e1.5	e10	6.7	8.2	e.45	1.4	.02	4.7	.34
13	e.95	e.80	e1.0	e1.0	e10	7.1	9.6	e.40	.89	.01	4.5	.38
14	e.95	e.90	e1.5	e.90	e10	7.8	9.3	.35	.52	.00	4.0	.34
15	e.95	e1.0	e1.5	e.80	e9.0	8.1	8.1	.42	.54	.00	4.0	.27
16	e1.0	e1.0	e1.6	e.90	e8.0	8.0	7.2	.83	.42	.00	3.8	.20
17	e1.0	e.90	e1.5	e1.0	e7.0	8.0	6.6	.83	.28	.00	4.4	.15
18	e1.0	e.80	e1.5	e.90	e6.0	7.9	6.2	.88	.20	.01	3.9	.14
19	e1.0	e.90	e1.5	e.90	e6.0	7.8	5.3	1.0	.20	.00	3.3	.16
20	e1.0	e.80	e1.0	e.90	e6.0	7.8	4.9	1.1	.47	.00	2.9	.19
21	e1.0	e1.0	e1.0	e1.0	e6.0	8.4	4.7	1.1	.58	.09	2.3	.19
22	1.0	e1.5	e1.5	e1.0	e5.0	9.4	4.2	1.1	.61	.50	1.8	.17
23	.86	e1.5	e1.5	e1.0	e5.0	9.5	3.8	1.5	.65	.65	1.3	.14
24	.78	e1.5	e2.0	e.90	e5.0	10	e3.5	1.5	.30	.65	1.2	.11
25	.71	e1.5	e2.0	e.90	e5.0	10	e3.0	1.5	.18	.65	1.1	.09
26	.61	e1.5	e2.0	e.90	e4.5	10	e3.0	1.6	.12	.58	1.1	.09
27	.57	e2.0	e2.0	e1.0	e4.5	e9.0	e2.5	2.0	.09	.55	2.0	.25
28	.51	e2.0	e2.0	e1.0	e4.5	e7.5	e2.5	2.6	.06	.45	2.2	.59
29	.78	e2.0	e1.5	e1.5	---	e7.0	e2.0	2.2	.08	57	1.9	.63
30	.78	e1.5	e1.5	e1.5	---	10	e2.0	1.8	.11	1190	1.5	.56
31	.84	---	e2.0	e1.5	---	10	---	3.0	---	133	1.2	---
TOTAL	28.14	33.60	42.00	34.90	204.5	237.0	382.7	36.96	37.70	1384.88	260.5	10.87
MEAN	.91	1.12	1.35	1.13	7.30	7.65	12.8	1.19	1.26	44.7	8.40	.36
MAX	1.0	2.0	2.0	2.0	20	10	80	3.0	4.2	1190	64	.95
MIN	.51	.70	.80	.80	1.5	5.0	2.0	.35	.06	.00	1.1	.09
AC-FT	56	67	83	69	406	470	759	73	75	2750	517	22

CAL YR 1986 TOTAL 4865.36 MEAN 13.3 MAX 800 MIN .00 AC-FT 9650
WTR YR 1987 TOTAL 2693.73 MEAN 7.38 MAX 1190 MIN .00 AC-FT 5340

e Estimated

MISSOURI RIVER MAIN STEM

06177000 MISSOURI RIVER NEAR WOLF POINT, MT

LOCATION.--Lat 48°04'00", long 105°31'55", in SW¼NW¼ sec.28, T.27 N., R.48 E., McCone County, Hydrologic Unit 10060001, on right bank 500 ft downstream from bridge on State Highway 13, 5 mi southeast of Wolf Point, 7.8 mi downstream from Wolf Creek, and at mile 1,701.4.

DRAINAGE AREA.--82,290 mi^2.

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

REVISED RECORDS.--WSP 1146: 1931. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,958.57 ft above National Geodetic Vertical Datum of 1929. Prior to Apr. 13, 1930, nonrecording gages at Wolf Point ferry landing 5.5 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Dec. 11 to Mar. 16 and Aug. 3, 4. Records good except those for estimated daily discharges, which are fair. Flow partly regulated by Fort Peck Lake and many other reservoirs upstream from station. Diversion for irrigation of about 1,010,400 acres upstream from station.

AVERAGE DISCHARGE.--11 years (1928-39, prior to Fort Peck Lake reaching operational level), 7,219 ft^3/s, 5,230,000 acre-ft/yr; 44 years (1943-87, after operational level was reached), 10,580 ft^3/s, 7,665,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 66,800 ft^3/s, Mar. 25, 1939, gage height, 14.4 ft, ice present, from rating curve extended above 39,000 ft^3/s; maximum gage height, 15.64 ft, Mar. 27, 1960 (backwater from ice); minimum daily discharge, 320 ft^3/s, Dec. 10, 1941.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 14, 1908, reached a stage of about 20 ft, present site and datum.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 17,300 ft^3/s, Oct. 10, July 30, gage height, 5.59 ft; maximum gage height may have been higher during period of no gage-height record, Dec. 11 to Mar. 16; minimum daily discharge, 4,970 ft^3/s, Apr. 23, 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13400	8380	6590	e7100	e11500	e11100	6880	5220	6680	6390	8760	6250
2	14000	8550	6600	e7100	e11400	e11700	7210	5220	6570	6400	8450	6180
3	13600	8560	6630	e7400	e11600	e11700	7830	5270	6170	6290	e8500	6230
4	12200	8460	6600	e7200	e11400	e11800	8830	5120	6360	6620	e8500	6210
5	12100	8440	6470	e7300	e11300	e11700	9300	5180	6260	6270	8570	6260
6	13700	8330	6450	e7300	e11600	e9700	9490	5120	6400	6340	7660	6230
7	15600	8330	6410	e7400	e11200	e7700	9560	5090	6510	6030	7650	6050
8	16600	8070	6420	e7200	e11300	e6900	8720	5080	6440	5980	7710	6120
9	17000	7280	6380	e7600	e11200	e6800	8180	5130	6310	5930	7730	6330
10	17000	8430	6280	e7600	e11000	e6800	7310	5220	6170	5970	7710	6320
11	16100	8830	e6000	e7800	e11100	e6900	6920	5070	6240	6070	7810	6380
12	15900	8150	e6000	e7400	e11200	e7400	7010	5180	6550	6130	7340	6320
13	15800	8710	e6500	e7300	e11600	e7700	6250	5470	7010	5880	8100	6240
14	16000	8090	e7000	e7100	e11500	e8000	6040	5880	7110	5830	6770	6390
15	16000	7740	e7500	e7300	e11500	e8000	5950	6530	7120	5810	7330	6490
16	15800	6670	e7500	e7600	e11700	e8100	5800	6130	7050	5790	7520	6420
17	15200	6390	e7600	e7500	e11700	7780	5660	6060	7010	5770	7590	6440
18	13800	6320	e7600	e7200	e11800	7680	5530	6070	7080	5860	7440	6510
19	12200	6370	e7500	e8700	e11800	7590	5600	5960	6770	5860	7340	6260
20	11100	6360	e7700	e10300	e11800	7670	5520	6150	6850	5650	7250	6430
21	10700	6730	e7600	e10500	e11900	8040	5290	5960	6790	8130	7400	6130
22	10200	6890	e7400	e10500	e11700	8130	5090	5640	6630	10100	7280	6350
23	9680	6560	e7300	e10600	e11700	8230	4970	5860	6640	7450	7280	6290
24	9360	6590	e7400	e10400	e11600	7820	5000	5570	6490	7280	7210	6210
25	8880	6640	e7400	e10300	e11800	8390	4970	5590	6420	7550	7180	6180
26	9040	5960	e7400	e10000	e11600	10100	5410	5980	6430	7630	7310	6210
27	8900	7100	e7500	e10100	e11500	10400	5290	6140	6540	7600	7500	6420
28	8710	6360	e7400	e10200	e11400	10500	5290	6400	6530	7890	7310	6460
29	8600	6300	e7300	e10200	---	9490	5170	6210	6920	8110	6990	6200
30	8530	6570	e7400	e11600	---	7570	5220	6090	6280	13500	6230	6240
31	8710	---	e7200	e11400	---	6940	---	6200	---	11500	6230	---
TOTAL	394410	222160	217030	267200	322400	268330	195290	175790	198330	217610	233650	188750
MEAN	12720	7405	7001	8619	11510	8656	6510	5671	6611	7020	7537	6292
MAX	17000	8830	7700	11600	11900	11800	9560	6530	7120	13500	8760	6510
MIN	8530	5960	6000	7100	11000	6800	4970	5070	6170	5650	6230	6050
AC-FT	782300	440700	430500	530000	639500	532200	387400	348700	393400	431600	463400	374400

CAL YR 1986 TOTAL 3635610 MEAN 9961 MAX 21700 MIN 5960 AC-FT 7211000
WTR YR 1987 TOTAL 2900950 MEAN 7948 MAX 17000 MIN 4970 AC-FT 5754000

e Estimated

06177500 REDWATER RIVER AT CIRCLE, MT

LOCATION.--Lat 47°24'51", long 105°34'30", in SW¼SW¼ sec.11, T.19 N., R.48 E., McCone County, Hydrologic Unit 10060002, on left bank at Circle, 1 mi upstream from Horse Creek, and at mile 110.2.

DRAINAGE AREA.--547 mi^2.

PERIOD OF RECORD.--April to November 1929, March to November 1930, July 1931 to December 1932, March to June 1933, February to November 1934, April 1935 to December 1936, April 1937 to June 1972, October 1974 to current year. Monthly discharge only for some periods, published in WSP 1309. Prior to October 1967, published as Redwater Creek at Circle.

REVISED RECORDS.--WSP 1006: 1929-30, 1932-33, 1935-39. WSP 1509: 1929, 1934. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Sharp-crested weir since Sept. 24, 1938. Datum of gage is 2,394.32 ft National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to June 1, 1941, and Mar. 23, 1943, to Feb. 16, 1948, nonrecording gage at site 0.3 mi upstream at same datum. June 1, 1941, to Mar. 22, 1943, nonrecording gage at site 200 ft upstream at datum 2.8 ft lower. Feb. 26, 1948, to May 7, 1950, nonrecording gage at site 200 ft upstream at present datum.

REMARKS.--Estimated daily discharges: Nov. 8 to Mar. 10, Sept. 4-7, 11-19 and Sept. 21-26. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 1,200 acres upstream from station.

AVERAGE DISCHARGE.--49 years (1931-32, 1935-36, 1937-71, 1975-87), 13.3 ft^3/s, 9,640 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,960 ft^3/s, June 29, 1986, gage height, 12.85 ft, from floodmarks, rating curve extended above 3,500 ft^3/s; no flow at time most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 80 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 1	0015	*47	*4.82	No peaks greater than base discharge this year.			

Minimum daily discharge, 0.23 ft^3/s, Aug. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44	7.8	e8.0	e4.0	e7.5	e4.0	36	4.5	18	.95	.69	.91
2	39	7.6	e7.5	e4.0	e10	e4.5	28	4.7	12	.86	.80	.75
3	37	7.8	e7.0	e4.0	e9.0	e4.5	27	4.8	7.9	.83	.82	.68
4	35	7.8	e6.5	e4.0	e8.0	e5.0	26	4.7	6.5	.90	.81	e.60
5	32	8.4	e6.0	e4.0	e7.0	e6.5	25	4.5	5.7	.87	.69	e.60
6	30	9.3	e5.5	e3.5	e6.5	e8.5	25	4.4	5.1	2.2	.62	e.65
7	28	9.5	e5.5	e3.5	e7.0	e13	24	4.2	4.5	3.9	.59	e.65
8	28	e7.0	e5.5	e3.5	e7.5	e11	22	3.9	4.0	2.8	.56	.50
9	26	e6.0	e5.5	e3.5	e8.0	e9.0	19	3.7	3.5	2.2	.54	.44
10	24	e5.5	e5.0	e3.5	e8.0	e6.5	19	3.4	3.3	1.8	.43	.48
11	22	e5.5	e5.0	e3.5	e8.0	7.0	19	3.0	3.0	1.7	.39	e.45
12	21	e5.0	e5.0	e4.0	e7.5	7.1	22	2.9	2.6	1.4	.36	e.45
13	19	e5.5	e5.0	e4.0	e7.5	6.8	23	2.7	2.4	1.2	.33	e.50
14	18	e5.5	e5.0	e4.5	e7.5	7.0	21	2.6	2.0	1.1	.39	e.50
15	17	e5.5	e5.0	e4.5	e7.0	9.9	19	2.5	1.8	.93	.37	e.55
16	17	e5.5	e4.5	e4.0	e6.5	11	17	2.6	1.7	.76	.38	e.60
17	15	e5.5	e4.5	e3.5	e6.5	13	14	3.9	1.6	.75	.40	e.60
18	14	e5.0	e4.5	e3.5	e6.0	12	11	4.4	1.4	1.2	.40	e.60
19	13	e5.5	e4.0	e3.5	e5.5	13	9.1	4.6	1.4	1.5	.36	e.60
20	12	e5.5	e4.0	e3.0	e5.5	14	7.6	6.8	1.8	1.1	.32	.58
21	11	e6.0	e4.0	e3.0	e5.0	17	6.9	15	1.5	1.2	.27	e.60
22	10	e7.0	e4.0	e3.0	e5.0	19	6.5	12	1.3	1.3	.29	e.65
23	9.8	e7.0	e4.0	e3.0	e5.0	17	6.6	9.8	1.4	1.2	.29	e.65
24	10	e8.0	e4.0	e3.0	e4.5	19	6.1	12	1.3	1.2	.23	e.65
25	9.5	e10	e4.0	e3.0	e4.5	18	5.8	9.8	1.2	1.1	.32	e.65
26	9.3	e9.5	e4.0	e3.0	e4.5	17	5.3	7.8	1.1	.95	.86	e.65
27	9.3	e9.5	e4.0	e3.0	e4.5	17	5.1	8.6	1.1	.85	1.8	.73
28	9.2	e9.0	e4.0	e3.5	e4.0	17	4.8	25	1.1	.78	1.4	1.1
29	8.5	e8.5	e4.0	e3.5	---	16	4.6	35	1.1	.66	1.3	.94
30	8.4	e8.0	e4.0	e4.0	---	12	4.5	29	1.0	.83	1.1	1.1
31	7.8	---	e4.0	e6.0	---	15	---	23	---	.77	1.0	---
TOTAL	593.8	213.2	152.5	113.5	183.0	357.3	469.9	265.8	102.3	39.79	19.11	19.41
MEAN	19.2	7.11	4.92	3.66	6.54	11.5	15.7	8.57	3.41	1.28	.62	.65
MAX	44	10	8.0	6.0	10	19	36	35	18	3.9	1.8	1.1
MIN	7.8	5.0	4.0	3.0	4.0	4.0	4.5	2.5	1.0	.66	.23	.44
AC-FT	1180	423	302	225	363	709	932	527	203	79	38	38

CAL YR 1986 TOTAL 15663.37 MEAN 42.9 MAX 2890 MIN .01 AC-FT 31070
WTR YR 1987 TOTAL 2529.57 MEAN 6.93 MAX 44 MIN .23 AC-FT 5020

e Estimated

POPLAR RIVER BASIN

06178000 POPLAR RIVER AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 48°59'25", long 105°41'46", in NE¼NE¼SE¼ sec.6, T.37 N., R.46 E., Daniels County, Hydrologic Unit 10060003, on left bank 0.7 mi south of international boundary, 1.5 mi upstream from Coal Creek, 18.5 mi northwest of Scobey, Mt, and at mile 135.7.

DRAINAGE AREA.--358 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1931 to current season (seasonal records only for most seasons). Published as Middle Fork Poplar River at international boundary, March 1931 to November 1975.

REVISED RECORDS.--WSP 1389: 1931, 1935-37(M), 1939-40, 1942(M), 1943, 1948(M), 1950(M). WSP 1729: Drainage area. W 1984: Drainage area.

GAGE.--Water-stage recorder and concrete control since September 1977. Elevation of gage is 2,460 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Mar. 1 to Apr. 3 and Oct. 29-31. Water-discharge records good except those below 1.0 ft^3/s, which are poor. A few small diversions for irrigation upstream from station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,700 ft^3/s, Apr. 6, 1954, gage height, 10.25 ft, from floodmark, from rating curve extended above 2,500 ft^3/s on basis of slope-area measurement of peak flow; no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 260 ft^3/s, Apr. 2, gage height, 4.18 ft, backwater from ice; minimum daily, 0.04 ft^3/s, July 14-16.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1			e5.0	e160	8.3	1.8	.09	1.3	.62	1.9		
2			e4.0	e220	9.0	1.4	.08	1.2	.57	1.8		
3			e5.0	e150	11	.93	.09	.83	.51	1.8		
4			e8.0	93	9.0	.85	.06	.69	.36	1.8		
5			e10	47	7.6	.66	.07	.68	.30	1.5		
6			e15	34	6.7	.49	.07	.63	.26	1.5		
7			e20	28	5.8	.23	.07	.55	.27	1.5		
8			e15	26	5.1	.18	.07	.39	.26	1.6		
9			e12	26	3.9	.18	.05	.31	.32	2.0		
10			e10	24	3.4	.25	.28	.28	.29	2.4		
11			e9.0	22	3.3	.23	.08	.31	.31	2.1		
12			e10	21	3.1	.21	.06	.23	.21	2.0		
13			e11	20	2.7	.18	.05	.42	.23	2.0		
14			e12	19	2.4	.16	.04	.58	.23	2.0		
15			e11	17	2.3	.14	.04	2.7	.21	2.0		
16			e11	16	2.2	.17	.04	4.6	.29	2.2		
17			e11	15	2.4	.16	.05	4.4	.60	2.4		
18			e10	14	2.6	.15	.30	6.6	.94	2.5		
19			e10	14	2.8	.23	.38	4.4	1.2	2.5		
20			e10	13	2.8	.30	.26	3.0	1.1	2.4		
21			e9.0	13	2.9	.19	.16	2.0	1.0	2.5		
22			e9.0	12	2.4	.17	.14	1.4	.98	2.6		
23			e8.0	12	2.2	.18	.91	1.1	1.1	2.7		
24			e8.0	12	2.0	.12	1.1	.98	1.0	2.7		
25			e8.0	11	1.9	.09	.90	.94	1.0	2.8		
26			e10	10	1.9	.10	.71	1.0	1.0	3.1		
27			e14	9.6	2.2	.09	.55	1.0	1.2	2.9		
28			e20	9.1	3.6	.10	.44	.97	1.4	2.7		
29			e28	8.6	3.7	.10	.71	.86	1.7	e2.6		
30			e38	8.3	3.0	.09	1.6	.84	1.8	e2.5		
31			e50	---	2.1	---	1.6	.77	---	e2.4		
TOTAL			411.0	1084.6	124.3	10.13	11.05	45.96	21.26	69.4		
MEAN			13.3	36.2	4.01	.34	.36	1.48	.71	2.24		
MAX			50	220	11	1.8	1.6	6.6	1.8	3.1		
MIN			4.0	8.3	1.9	.09	.04	.23	.21	1.5		
AC-FT			815	2150	247	20	22	91	42	138		

e Estimated

POPLAR RIVER BASIN

06178000 POPLAR RIVER AT INTERNATIONAL BOUNDARY--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1964, 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
OCT										
14...	1600	11	0	0	1500	16.0	8.0	708	11.0	101
NOV										
12...	1500	5.0	0	0	1400	-15.0	0.0	719	14.0	102
FEB										
18...	1000	E5.0	0	0	482	0.0	0.0	707	10.6	78
MAR										
02...	1130	4.1	--	--	1320	-3.0	0.0	--	--	--
09...	1200	11	--	--	500	-6.0	0.0	--	--	--
17...	1200	11	100	2	735	1.0	0.5	703	10.4	78
APR										
02...	1330	255	--	--	270	10.0	0.5	--	--	--
09...	1120	27	--	--	640	7.5	7.5	--	--	--
15...	1030	17	10	1	780	15.0	9.0	698	9.4	89
MAY										
19...	1300	2.7	70	3	1160	20.0	15.0	699	12.8	139
JUN										
17...	1500	0.16	0	0	1680	25.0	24.0	700	12.2	159
JUL										
16...	1030	0.04	60	1	1880	21.0	21.0	695	7.4	92
AUG										
18...	1600	6.8	60	1	1070	21.0	18.0	705	7.4	85
SEP										
15...	1200	0.18	60	1	1710	21.0	15.0	700	6.4	70

DATE	TIME	PH (STAND-ARD UNITS) (00400)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
OCT											
14...	1600	8.40	65	9.0	320	0	48	48	240	6	9.8
NOV											
12...	1500	8.30	9	2.7	430	0	69	63	190	4	9.0
FEB											
18...	1000	8.20	90	--	170	0	32	21	41	1	10
MAR											
17...	1200	8.00	55	1.2	240	0	45	30	78	2	7.7
APR											
15...	1030	8.60	45	2.3	260	0	47	34	76	2	7.1
MAY											
19...	1300	9.00	27	3.0	250	0	26	46	200	6	7.2
JUN											
17...	1500	9.00	44	2.8	240	0	20	47	320	9	8.4
JUL											
16...	1030	9.10	80	3.0	230	0	22	42	340	10	9.0
AUG											
18...	1600	8.60	210	190	160	0	21	27	180	6	10
SEP											
15...	1200	8.60	17	2.2	270	0	34	44	320	9	9.1

06178000 POPLAR RIVER AT INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUORIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITROGEN, NITRATE TOTAL (MG/L AS N) (00620)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
OCT 14...	535	290	8.7	0.40	12	980	1.3	29	--	0.010	<0.100
NOV 12...	617	230	8.0	0.50	15	960	1.3	13	--	<0.010	<0.100
FEB 18...	214	55	3.8	0.20	13	300	0.41	E4.1	--	0.010	<0.100
MAR 17...	316	95	4.4	0.30	12	460	0.63	13	--	<0.010	<0.100
APR 15...	366	81	3.1	0.30	8.0	480	0.65	22	--	<0.010	<0.100
MAY 19...	496	180	6.0	0.50	1.2	770	1.0	5.5	--	<0.010	<0.100
JUN 17...	596	340	16	0.50	0.7	1100	1.5	0.48	--	<0.010	<0.100
JUL 16...	572	440	12	0.60	0.9	1200	1.6	0.13	--	<0.010	<0.100
AUG 18...	405	160	5.5	0.40	9.3	660	0.89	12	0.010	0.090	0.100
SEP 15...	541	330	10	0.60	0.9	1100	1.5	0.52	--	<0.010	<0.100

DATE	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITROGEN,AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHORUS, TOTAL (MG/L AS P) (00665)	PHOSPHORUS, ORTHO, TOTAL (MG/L AS P) (70507)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	SEDIMENT, SUS-PENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 14...	0.040	1.4	1.4	<0.200	0.040	--	1400	84	191	5.7	95
NOV 12...	0.030	0.47	0.50	0.020	<0.010	--	1200	25	16	0.22	78
FEB 18...	0.020	1.1	1.1	0.110	0.050	--	280	200	9	E0.12	55
MAR 17...	0.010	0.99	1.0	0.050	0.010	8.5	460	150	2	0.06	60
APR 15...	0.010	0.99	1.0	0.050	0.010	--	500	100	12	0.56	57
MAY 19...	<0.010	--	1.5	0.030	<0.010	--	1100	41	29	0.21	--
JUN 17...	0.040	0.96	1.0	0.060	<0.010	--	1800	21	10	<0.01	41
JUL 16...	0.040	1.6	1.6	0.050	<0.010	19	2100	61	30	<0.01	50
AUG 18...	0.180	1.5	1.7	0.310	0.240	--	1300	180	107	2.0	100
SEP 15...	0.020	0.58	0.60	<0.010	0.010	--	1800	25	52	0.02	87

DATE	TIME	ALUMINUM, DIS-SOLVED (UG/L AS AL) (01106)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BERYLLIUM, DIS-SOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)
MAR 17...	1200	10	2	1	<10	<0.5	<1	<1	<10
JUL 16...	1030	20	--	5	--	<0.5	--	<1	--

06178000 POPLAR RIVER AT INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)
MAR								
17...	<10	4	1	280	<5	<5	20	14
JUL								
16...	30	--	2	--	--	<5	--	3

DATE	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	MERCURY DISSOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
MAR								
17...	<0.10	0.2	5	<1	<1	<1	<10	6
JUL								
16...	--	1.0	--	6	--	<1	--	6

POPLAR RIVER BASIN

06178500 EAST POPLAR RIVER AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 48°59'58", long 105°24'32", in SW¼SW¼ sec.3, T.1, R.26 W., second meridian, in Saskatchewan Hydrologic Unit 10060003, on left bank 10 ft north of international boundary, 400 ft southwest of Canadian East Poplar Port of Entry, 14 mi north of Scobey, Mt, and at mile 21.9.

DRAINAGE AREA.--541 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1931 to current year (seasonal records only in most seasons prior to October 1974). Prior to March 1962, published as East Fork Poplar River at international boundary.

REVISED RECORDS.--WSP 1389: 1932, 1939, 1942-43, 1947. W 1983: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 2,410.92 ft National Geodetic Vertical Datum of 1929 (International Boundary Survey datum). Prior to Oct. 5, 1953, water-stage recorder at site 80 ft upstream at same datum.

REMARKS.--Estimated daily discharges: Aug. 25. Water-discharge records good. Since September 1975 flow regulated by Morrison Dam at Cookson Reservoir 3 miles upstream. Several diversions for irrigation upstream from station.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,020 ft^3/s, Apr. 23, 1975, gage height, 12.01 ft; maximum gage height, 12.8 ft Mar. 25, 1943, from floodmark (backwater from ice); no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 32 ft^3/s, Apr. 19, gage height, 5.93 ft; minimum daily, 2.1 ft^3/s, June 15, 18, and July 3.

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1987
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	2.6	2.8	2.8	4.3	16	6.0	2.5	2.8	2.3	2.6	2.7	2.6
2	2.6	2.8	2.8	4.1	13	4.2	2.2	2.5	2.3	2.4	2.8	2.6
3	2.6	2.8	3.0	3.8	10	3.0	2.1	2.4	2.4	2.5	2.7	2.6
4	2.6	2.8	3.3	3.5	9.8	2.6	2.2	2.4	2.3	2.7	2.7	2.6
5	2.6	2.8	3.5	3.5	12	2.5	2.3	2.5	2.3	2.4	2.6	2.6
6	2.6	2.9	3.6	3.5	11	2.7	3.0	2.3	2.4	2.4	2.7	2.6
7	2.5	3.1	3.7	3.5	11	2.5	2.7	2.3	2.3	2.3	2.8	2.7
8	2.5	3.0	3.3	3.3	12	2.3	2.4	2.3	2.3	2.9	2.6	2.7
9	2.5	2.9	2.9	4.6	11	2.2	2.4	2.3	2.4	2.4	2.6	2.6
10	2.4	3.0	2.8	6.7	12	2.8	3.3	2.4	2.7	2.5	2.7	2.7
11	2.5	2.9	2.8	4.7	11	2.8	3.2	2.5	2.6	2.7	2.7	2.8
12	2.6	3.1	2.8	3.9	12	2.6	2.8	2.3	2.5	2.6	2.8	2.6
13	2.7	2.9	2.9	3.4	12	2.4	2.6	2.3	2.4	2.8	2.7	2.6
14	2.5	2.9	3.0	3.1	12	2.2	2.5	2.5	2.3	2.4	2.8	2.5
15	2.3	2.9	3.0	3.1	12	2.1	2.4	3.2	2.4	2.6	2.8	2.5
16	2.4	2.8	3.0	4.2	12	2.2	2.3	2.9	2.6	2.7	2.6	2.5
17	2.4	2.9	3.0	17	12	2.3	2.3	2.8	2.6	2.8	2.7	2.5
18	2.5	2.9	3.0	18	12	2.1	3.2	2.8	2.5	2.6	2.6	2.5
19	2.5	3.0	3.0	23	13	2.2	3.9	2.6	2.4	2.7	2.6	2.7
20	2.5	3.0	3.1	20	12	2.6	3.3	2.4	2.4	2.7	2.6	2.8
21	2.6	2.9	3.2	20	11	2.5	3.0	2.4	2.4	3.1	2.7	2.6
22	2.6	2.9	3.2	20	12	2.5	3.0	2.2	2.4	2.8	2.7	2.6
23	2.5	2.9	3.1	19	12	2.5	2.8	2.3	2.4	2.8	2.7	2.5
24	2.6	2.8	3.0	19	12	2.4	2.7	2.4	2.3	2.7	2.7	2.4
25	2.5	2.9	3.1	19	12	2.3	2.5	e2.4	2.3	2.8	2.7	2.4
26	2.6	3.0	3.5	19	12	2.2	2.4	2.8	2.4	2.9	2.7	2.4
27	2.6	2.8	3.7	19	13	2.2	2.5	2.6	2.7	2.5	2.7	2.5
28	2.6	2.8	3.2	19	12	2.3	2.4	2.5	2.8	2.6	2.6	2.5
29	2.7	---	3.0	18	12	2.3	3.1	2.5	2.6	2.6	2.6	2.5
30	2.8	---	3.1	18	12	2.3	3.5	2.3	2.5	2.6	2.6	2.4
31	2.8	---	3.7	---	12	---	3.2	2.4	---	2.7	---	2.2
TOTAL	79.3	81.2	97.1	331.2	369.8	77.8	84.7	77.3	73.2	81.8	80.5	79.3
MEAN	2.56	2.90	3.13	11.0	11.9	2.59	2.73	2.49	2.44	2.64	2.68	2.56
MAX	2.8	3.1	3.7	23	16	6.0	3.9	3.2	2.8	3.1	2.8	2.8
MIN	2.3	2.8	2.8	3.1	9.8	2.1	2.1	2.2	2.3	2.3	2.6	2.2
AC-FT	157	161	193	657	733	154	168	153	145	162	160	157

CAL YR 1987 TOTAL 1513.2 MEAN 4.15 MAX 23 MIN 2.1 AC-FT 3000

e Estimated

06178500 EAST POPLAR RIVER AT INTERNATIONAL BOUNDARY--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1964-65, 1975 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE:. February 1982 to current year.
WATER TEMPERATURE:. June 1975 to September 1983.

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

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE:. Maximum daily observed, 1,810 microsiemens, Nov. 12, 1986; minimum daily observed, 654 microsiemens, Apr. 16, 1982.
WATER TEMPERATURE (water years 1975-83):. Maxumum, 29.5°C, July 6, 1975, July 25, 26, 1978; minimum, 0.0°C on many days during winters most years.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE:. Maximum daily observed, 1,810 microsiemens, Nov. 12, minimum daily observed, 1,080 microsiemens, Mar. 8.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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 WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	TUR-BID-ITY (NTU) (00076)
OCT 15...	1030	2.7	40	1	1440	8.40	8.0	5.5	709	8	5.3
NOV 13...	0930	2.3	90	2	1860	7.70	-15.0	0.0	704	3	1.9
DEC 15...	1400	2.6	0	0	1530	7.70	2.0	0.0	706	7	1.2
JAN 14...	1300	2.6	100	2	1420	7.90	-8.0	0.0	711	7	1.4
FEB 18...	1130	2.9	0	0	1400	7.90	2.0	0.0	708	10	--
MAR 17...	1430	3.0	100	2	1400	8.10	1.0	0.5	703	18	2.3
APR 15...	1300	3.0	10	1	1430	8.70	17.5	11.0	697	19	3.5
MAY 19...	0800	12	100	3	1230	8.60	8.5	11.5	700	21	4.4
JUN 17...	1100	2.4	10	1	1420	8.50	23.0	21.0	705	20	2.2
JUL 16...	1330	2.4	60	1	1500	8.40	26.0	23.0	697	23	2.2
AUG 19...	0900	2.6	0	0	1400	8.40	15.0	15.0	702	2	2.1
SEP 15...	1500	2.4	60	1	1620	8.20	26.0	17.0	700	6	1.9

DATE	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
OCT 15...	12.2	105	390	0	74	51	210	5	7.3	493	290
NOV 13...	13.6	101	520	0	100	66	250	5	9.5	550	390
DEC 15...	8.0	59	420	0	87	50	200	4	7.2	560	300
JAN 14...	10.0	74	400	0	81	47	190	4	6.9	527	280
FEB 18...	12.4	92	400	0	83	47	190	4	7.2	539	290
MAR 17...	12.0	91	390	0	78	47	190	4	6.6	528	280
APR 15...	11.2	112	350	0	61	49	200	5	9.4	507	280
MAY 19...	8.2	82	320	0	47	49	180	4	13	476	240
JUN 17...	7.0	85	330	0	47	52	220	5	7.9	510	300
JUL 16...	8.4	108	350	0	56	52	210	5	7.1	489	320
AUG 19...	9.0	97	370	0	66	50	210	5	7.6	497	270
SEP 15...	8.2	93	410	32	69	57	220	5	8.6	375	370

06178500 EAST POPLAR RIVER AT INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRATE TOTAL (MG/L AS N) (00620)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)
OCT 15...	6.0	0.30	13	950	1.3	6.9	0.180	0.020	0.200	0.240
NOV 13...	8.9	0.50	18	1200	1.6	7.3	0.180	0.020	0.200	0.780
DEC 15...	5.9	0.30	16	1000	1.4	7.0	--	<0.010	0.200	0.800
JAN 14...	6.0	0.30	14	940	1.3	6.6	--	<0.010	0.200	0.610
FEB 18...	6.9	0.30	13	960	1.3	7.5	--	<0.010	0.100	0.500
MAR 17...	8.6	0.40	13	940	1.3	7.6	--	<0.010	0.100	0.390
APR 15...	5.1	0.40	8.2	920	1.2	7.4	--	<0.010	<0.100	0.040
MAY 19...	5.0	0.30	4.7	830	1.1	28	--	0.010	<0.100	0.140
JUN 17...	6.0	0.30	14	960	1.3	6.3	--	<0.010	<0.100	0.030
JUL 16...	4.6	0.30	8.3	950	1.3	6.2	--	<0.010	<0.100	0.050
AUG 19...	5.5	0.30	12	920	1.3	6.5	--	<0.010	<0.100	0.040
SEP 15...	6.5	0.30	9.8	970	1.3	6.3	--	<0.010	<0.100	0.030

DATE	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHORUS, TOTAL (MG/L AS P) (00665)	PHOSPHORUS, ORTHO, TOTAL (MG/L AS P) (70507)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 15...	1.1	1.3	<0.200	0.010	--	1900	9	40	0.29	58
NOV 13...	0.42	1.2	0.050	0.020	--	2300	30	18	0.11	40
DEC 15...	0.0	0.80	<0.010	0.010	--	1800	32	129	0.91	27
JAN 14...	0.09	0.70	0.010	0.020	--	1700	10	95	0.67	26
FEB 18...	0.30	0.80	0.010	<0.010	--	1900	12	46	0.36	19
MAR 17...	0.91	1.3	0.020	<0.010	3.5	1700	10	48	0.39	7
APR 15...	1.3	1.3	0.040	<0.010	--	1700	12	20	0.16	80
MAY 19...	1.3	1.4	0.030	<0.010	--	1400	11	37	1.2	83
JUN 17...	2.8	2.8	0.070	<0.010	--	2100	25	9	0.06	71
JUL 16...	0.85	0.90	0.030	<0.010	--	2000	8	19	0.12	66
AUG 19...	0.66	0.70	0.020	<0.010	6.7	1900	13	45	0.32	97
SEP 15...	0.47	0.50	<0.010	<0.010	--	2000	20	61	0.40	36

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)
MAR 17...	1430	<10	3	2	<10	<0.5	<1	<1	<10
AUG 19...	0900	<10	--	2	--	<0.5	--	<1	--

POPLAR RIVER BASIN

06178500 EAST POPLAR RIVER AT INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)
MAR 17...	<10	4	1	670	<5	<5	180	180	<0.10
AUG 19...	10	--	<1	--	--	<5	--	16	--

DATE	MERCURY DISSOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	SILVER, DISSOLVED (UG/L AS AG) (01075)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
MAR 17...	<0.1	4	<1	<1	<1	--	<10	11
AUG 19..	--	--	1	--	<1	<1	--	5

COMPOSITE OF MONTHLY SAMPLES, WATER YEAR OCTOBER 1985 TO SEPTEMBER 1986

COMPOSITE PERIOD	URANIUM NATURAL DISSOLVED (UG/L AS U) (22703)
OCT 01 1985-SEP 30 1986	2.2

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1480	1400	1410	1390	1390	1410	1270	1240	1280	1380	1360	1360
2	1460	1420	1360	1420	1430	1350	1200	1240	1290	1390	1370	1380
3	1460	1430	1460	1410	1420	1400	1340	1250	1300	1390	1400	1390
4	1420	1410	1470	1400	1400	1360	1210	1340	1310	1380	1400	1400
5	1440	1400	1490	1430	1270	1290	1150	1320	1340	1380	1400	1380
6	1390	1420	1580	1420	1380	1180	1150	1260	1400	1360	1390	1380
7	1420	1410	1570	1330	1360	1110	1240	1260	1400	1360	1370	1400
8	1410	1630	1470	1450	1370	1080	1280	1260	1410	1370	1410	1390
9	1470	1610	1530	1500	1360	1200	1330	1270	1420	1370	1390	1380
10	1440	1620	1600	1500	1360	1320	1350	1250	1410	1370	1400	1380
11	1430	1790	1610	1470	1370	1360	1360	1260	1400	1390	1400	1370
12	1440	1810	1510	1460	1380	1420	1350	1240	1370	1370	1390	1390
13	1440	1770	1510	1430	1410	1430	1350	1250	1370	1350	1380	1390
14	1460	1780	1500	1420	1410	1380	1370	1230	1390	1380	1370	1590
15	1450	1680	1480	1460	1420	1380	1380	1220	1400	1390	1370	1590
16	1440	1580	1500	1590	1410	1390	1430	1250	1410	1430	1370	1520
17	1450	1520	1490	1580	1450	1390	1450	1260	1420	1440	1360	1520
18	1470	1490	1470	1520	1440	1410	1260	1250	1420	1370	1360	1410
19	1480	1460	1440	1520	1420	1410	1260	1250	1430	1390	1340	1400
20	1680	1570	1530	1500	1420	1370	1270	1260	1400	1360	1350	1420
21	1640	1580	1540	1510	1410	1400	1250	1250	1430	1340	1370	1440
22	1530	1530	1560	1490	1440	1400	1260	1240	1390	1350	1380	1430
23	1490	1540	1510	1500	1470	1380	1260	1260	1400	1400	1400	1430
24	1450	1460	1480	1500	1470	1390	1270	1230	1380	1420	1410	1430
25	1460	1450	1450	1490	1480	1410	1270	1230	1380	1400	1420	1420
26	1470	1450	1450	1490	1500	1410	1280	1250	1400	1390	1420	1420
27	1470	1460	1460	1470	1490	1360	1270	1250	1400	1390	1410	1420
28	1460	1460	1460	1450	1490	1440	1280	1250	1390	1380	1400	1460
29	1460	1480	1470	1440	---	1430	1260	1260	1380	1380	1400	1420
30	1450	1480	1480	1430	---	1480	1260	1240	1380	1370	1400	1410
31	1440	---	1470	1430	---	1460	---	1250	---	1380	1410	---
MEAN	1466	1536	1494	1465	1415	1361	1289	1254	1383	1381	1387	1424

WTR YR 1987 MEAN 1404 MAX 1810 MIN 1080

06179000 EAST FORK POPLAR RIVER NEAR SCOBEY, MT

LOCATION.--Lat 48°51'08", long 105°25'15", in NE¼NW¼ sec.27, T.36 N., R.48 E., Daniels County, Hydrologic Unit 10060003, at bridge on State Highway 13, 2.5 mi upstream from mouth, and 4 mi north of Scobey.

DRAINAGE AREA.--722 mi .

PERIOD OF RECORD.--Water years 1975 to current year.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: October 1975 to September 1979.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE (water years 1976-79): Maximum, 27.5°C July 15, 1978, July 19, 1979; minimum, 0.0°C on many days during winter.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	PH (STAND-ARD UNITS) (00400)
OCT 15...	1130	E3.0	--	0	1380	16.0	6.0	710	10.4	90	8.90
NOV 13...	0715	E3.0	0	0	1820	-15.0	0.0	707	11.6	86	8.60
DEC 15...	1500	E3.2	0	0	1950	1.0	0.0	706	11.8	88	8.10
JAN 15...	0900	E3.5	0	0	1780	-22.0	0.0	720	12.8	93	8.10
FEB 18...	1300	E3.3	0	0	1320	3.0	0.0	709	11.8	87	8.20
MAR 17...	1600	E3.5	100	2	1040	1.0	0.5	704	12.0	90	8.50
APR 15...	1430	E5.0	10	1	752	18.0	11.0	697	9.2	92	8.80
MAY 20...	0730	E13	100	3	1340	4.0	11.0	708	7.0	69	8.80
JUN 17...	1300	E2.5	10	1	1360	23.0	21.0	707	10.0	122	9.10
JUL 16...	1430	E3.0	50	1	1560	26.0	22.0	699	8.6	108	9.60
AUG 19...	1100	E3.0	0	0	1400	20.0	15.0	707	6.4	69	9.00
SEP 16...	0700	E2.5	90	1	1510	9.0	15.0	705	6.2	67	9.10

DATE	COLOR (PLAT-INUM-COBALT UNITS) (00080)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
OCT 15...	25	22	300	0	38	49	220	6	8.2	454
NOV 13...	11	2.8	420	0	53	69	280	6	10	651
DEC 15...	10	1.4	510	0	91	69	270	5	9.5	648
JAN 15...	9	2.2	470	0	90	60	250	5	8.5	612
FEB 18...	10	2.5	320	0	58	43	170	4	6.8	473
MAR 17...	16	2.0	270	0	47	36	140	4	5.3	378
APR 15...	75	3.5	200	0	37	27	85	3	9.3	286
MAY 20...	34	3.4	310	0	36	53	200	5	13	513
JUN 17...	27	3.7	280	0	22	55	230	6	15	483
JUL 16...	55	2.0	240	0	15	48	260	7	12	507
AUG 19...	9	2.8	270	0	27	48	230	6	9.7	470
SEP 16...	27	2.6	290	0	23	56	260	7	10	518

POPLAR RIVER BASIN

06179000 EAST FORK POPLAR RIVER NEAR SCOBEY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)
OCT										
15...	290	8.4	0.30	3.3	890	1.2	E7.2	0.010	<0.100	0.020
NOV										
13...	390	15	0.40	4.9	1200	1.6	E9.8	<0.010	<0.100	<0.010
DEC										
15...	400	11	0.40	12	1300	1.7	E11	<0.010	<0.100	0.040
JAN										
15...	360	10	0.40	6.9	1200	1.6	E11	<0.010	<0.100	0.030
FEB										
18...	260	7.8	0.30	6.0	840	1.1	E7.5	<0.010	<0.100	0.020
MAR										
17...	200	5.9	0.30	6.0	670	0.91	E6.3	<0.010	<0.100	0.020
APR										
15...	110	3.6	0.30	7.4	450	0.61	E6.1	<0.010	<0.100	0.020
MAY										
20...	260	6.0	0.30	2.6	880	1.2	E31	<0.010	<0.100	0.020
JUN										
17...	280	7.5	0.30	1.7	900	1.2	E6.1	<0.010	<0.100	0.040
JUL										
16...	330	7.8	0.40	2.4	980	1.3	E8.0	<0.010	<0.100	0.040
AUG										
19...	300	7.3	0.30	2.3	910	1.2	E7.4	<0.010	<0.100	0.020
SEP										
16...	320	8.6	0.40	1.8	990	1.3	E6.7	<0.010	<0.100	0.030

DATE	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)	PHOS-PHORUS, ORTHO, TOTAL (MG/L AS P) (70507)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
15...	0.88	0.90	<0.200	<0.010	--	1800	33	37	E0.30	65
NOV										
13...	--	0.80	0.030	0.010	--	2100	25	30	E0.24	82
DEC										
15...	0.26	0.30	<0.010	<0.010	--	2200	19	97	E0.84	18
JAN										
15...	0.57	0.60	0.020	0.010	--	2000	16	27	E0.26	36
FEB										
18...	0.28	0.30	0.010	<0.010	--	1400	32	44	E0.39	27
MAR										
17...	0.68	0.70	0.020	<0.010	4.3	1000	29	33	E0.31	41
APR										
15...	1.4	1.4	0.070	<0.010	--	610	99	8	E0.11	97
MAY										
20...	1.9	1.9	0.060	<0.010	--	1700	33	40	E1.4	71
JUN										
17...	0.96	1.0	0.070	<0.010	--	1700	33	19	E0.13	34
JUL										
16...	2.0	2.0	0.050	<0.010	--	2100	39	5	E0.04	67
AUG										
19...	1.3	1.3	0.040	<0.010	12	1900	40	25	E0.20	96
SEP										
16...	0.97	1.0	<0.010	<0.010	--	2200	38	16	E0.11	86

06179000 EAST FORK POPLAR RIVER NEAR SCOBEY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)
MAR 17...	1600	<10	2	1	<10	<0.5	<1	<1	<10	<10	5	1
AUG 19...	1100	20	--	5	--	<0.5	--	<1	--	<10	--	1

DATE	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	MERCURY DISSOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
MAR 17...	260	<5	<5	30	13	<0.10	<0.1	4	<1	<1	<1	3
AUG 19...	--	--	<5	--	5	--	<0.1	--	8	--	<1	<3

06179200 POPLAR RIVER ABOVE WEST FORK, NEAR BREDETTE, MT

LOCATION.--Lat 48°33'05", long 105°21'55", in NW¼SW¼SW¼ sec.4, T.32 N., R.49 E., Roosevelt County, Hydrologic Unit 10060004, on county road bridge, 3.8 mi upstream from mouth, and 4.4 mi northwest of Bredette.

DRAINAGE AREA.--1,745 mi2.

PERIOD OF RECORD.--Water years 1976-81, 1985 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)
APR 16...	1000	60	40	1	820	10.0	10.0	8.40	210	0	37
MAY 20...	1130	21	100	3	1380	5.0	9.0	9.00	270	0	29
JUL 17...	0900	1.2	100	2	1850	16.0	18.0	9.40	230	0	13
AUG 19...	1330	6.8	0	0	1580	23.0	19.0	9.30	340	0	59

DATE	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
APR 16...	29	120	4	8.1	328	150	11	0.30	6.7	560	0.76
MAY 20...	47	240	6	8.6	492	280	13	0.40	1.2	920	1.2
JUL 17...	48	340	10	8.8	570	410	16	0.50	1.8	1200	1.6
AUG 19...	46	190	5	7.3	513	330	14	0.50	12	970	1.3

DATE	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)
APR 16...	91	0.790	--	660	--	--	49	--	--	--	--
MAY 20...	52	<0.100	3	1300	<1	<10	13	<5	6	<0.1	<1
JUL 17...	3.8	0.560	--	1900	--	--	16	--	--	--	--
AUG 19...	18	<0.100	--	1700	--	--	20	--	--	--	--

POPLAR RIVER BASIN

06180400 WEST FORK POPLAR RIVER NEAR BREDETTE, MT

LOCATION.--Lat 48°33'01", long 105°25'42", in SW¼SW¼ sec.1, t.32 N., R.48 E., Roosevelt County, Hydrologic Unit 10060004, at bridge on State Highway 13, 5.9 mi upstream from mouth, and 6.6 mi northwest of Bredette.

DRAINAGE AREA.--1,010 mi2.

PERIOD OF RECORD.--Water year 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)
APR 16...	0830	39	10	1	848	10.0	8.5	8.50	130	0	24
MAY 20...	1000	17	100	3	1030	2.0	8.5	8.60	100	0	17
JUL 17...	0815	1.6	100	2	1400	15.5	17.5	8.90	82	0	9.8
AUG 19...	1230	5.8	0	0	925	22.0	19.0	8.50	81	0	16

DATE	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
APR 16...	16	150	6	4.9	375	83	4.5	0.40	5.8	510	0.70
MAY 20...	14	220	10	3.7	454	120	5.0	0.40	3.8	660	0.89
JUL 17...	14	300	15	4.2	569	180	9.5	0.60	5.1	870	1.2
AUG 19...	10	180	9	5.2	383	110	5.5	0.40	10	570	0.77

DATE	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)
APR 16...	54	<0.100	--	350	--	--	65	--	--	--	--
MAY 20...	30	<0.100	3	500	<1	<10	160	<5	13	<0.1	<1
JUL 17...	3.6	<0.100	--	800	--	--	73	--	--	--	--
AUG 19...	8.9	0.240	--	490	--	--	150	--	--	--	--

06181000 POPLAR RIVER NEAR POPLAR, MT

(national stream-quality accounting network station)

LOCATION.--Lat 48°10'15", long 105°10'42", in NE¼NE¼ sec.19, T.28 N., R.51 E., Roosevelt County, Hydrologic Unit 10060003, on right bank 4 mi north of Poplar, and at mile 11.
DRAINAGE AREA.---3,174 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1908 to October 1924, August 1947 to September 1969, June 1975 to September 1979, October 1981 to current year. Monthly discharge only for some periods, published in WSP 1309.
REVISED RECORDS.--WSP 1176. 1948. WSP 1389:. 1911. WSP 1729:. Drainage area.
GAGE.--Water-stage recorder. Elevation of gage is 1,970 ft, from topographic map. Prior to May 1, 1911, nonrecording gage at site 4.2 mi upstream at different datum. May 1, 1911, to Oct. 4, 1913, nonrecording gage at site 14 mi upstream at different datum. Oct. 5, 1913, to Oct. 31, 1924, nonrecording gage at site 2.2 mi upstream at different datum. Aug. 10, 1947, to Sept. 30, 1969, water-stage recorder at present site and datum.
REMARKS.--Estimated daily discharges:. Nov. 8-13, Nov. 26 to Mar. 30. Water-discharge records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 5,500 acres upstream from station. Flow partially regulated by Coronach Dam, on the East Fork Poplar River, 2 mi north of international boundary. 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 (1908-24, 1947-69, 1975-79, 1982-87), 132 ft^3/s, 95,630 acre-ft/yr.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,400 ft^3/s, Apr. 6, 1954, gage height, 17.86 ft, from floodmark, from slope-area measurement of peak flow; no flow at times.
EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 10, 1946, reached a stage of 18.1 ft, from floodmark, discharge, 40,000 ft^3/s, from slope-area measurement of peak flow made at site 20 mi upstream.
EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft^3/s, and maximums (*):.

Date	Time	Discharge	Gage height	Date	Time	Discharge	Gage height
Apr. 3	1045	520	4.26	July 30	2015	*3,510	*10.36

Minimum daily discharge, 4.70 ft^3/s, July 16.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	115	41	e20	e35	e25	e50	215	63	36	9.3	323	13
2	107	40	e25	e35	e25	e60	349	62	31	8.4	168	12
3	105	40	e25	e30	e25	e70	486	70	31	7.8	99	11
4	101	40	e20	e30	e30	e80	397	66	30	7.1	69	12
5	91	40	e20	e30	e35	e90	433	62	30	6.4	52	11
6	84	40	e25	e25	e40	e100	362	59	28	6.7	42	11
7	84	42	e20	e25	e45	e100	304	58	25	6.5	36	10
8	82	e25	e20	e25	e45	e70	265	56	23	6.1	32	10
9	79	e20	e15	e25	e50	e40	229	52	21	5.7	28	9.9
10	69	e15	e15	e30	e60	e45	201	47	20	6.1	25	9.6
11	63	e15	e20	e30	e90	e60	177	43	19	7.2	22	10
12	61	e15	e20	e25	e100	e70	163	40	18	7.4	20	10
13	61	e20	e15	e20	e100	e90	150	37	16	6.9	19	9.4
14	61	24	e20	e18	e100	e100	137	35	15	6.5	17	9.9
15	59	23	e20	e15	e100	e90	127	32	13	5.8	16	9.9
16	59	26	e20	e15	e90	e90	119	36	12	4.7	17	10
17	56	26	e20	e20	e80	e90	110	38	10	5.1	44	11
18	55	26	e20	e20	e80	e90	102	37	10	8.9	121	11
19	53	31	e20	e20	e70	e90	96	37	13	11	43	13
20	53	30	e20	e20	e70	e90	90	40	18	10	29	12
21	52	29	e20	e25	e70	e80	84	38	18	15	22	12
22	52	29	e25	e20	e60	e80	82	37	16	15	18	11
23	47	30	e25	e15	e50	e80	83	34	15	19	15	11
24	46	32	e30	e15	e50	e80	82	32	14	18	14	11
25	45	25	e30	e20	e45	e80	82	31	13	17	13	11
26	45	e25	e25	e25	e40	e60	79	29	13	15	13	11
27	44	e30	e30	e30	e35	e50	73	30	12	14	13	13
28	43	e30	e30	e35	e40	e40	69	31	11	13	13	19
29	43	e25	e25	e35	---	e60	66	60	12	13	13	17
30	41	e25	e30	e35	---	e100	63	63	11	1330	13	16
31	41	---	e35	e30	---	181	---	43	---	961	13	---
TOTAL	1997	859	705	778	1650	2456	5275	1398	554	2573.6	1382	347.7
MEAN	64.4	28.6	22.7	25.1	58.9	79.2	176	45.1	18.5	83.0	44.6	11.6
MAX	115	42	35	35	100	181	486	70	36	1330	323	19
MIN	41	15	15	15	25	40	63	29	10	4.7	13	9.4
AC-FT	3960	1700	1400	1540	3270	4870	10460	2770	1100	5100	2740	690

CAL YR 1986 TOTAL 65125.2 MEAN 178 MAX 5000 MIN .30 AC-FT 129200
WTR YR 1987 TOTAL 19975.3 MEAN 54.7 MAX 1330 MIN 4.7 AC-FT 39620

e Estimated

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1975-81, November 1986 to September 1987.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
NOV 18...	1100	27	0	0	1860	-28.0	0.0	713	13.5	99	K8
JAN 14...	1045	18	100	2	1710	-10.0	0.0	719	12.2	89	K6
MAR 25...	1100	118	100	2	894	0.0	0.5	717	12.4	92	<1
MAY 29...	0930	60	30	1	1470	16.0	16.5	711	9.6	106	K7
JUL 09...	0900	5.6	40	1	2150	20.0	23.0	708	8.2	104	110
SEP 21...	1100	12	0	0	1840	15.0	15.0	720	8.9	94	K4

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	PH (STAND-ARD UNITS) (00400)	BICAR-BONATE WATER WHOLE IT-FLD (MG/L) (00450)	CAR-BONATE WATER WHOLE IT-FLD (MG/L) (00447)	ALKA-LINITY WH WAT TOTAL FIELD MG/L AS CACO3 (00410)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV 18...	K12	8.60	748	18	632	9.3	290	0	42	44	350
JAN 14...	K14	8.30	724	0	592	4.2	280	0	48	39	300
MAR 25...	<1	8.20	382	0	311	43	160	0	29	22	150
MAY 29...	K17	8.50	493	16	427	35	190	0	26	31	260
JUL 09...	290	8.60	500	20	440	18	220	0	22	41	380
SEP 21...	K4	8.50	535	11	455	14	210	0	26	35	340

DATE	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, 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)
NOV 18...	9	7.1	591	310	66	0.50	8.2	1170	1200	1.6	86
JAN 14...	8	5.6	587	260	61	0.50	7.5	1090	1100	1.5	53
MAR 25...	5	4.6	327	130	33	0.30	6.1	566	560	0.77	180
MAY 29...	8	6.6	448	200	83	0.40	2.5	904	870	1.2	147
JUL 09...	11	8.2	453	270	270	0.40	2.5	1280	1300	1.7	19
SEP 21...	10	7.4	443	230	170	0.40	2.0	1090	1100	1.5	35

06181000 POPLAR RIVER NEAR POPLAR, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHORUS, TOTAL (MG/L AS P) (00665)	PHOSPHORUS, DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P) (00671)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 18...	<0.010	<0.100	<0.010	<0.010	1.7	0.030	0.010	<0.010	35	2.6	94
JAN 14...	<0.010	<0.100	<0.010	<0.010	0.40	0.010	0.010	<0.010	55	2.7	87
MAR 25...	<0.010	0.130	<0.010	0.020	1.0	0.060	0.010	<0.010	93	30	98
MAY 29...	<0.010	<0.100	0.050	0.040	1.3	0.050	0.030	<0.010	66	11	92
JUL 09...	<0.010	<0.100	<0.010	0.030	1.1	0.040	<0.010	<0.010	51	0.77	100
SEP 21...	<0.010	<0.100	<0.010	<0.010	0.60	0.020	<0.010	<0.010	42	1.3	99

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)
NOV 18...	1100	20	2	76	<0.5	<1	<1	<3	<1	17	<5
MAR 25...	1100	110	2	55	<0.5	<1	<1	<3	3	95	<5
JUL 09...	0900	20	2	57	--	<1	<1	<3	1	17	<5
SEP 21...	1100	20	2	63	<0.5	<1	<1	<3	2	8	<5

DATE	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
NOV 18...	120	22	0.1	<10	5	<1	<1	610	<6	13
MAR 25...	52	17	<0.1	<10	2	<1	<1	350	<6	8
JUL 09...	110	6	<0.1	<10	1	<1	<1	480	<6	22
SEP 21...	90	5	--	<10	3	<1	<1	450	<6	<3

06181995 BEAVER CREEK AT INTERNATIONAL BOUNDARY

(International gaging station)

LOCATION.--Lat 48°59'59", long 105°02'06", in SE¼ sec.5, T.1, R.23 W., second meridian, in Saskatchewan, Hydrologic Unit 10060006, on left bank 300 ft north of international boundary, 6 mi east of Canadian Big Beaver Port of Entry, 8 mi upstream from mouth, and 9 mi southeast of Big Beaver, Saskatchewan.

DRAINAGE AREA.--149 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1977 to current year (seasonal records after November 1982). April 1949 to October 1952, seasonal records collected 0.8 mi downstream (station number 06182000 Beaver Creek near international boundary). Records probably are equivalent.

REVISED RECORDS.--W 1983: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,250 ft, from topographic map. April 1949 to October 1952, nonrecording gage 0.8 mi downstream at different datum.

REMARKS.--Estimated daily discharges: Jan. 1 to Apr. 2 and Nov. 18 to Nov. 30. Water-discharge records fair.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,020 ft^3/s, Apr. 7, 1952, gage height, 13.3 ft, from floodmark, from rating curve extended above 320 ft^3/s, on basis of slope-area measurements of peak flow; no flow at times.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 565 ft^3/s, Apr. 1, gage height, 5.78 ft (backwater from ice); minimum daily, 0.81 ft^3/s, June 18.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.7	1.4		e1.3	e1.4	e1.2	e322	1.4	5.6	1.0	1.4	.92
2	2.0	1.4		e1.2	e1.4	e1.3	e90	1.4	4.9	.99	1.3	.95
3	1.8	1.4		e1.2	e1.3	e1.4	49	1.6	2.8	.99	1.3	1.0
4	1.7	1.3		e1.2	e1.3	e1.6	28	1.4	2.0	.95	1.2	1.0
5	1.7	1.2		e1.2	e1.4	e1.9	14	1.4	1.7	2.1	1.2	1.0
6	1.7	1.1		e1.2	e1.6	e2.0	9.6	1.4	1.4	1.9	1.2	1.1
7	1.7	1.0		e1.3	e3.7	e7.0	6.5	1.4	1.3	1.1	1.1	1.1
8	1.9	1.1		e1.3	e28	e6.9	5.0	1.4	1.2	.99	1.1	1.1
9	1.8	1.1		e1.3	e41	e6.7	4.0	1.3	1.2	.95	1.2	1.1
10	1.8	1.1		e1.3	e26	e4.3	3.3	1.3	1.2	19	1.2	1.1
11	1.7	1.1		e1.3	e16	e3.2	3.0	1.2	1.2	2.0	1.1	1.1
12	1.7	1.2		e1.3	e14	e2.5	2.9	1.2	1.1	1.4	1.1	1.1
13	1.7	1.1		e1.3	e12	e2.3	2.5	1.2	.95	1.3	1.1	1.1
14	1.6	.92		e1.4	e9.9	e2.5	2.4	1.2	.92	1.2	1.2	1.2
15	1.6	.88		e1.6	e8.1	e2.3	2.3	1.2	.88	1.1	1.3	1.2
16	1.6	.85		e1.4	e7.4	e2.2	2.2	1.2	.85	1.1	1.2	1.2
17	1.5	.81		e1.6	e6.4	e2.3	2.0	1.2	.85	1.1	1.2	1.2
18	1.6	.85		e1.5	e2.9	e2.4	2.0	1.3	.81	1.7	1.2	1.2
19	1.6	.88		e1.5	e2.2	e2.6	1.9	1.4	.85	1.8	1.1	1.2
20	1.5	.92		e1.5	e1.9	e2.8	1.8	1.4	.95	1.3	1.1	1.2
21	1.5	.95		e1.5	e1.6	e2.9	1.8	1.3	.92	1.4	.99	1.2
22	1.5	.95		e1.5	e1.4	e3.0	1.7	1.4	.95	1.4	.99	1.1
23	1.5	.95		e1.5	e1.3	e3.0	1.7	1.3	.92	1.3	.95	1.1
24	1.4	.99		e1.5	e1.3	e3.0	1.7	1.3	.92	1.3	.95	1.1
25	1.4	1.1		e1.5	e1.3	e3.2	1.6	1.4	.88	1.2	.99	1.0
26	1.4	1.0		e1.5	e1.3	e26	1.5	1.5	.85	1.1	.99	.99
27	1.4	1.0		e1.5	e1.2	e112	1.5	1.6	.85	1.1	.95	1.1
28	1.4	1.1		e1.5	e1.2	e82	1.4	1.7	.95	1.1	.95	1.4
29	1.4	1.1		e1.5	---	e52	1.4	1.8	.99	1.4	1.1	1.3
30	1.4	1.2		e1.5	---	e46	1.4	1.6	1.1	3.2	1.1	1.2
31	1.4	---		e1.5	---	e222	---	1.5	---	1.6	.88	---
TOTAL	49.6	31.95		43.4	198.5	614.5	570.1	42.9	41.99	60.07	34.64	33.56
MEAN	1.60	1.06		1.40	7.09	19.8	19.0	1.38	1.40	1.94	1.12	1.12
MAX	2.0	1.4		1.6	41	222	322	1.8	5.6	19	1.4	1.4
MIN	1.4	.81		1.2	1.2	1.2	1.4	1.2	.81	.95	.88	.92
AC-FT	98	63		86	394	1220	1130	85	83	119	69	67

e Estimated

06181995 BEAVER CREEK AT INTERNATIONAL BOUNDARY--Continued

WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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 WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	TUR-BID-ITY (NTU) (00076)
NOV											
13...	1230	1.4	70	2	1900	8.00	-10.0	0.0	705	8	3.6
MAR											
18...	1400	2.3	100	2	1170	8.10	1.0	0.5	701	55	4.3
JUN											
18...	1100	0.77	40	1	1500	8.20	26.0	21.0	712	23	3.6
SEP											
01...	1330	0.97	0	0	1660	8.50	26.5	19.0	714	13	2.2

DATE	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV										
13...	10.2	76	300	0	62	36	350	9	7.9	661
MAR										
18...	12.4	94	200	0	44	23	200	6	6.9	395
JUN										
18...	8.6	104	200	0	38	26	310	10	7.0	519
SEP										
01...	12.0	139	210	0	39	28	310	9	7.2	470

DATE	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)
NOV										
13...	430	7.7	0.20	13	1300	1.8	4.9	<0.010	<0.100	0.150
MAR										
18...	240	7.5	0.20	10	770	1.0	4.8	<0.010	<0.100	0.090
JUN										
18...	340	5.7	0.20	9.4	1000	1.4	2.2	<0.010	<0.100	0.020
SEP										
01...	340	6.0	0.20	7.9	1000	1.4	2.7	<0.010	<0.100	0.020

DATE	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO-GEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS-PHORUS, TOTAL (MG/L AS P) (00665)	PHOS-PHORUS, ORTHO, TOTAL (MG/L AS P) (70507)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV										
13...	0.55	0.70	0.030	0.010	--	1700	18	19	0.07	48
MAR										
18...	1.1	1.2	0.070	0.020	6.9	900	150	21	0.13	61
JUN										
18...	1.2	1.2	0.050	<0.010	--	1600	26	21	0.04	74
SEP										
01...	1.9	1.9	0.020	<0.010	8.2	1500	12	54	0.14	95

06181995 BEAVER CREEK AT INTERNATIONAL BOUNDARY--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)
MAR 18...	1400	10	2	1	<10	<0.5	<1	<1	<10
SEP 01...	1330	--	--	2	--	<0.5	--	<1	--

DATE	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)
MAR 18...	<10	4	2	1100	<5	9	120	100
SEP 01...	<10	--	<1	--	--	<5	--	11

DATE	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	MERCURY DISSOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
MAR 18...	<0.10	0.1	3	<1	<1	<1	<10	16
SEP 01...	--	--	--	<1	--	<1	--	3

06183450 BIG MUDDY CREEK NEAR ANTELOPE, MT

LOCATION.--Lat 48°40'22", long 104°30'42", in SW¼SW¼NW¼ sec.27, T.34 N., R.55 E., Sheridan County, Hydrologic Unit 10060006, on right bank, 3 mi southwest of Antelope, and 7 mi south of Plentywood, MT.

DRAINAGE AREA.--967 mi^2. Prior to 1981, drainage area published as 1,171 mi^2.

WATER DISCHARGE RECORDS

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

REVISED RECORDS.--WDR MT-81-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,000 ft, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 7 to Mar. 31 and Sept. 17-30. Water-discharge records good except those for estimated daily discharges, which are poor. Several known diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--9 years, 35.8 ft^3/s, 25,940 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,890 ft^3/s, Apr. 14, 1982, gage height, 17.37 ft; no flow on many days during 1984, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,220 ft^3/s, Aug. 2, gage height, 11.37 ft, minimum, 0.05 ft^3/s, July 17.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	66	8.2	e4.5	e.60	e2.0	e6.0	380	15	4.7	.12	623	1.3
2	64	9.0	e5.0	e.80	e2.0	e7.0	427	14	4.5	.16	1100	1.2
3	54	8.5	e4.5	e.60	e2.0	e8.0	559	14	3.8	.72	541	1.0
4	50	8.5	e4.0	e.60	e2.0	e15	887	15	3.6	.66	170	1.0
5	42	8.0	e4.0	e.60	e2.5	e20	369	13	2.9	.72	80	2.2
6	42	6.1	e3.5	e.40	e3.0	e15	145	13	2.6	.67	56	4.0
7	38	e5.5	e3.5	e.20	e3.5	e12	83	12	3.9	.51	41	3.6
8	36	e5.0	e4.0	e.20	e7.0	e10	66	11	4.7	.35	31	2.8
9	34	e4.5	e3.5	e.40	e10	e8.0	61	11	4.3	.36	25	2.9
10	30	e4.5	e4.0	e.40	e15	e6.0	49	11	3.7	.38	21	3.1
11	27	e5.0	e4.0	e.40	e20	e7.0	36	10	3.2	.42	18	2.8
12	25	e5.5	e3.5	e.40	e25	e8.0	30	9.3	3.1	.28	15	2.4
13	27	e6.0	e3.5	e.60	e35	e9.0	21	8.0	2.7	.24	13	2.4
14	26	e6.5	e3.5	e.40	e45	e10	16	7.0	1.8	.15	12	2.1
15	22	e6.0	e4.0	e.20	e40	e10	10	6.1	1.6	.12	11	2.7
16	19	e5.5	e4.0	e.20	e35	e15	30	5.9	1.4	.08	11	2.9
17	18	e5.0	e4.0	e.20	e30	e20	23	6.3	1.1	.07	9.6	e2.9
18	16	e4.5	e3.5	e.20	e25	e20	20	6.2	.71	4.7	8.7	e3.0
19	20	e4.0	e3.5	e.40	e20	e25	37	5.5	.71	16	8.4	e3.0
20	16	e3.5	e3.0	e.40	e15	e25	29	5.7	.85	15	10	e3.0
21	13	e4.0	e2.0	e.40	e13	e25	31	4.8	.68	13	9.8	e3.1
22	12	e4.5	e.80	e.20	e11	e30	17	3.9	.64	12	8.8	e3.1
23	10	e4.5	e.80	e.20	e10	e40	21	3.1	.55	11	7.4	e3.1
24	10	e5.0	e.80	e.20	e9.0	e50	42	2.9	.35	9.4	6.5	e3.2
25	10	e5.0	e.80	e.40	e8.0	e60	27	5.5	.28	14	6.2	e3.2
26	6.2	e5.0	e.80	e.60	e7.0	e35	21	8.5	.20	15	6.1	e3.2
27	7.2	e5.0	e.80	e.80	e6.0	e45	17	8.3	.17	13	5.5	e3.3
28	9.2	e5.0	e1.0	e.80	e5.0	e40	22	8.4	.18	11	5.0	e3.3
29	10	e5.0	e.80	e1.0	---	e35	21	7.3	.15	17	4.4	e3.4
30	8.5	e4.5	e.80	e1.0	---	e35	15	6.1	.13	29	2.9	e3.4
31	8.1	---	e.80	e2.0	---	e50	---	5.1	---	41	1.4	---
TOTAL	776.2	166.8	87.20	15.80	408.0	701.0	3512	262.9	59.20	227.11	2868.7	82.7
MEAN	25.0	5.56	2.81	.51	14.6	22.6	117	8.48	1.97	7.33	92.5	2.76
MAX	66	9.0	5.0	2.0	45	60	887	15	4.7	41	1100	4.0
MIN	6.2	3.5	.80	.20	2.0	6.0	10	2.9	.13	.07	1.4	1.0
AC-FT	1540	331	173	31	809	1390	6970	521	117	450	5690	164

CAL YR 1986 TOTAL 11755.16 MEAN 32.2 MAX 1200 MIN .17 AC-FT 23320
WTR YR 1987 TOTAL 9167.54 MEAN 25.1 MAX 1100 MIN .07 AC-FT 18180

e Estimated

06183450 BIG MUDDY CREEK NEAR ANTELOPE, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1979 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
NOV 13...	1600	6.0	60	1	2420	-5.0	0.0	712	13.2	98
DEC 16...	0930	4.4	0	0	3460	-1.0	0.0	716	9.0	66
FEB 17...	1330	31	50	1	2480	1.0	0.0	716	11.8	87
MAR 26...	1300	38	--	--	1100	7.0	0.5	--	--	--
APR 08...	1700	69	--	--	630	18.0	12.0	--	--	--
14...	1530	14	60	1	1050	18.5	10.0	711	8.8	84
MAY 18...	1500	5.9	100	51	2180	10.0	13.5	712	8.4	87
JUN 18...	1400	0.81	60	1	2570	28.0	23.0	719	9.8	122
JUL 17...	1200	0.05	100	2	3320	16.0	18.0	717	6.8	77
AUG 19...	1700	8.6	40	1	1740	25.0	21.0	715	9.2	111
SEP 02...	0930	1.4	0	0	2230	22.0	17.5	714	5.6	63

DATE	TIME	PH (STAND-ARD UNITS) (00400)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV 13...	1600	8.30	480	0	72	73	420	9	12	677
DEC 16...	0930	8.10	700	0	100	110	700	12	12	1010
FEB 17...	1330	8.60	500	0	77	75	430	9	9.7	730
APR 14...	1530	8.10	260	0	45	37	140	4	9.1	295
MAY 18...	1500	8.90	400	0	39	73	380	8	8.8	554
JUN 18...	1400	9.70	410	0	18	89	500	11	6.7	532
JUL 17...	1200	10.10	410	0	11	93	660	14	8.2	546
AUG 19...	1700	8.70	370	0	58	55	250	6	11	484
SEP 02...	0930	8.60	440	0	64	68	380	8	11	571

DATE	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, 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)
NOV 13...	670	35	0.30	9.6	1700	2.3	28	0.100	0.130	1.9
DEC 16...	1000	27	0.40	11	2600	3.5	30	0.300	0.300	1.0
FEB 17...	710	27	0.30	5.6	1800	2.4	148	<0.100	0.140	1.3
APR 14...	260	7.4	0.20	12	690	0.94	27	0.200	0.270	1.8
MAY 18...	660	19	0.30	0.9	1500	2.1	24	<0.100	<0.010	--
JUN 18...	940	23	0.30	1.7	1900	2.6	4.2	<0.100	0.030	0.67
JUL 17...	1300	36	0.40	0.5	2400	3.3	0.33	<0.100	0.050	3.0
AUG 19...	450	13	0.30	16	1100	1.6	27	<0.100	0.050	2.0
SEP 02...	590	18	0.40	12	1500	2.0	5.5	<0.100	0.040	1.5

06183450 BIG MUDDY CREEK NEAR ANTELOPE, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHORUS, TOTAL (MG/L AS P) (00665)	CARBON, ORGANIC DISSOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUSPENDED TOTAL (MG/L AS C) (00689)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 13...	2.0	0.110	--	--	1200	50	41	0.66	77
DEC 16...	1.3	0.100	--	--	1900	60	292	3.5	22
FEB 17...	1.4	0.210	--	--	1400	40	40	3.3	66
APR 14...	2.1	0.140	14	0.5	430	94	102	3.9	99
MAY 18...	1.2	0.050	14	0.5	1200	20	27	0.43	40
JUN 18...	0.70	0.100	--	--	1500	30	18	0.04	94
JUL 17...	3.0	0.120	28	1.9	1700	10	5	0.00	58
AUG 19...	2.0	0.040	19	1.1	890	24	69	1.6	81
SEP 02...	1.5	0.090	--	--	1000	40	111	0.41	81

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)
APR 14...	1530	4	2	<10	<0.5	<1	<1	30	<10	17	3	4000
JUL 17...	1200	--	4	--	<10	--	<1	--	<10	--	4	--

DATE	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	MERCURY DISSOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
APR 14...	9	<5	200	85	0.20	0.5	14	3	<1	3	20	15
JUL 17...	--	<5	--	10	--	0.3	--	4	--	<1	--	<10

06183700 BIG MUDDY CREEK DIVERSION CANAL NEAR MEDICINE LAKE, MT.

LOCATION.--Lat 48°30'34", long 104°32'55", in SE¼NW¼SE¼ sec.22, T.32 N., R.55 E., Sheridan County, Hydrologic Unit 10060006, on right bank, on dike road about 75 ft downstream from canal headgate and 2.2 miles northwest of Medicine Lake.

PERIOD OF RECORD.--August 1985 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,940 ft, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 9 to Mar. 31 and Sept. 5-9. Records poor. Canal diverts water into Medicine Lake at the Medicine Lake National Wildlife Refuge. At times stage-discharge relationship is severely affected by backwater from Medicine Lake.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 1,300 ft^3/s, Mar. 2, 1986; maximum gage height observed, 9.24 ft, Mar. 3, 1986; no flow at times most years.

EXTREMES FOR CURRENT YEAR.-- Maximum daily discharge, 451 ft^3/s, Aug. 3; maximum gage height, 7.30 ft, Aug. 3; no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.8	.52	e.40	e.10	e1.0	e3.0	69	.00	.00	.00	.00	.00
2	2.6	.51	e.40	e.10	e1.0	e3.0	190	.00	.00	.00	184	.00
3	2.6	.57	e.30	e.10	e1.0	e2.8	162	.00	.00	.00	451	.00
4	1.2	.44	e.30	e.10	e1.0	e2.6	340	.00	.00	.00	247	.00
5	1.4	.58	e.30	e.10	e1.2	e2.6	327	.00	.00	.00	59	e.00
6	1.0	.65	e.20	e.10	e1.6	e2.7	115	.00	.00	.00	17	e.00
7	.99	.68	e.20	e.10	e2.0	e2.7	43	.00	.00	.00	5.7	e.00
8	1.1	.09	e.20	e.10	e2.5	e2.7	30	.00	.00	.00	2.4	e.00
9	1.4	e.30	e.20	e.10	e3.0	e2.5	.00	.00	.00	.00	1.8	e.00
10	.17	e.40	e.10	e.10	e4.0	e2.6	.00	.00	.00	.00	1.5	.00
11	.64	e.40	e.10	e.10	e5.0	e2.5	.00	.00	.00	.00	.41	.00
12	.76	e.40	e.10	e.10	e7.0	e2.6	.00	.00	.00	.00	.43	.00
13	.73	e.50	e.10	e.10	e10	e2.8	.00	.00	.00	.00	.34	.00
14	.74	e.50	e.10	e.10	e15	e3.6	.00	.00	.00	.00	.35	.00
15	.64	e.50	e.10	e.10	e20	e4.5	.00	.00	.00	.00	.05	.00
16	.77	e.50	e.10	e.10	e17	e4.2	.00	.00	.00	.00	.05	.00
17	.81	e.40	e.10	e.10	e15	e4.1	.00	.00	.00	.00	.02	.00
18	.76	e.40	e.10	e.10	e13	e4.2	.00	.00	.00	.00	.00	.00
19	.74	e.40	e.10	e.10	e11	e4.4	.00	.00	.00	.00	.00	.00
20	.75	e.40	e.10	e.10	e10	e4.9	.00	.00	.00	.00	.00	.00
21	.76	e.50	e.10	e.10	e9.0	e6.2	.00	.00	.00	.00	.00	.00
22	.75	e.50	e.10	e.10	e8.0	e6.7	.00	.00	.00	.00	.00	.00
23	.78	e.40	e.10	e.10	e7.0	e8.3	.00	.00	.00	.00	.00	.00
24	.79	e.50	e.10	e.10	e6.0	e9.4	.00	.00	.00	.00	.00	.00
25	.71	e.50	e.10	e.10	e5.0	e10	.00	.00	.00	.00	.00	.00
26	.58	e.50	e.10	e.10	e4.5	e12	.00	.00	.00	.00	.00	.00
27	.51	e.50	e.10	e.20	e4.0	e14	.00	.00	.00	.00	.00	.00
28	.59	e.50	e.10	e.40	e3.5	e18	.00	.00	.00	.00	.00	.00
29	1.0	e.50	e.10	e.60	---	e15	.00	.00	.00	.00	.00	.00
30	.88	e.40	e.10	e.80	---	e16	.00	.00	.00	.00	.00	.00
31	.21	---	e.10	e1.0	---	e18	---	.00	---	.00	.00	---
TOTAL	29.16	13.94	4.70	5.60	188.3	198.6	1276.00	.00	.00	.00	971.05	.00
MEAN	.94	.46	.15	.18	6.72	6.41	42.5	.00	.00	.00	31.3	.00
MAX	2.6	.68	.40	1.0	20	18	340	.00	.00	.00	451	.00
MIN	.17	.09	.10	.10	1.0	2.5	.00	.00	.00	.00	.00	.00
AC-FT	58	28	9.3	11	373	394	2530	.0	.0	.0	1930	.0

CAL YR 1986 TOTAL 9108.03 MEAN 25.0 MAX 1300 MIN .00 AC-FT 18070
WTR YR 1987 TOTAL 2687.35 MEAN 7.36 MAX 451 MIN .00 AC-FT 5330

e Estimated

06183750 LAKE CREEK NEAR DAGMAR, MT

LOCATION.--Lat 48°33'51", long 104°10'38", in SE¼SE¼SW¼ sec. 31, T.33 N., R.58 E., Sheridan, County, Hydrologic Unit 10060006, on left bank, at downstream end of dike, just north of Medicine Lake National Wildlife Refuge, and 1.7 miles southeast of Dagmar.

DRAINAGE AREA.--101 mi^2.

PERIOD OF RECORD.--September 1985 to current year. Seasonal records only.

GAGE.--Water-stage recorder. Elevation of gage is 1,979.00 ft, from topographic map.

REMARKS.--Estimated daily discharges: Mar. 1-31. Records fair except those for estimated daily discharges, which are poor. Numerous diversions upstream for irrigation.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 47 ft^3/s, Mar. 26, 1986; maximum gage height, 2.07 ft, Apr. 9, 1987; no flow most days.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 32 ft^3/s, Apr. 9, gage height, 2.07 ft; no flow most days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	---	---	---	e.00	8.7	3.7	.74	.00	.00	.00
2	.00	.00	---	---	---	e.00	14	4.0	.56	.00	.00	.00
3	.00	.00	---	---	---	e.00	3.9	5.9	.43	.00	.00	.00
4	.00	.00	---	---	---	e.00	3.4	5.7	.31	.00	.00	.00
5	.00	.00	---	---	---	e.00	7.6	4.5	.23	.00	.00	.00
6	.00	.00	---	---	---	e.00	21	3.7	.15	.00	.00	.00
7	.00	.00	---	---	---	e.00	30	1.1	.06	.00	.00	.00
8	.00	.00	---	---	---	e.00	31	.52	.04	.00	.00	.00
9	.00	.00	---	---	---	e.00	32	.19	.02	.00	.00	.00
10	.00	.00	---	---	---	e.00	29	.07	.02	.00	.00	.00
11	.00	.00	---	---	---	e.00	27	.04	.0	.00	.00	.00
12	.00	.00	---	---	---	e.00	23	.02	.00	.00	.00	.00
13	.00	.00	---	---	---	e.00	19	.04	.00	.00	.00	.00
14	.00	---	---	---	---	e.00	16	.05	.00	.00	.00	.00
15	.00	---	---	---	---	e.00	14	.07	.00	.00	.00	.00
16	.00	---	---	---	---	e.50	12	.18	.00	.00	.00	.00
17	.00	---	---	---	---	e1.0	10	.80	.00	.00	.00	.00
18	.00	---	---	---	---	e1.0	9.2	1.4	.00	.00	.00	.00
19	.00	---	---	---	---	e1.5	8.0	1.2	.00	.00	.00	.00
20	.00	---	---	---	---	e1.0	6.6	.87	.00	.00	.00	.00
21	.00	---	---	---	---	e1.0	5.7	.59	.00	.00	.00	.00
22	.00	---	---	---	---	e1.0	5.5	.40	.00	.00	.00	.00
23	.00	---	---	---	---	e1.0	4.9	.27	.00	.00	.00	.00
24	.00	---	---	---	---	e1.0	4.6	.45	.00	.00	.00	.00
25	.00	---	---	---	---	e2.0	4.6	.67	.00	.00	.00	.00
26	.00	---	---	---	---	e2.5	4.4	.61	.00	.00	.00	.00
27	.00	---	---	---	---	e3.0	3.9	.62	.00	.00	.00	.00
28	.00	---	---	---	---	e2.0	3.7	.85	.00	.00	.00	.00
29	.00	---	---	---	---	e1.0	3.9	1.2	.00	.00	.00	.00
30	.00	---	---	---	---	e1.0	3.4	1.1	.00	.00	.00	.00
31	.00	---	---	---	---	e4.0	---	.87	---	.00	.00	---
TOTAL	.00	---	---	---	---	24.50	370.0	41.68	2.56	.00	.00	.00
MEAN	.00	---	---	---	---	.79	12.3	1.34	.085	.00	.00	.00
MAX	.00	---	---	---	---	4.0	32	5.9	.74	.00	.00	.00
MIN	.00	---	---	---	---	.00	3.4	.02	.00	.00	.00	.00
AC-FT	.0	---	---	---	---	49	734	83	5.1	.0	.0	.0

e Estimated

06183800 COTTONWOOD CREEK NEAR DAGMAR, MT

LOCATION.--Lat 48°30'35", long 104°10'23", in SE¼NE¼SE¼ sec.21, T.32 N., R.58 E., Sheridan County, Hydrologic Unit 10060006, on right bank, at bridge on county road 1.2 mi southeast of Medicine Lake National Wildlife Refuge, and 5.3 mi south of Dagmar.

DRAINAGE AREA.--126 mi^2.

PERIOD OF RECORD.--October 1985 to current year. Seasonal records only.

GAGE.--Water-stage recorder. Elevation of gage is 1,975.00 ft, from topographic map.

REMARKS.--Estimated daily discharges: Mar. 1-29. Records good except those for estimated daily discharges, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 277 ft ^{3}/s, Apr. 2, 1987, gage height, 4.78 ft; no flow most days each year.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 277 ft ^{3}/s, Apr. 2, gage height, 4.78 ft; no flow most days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	---	---	---	e.00	158	.16	.00	.00	.00	.00
2	.00	.00	---	---	---	e.00	226	.08	.00	.00	.00	.00
3	.00	.00	---	---	---	e.00	159	.11	.00	.00	.00	.00
4	.00	.00	---	---	---	e.00	160	.09	.00	.00	.00	.00
5	.00	.00	---	---	---	e.00	115	.04	.00	.00	.00	.00
6	.00	.00	---	---	---	e.00	58	.03	.00	.00	.00	.00
7	.00	.00	---	---	---	e.00	26	.02	.00	.00	.00	.00
8	.00	.00	---	---	---	e.00	13	.02	.00	.00	.00	.00
9	.00	.00	---	---	---	e.00	11	.02	.00	.00	.00	.00
10	.00	.00	---	---	---	e.00	8.8	.02	.00	.00	.00	.00
11	.00	.00	---	---	---	e.00	6.9	.01	.00	.00	.00	.00
12	.00	.00	---	---	---	e.00	6.1	.01	.00	.00	.00	.00
13	.00	.00	---	---	---	e.00	4.9	.01	.00	.00	.00	.00
14	.00	.00	---	---	---	e.00	3.5	.01	.00	.00	.00	.00
15	.00	---	---	---	---	e.00	2.9	.01	.00	.00	.00	.00
16	.00	---	---	---	---	e2.0	2.7	.01	.00	.00	.00	.00
17	.00	---	---	---	---	e3.0	2.4	.02	.00	.00	.00	.00
18	.00	---	---	---	---	e3.0	2.2	.00	.00	.00	.00	.00
19	.00	---	---	---	---	e4.0	2.0	.00	.00	.00	.00	.00
20	.00	---	---	---	---	e3.0	1.7	.00	.00	.00	.00	.00
21	.00	---	---	---	---	e3.0	1.7	.00	.00	.00	.00	.00
22	.00	---	---	---	---	e3.0	1.5	.00	.00	.00	.00	.00
23	.00	---	---	---	---	e3.0	1.3	.00	.00	.00	.00	.00
24	.00	---	---	---	---	e3.0	1.2	.00	.00	.00	.00	.00
25	.00	---	---	---	---	e4.0	1.0	.00	.00	.00	.00	.00
26	.00	---	---	---	---	e6.0	.48	.00	.00	.00	.00	.00
27	.00	---	---	---	---	e10	.21	.00	.00	.00	.00	.00
28	.00	---	---	---	---	e9.0	.09	.00	.00	.00	.00	.00
29	.00	---	---	---	---	e8.0	.19	.00	.00	.00	.00	.00
30	.00	---	---	---	---	7.4	.23	.00	.00	.00	.00	.00
31	.00	---	---	---	---	6.6	---	.00	---	.00	.00	---
TOTAL	.00	---	---	---	---	78.00	978.00	.67	.00	.00	.00	.00
MEAN	.00	---	---	---	---	2.52	32.6	.022	.00	.00	.00	.00
MAX	.00	---	---	---	---	10	226	.16	.00	.00	.00	.00
MIN	.00	---	---	---	---	.00	.09	.00	.00	.00	.00	.00
AC-FT	.0	---	---	---	---	155	1940	1.3	.0	.0	.0	.0

e Estimated

06183850 SAND CREEK NEAR DAGMAR, MT

LOCATION.--Lat 48°29'38", long 104°16'23", in SE¼NW¼NW¼ sec.26, T.32 N., R.57 E., Sheridan County, Hydrologic Unit 10060006, at Medicine Lake National Wildlife Refuge boundary, on right bank at downstream end of culvert on county road, 1.0 mi upstream from mouth, and 7 mi southwest of Dagmar.

DRAINAGE AREA.--122 mi^2.

PERIOD OF RECORD.--August 1985 to current year (seasonal records only).

GAGE.--Water-stage recorder. Elevation of gage is 1,945 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Mar. 1 to Apr. 2. Records good except those for estimated daily discharges, which are poor. No known diversions for irrigation upstream of 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.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 112 ft^3/s, Apr. 3, 1987, gage height, 4.06 ft; no flow many days each year.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 112 ft^3/s, Apr. 3, gage height, 4.06 ft; no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	---	---	---	e.00	e40	4.6	.64	.00	.00	.00
2	.00	.00	---	---	---	e.00	e50	4.2	1.3	.00	.00	.00
3	.00	.00	---	---	---	e.00	83	5.1	1.7	.00	.00	.00
4	.00	.00	---	---	---	e1.0	81	4.9	1.3	.00	.00	.00
5	.00	.00	---	---	---	e1.0	41	4.5	.28	.00	.00	.00
6	.00	.00	---	---	---	e1.0	23	4.4	.07	.00	.00	.00
7	.00	.00	---	---	---	e1.0	15	4.1	.0	.00	.00	.00
8	.00	.00	---	---	---	e1.0	12	3.7	.00	.00	.00	.00
9	.00	.00	---	---	---	e.50	11	3.1	.00	.00	.00	.00
10	.00	.00	---	---	---	e.50	12	2.2	.00	.00	.00	.00
11	.00	.00	---	---	---	e1.0	11	1.3	.00	.00	.00	.00
12	.00	.00	---	---	---	e1.0	9.7	.28	.00	.00	.00	.00
13	.00	.00	---	---	---	e1.0	9.1	.07	.00	.00	.00	.00
14	.00	.00	---	---	---	e2.0	8.4	.04	.00	.00	.00	.00
15	.00	---	---	---	---	e3.0	7.8	.0	.00	.00	.00	.00
16	.00	---	---	---	---	e3.0	7.4	.00	.00	.00	.00	.00
17	.00	---	---	---	---	e3.0	7.2	.03	.00	.00	.00	.00
18	.00	---	---	---	---	e2.5	7.0	.12	.00	.00	.00	.00
19	.00	---	---	---	---	e2.5	6.6	2.5	.00	.00	.00	.00
20	.00	---	---	---	---	e2.5	6.3	2.7	.00	.00	.00	.00
21	.00	---	---	---	---	e5.0	5.9	4.2	.00	.00	.00	.00
22	.00	---	---	---	---	e4.0	5.7	3.6	.00	.00	.00	.00
23	.00	---	---	---	---	e4.0	5.6	2.8	.00	.00	.00	.00
24	.00	---	---	---	---	e3.5	5.7	2.0	.00	.00	.00	.00
25	.00	---	---	---	---	e5.0	5.6	.66	.00	.00	.00	.00
26	.00	---	---	---	---	e6.0	5.2	.09	.00	.00	.00	.00
27	.00	---	---	---	---	e10	4.7	.05	.00	.00	.00	.00
28	.00	---	---	---	---	e8.0	4.4	.05	.00	.00	.00	.00
29	.00	---	---	---	---	e7.0	4.2	1.5	.00	.00	.00	.00
30	.00	---	---	---	---	e5.0	4.2	1.6	.00	.00	.00	.00
31	.00	---	---	---	---	e8.0	---	.95	---	.00	.00	---
TOTAL	.00	---	---	---	---	93.00	499.7	65.34	5.29	.00	.00	.00
MEAN	.00	---	---	---	---	3.00	16.7	2.11	.18	.00	.00	.00
MAX	.00	---	---	---	---	10	83	5.1	1.7	.00	.00	.00
MIN	.00	---	---	---	---	.00	4.2	.00	.00	.00	.00	.00
AC-FT	.0	---	---	---	---	184	991	130	10	.0	.0	.0

e Estimated

06185110 BIG MUDDY CREEK NEAR MOUTH, NEAR CULBERTSON, MT

LOCATION.--Lat 48°09'52", long 104°37'45", in NE¼NW¼SW¼ sec.21, T.28 N., R.55 E., Roosevelt County, Hydrologic Unit 10060006, Fort Peck Indian Reservation, on right bank 30 ft downstream from U.S. Highway 2 bridge and 5.3 mi northwest of Culbertson.

DRAINAGE AREA.--2,684 mi^2.

WATER DISCHARGE RECORDS

PERIOD OF RECORD.--November 1981 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,896.52 ft above National Geodetic Vertical Datum of 1980 (unadjusted).

REMARKS.--Estimated daily discharges: Oct. 12 to Apr. 4, Apr. 24 to May 14, May 20 to June 8, June 18-29, and Aug. 23, 24, 27-30. Water-discharge records poor. Flows are subject to extreme regulation by diversions and dams at Medicine Lake National Wildlife Refuge about 40 mi upstream.

AVERAGE DISCHARGE.--6 years (1982-87), 37.5 ft^3/s, 27,170 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,860 ft^3/s, Apr. 16, 1982, gage height, 10.40 ft; no flow on many days.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 281 ft^3/s, Aug. 7, gage height, 4.06 ft; maximum gage height, 5.15 ft, Feb. 1, backwater from ice; minimum daily discharge, 0.70 ft^3/s, Jan. 16.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	37	e3.5	e6.0	e2.5	e2.5	e6.0	e35	e10	e8.7	12	139	11
2	53	e3.5	e7.0	e3.0	e3.0	e8.0	e30	e9.5	e7.4	14	55	11
3	69	e4.0	e6.0	e2.5	e2.5	e10	e30	e9.0	e8.0	15	51	8.9
4	71	e4.0	e5.0	e2.5	e3.0	e11	e30	e8.5	e7.3	14	57	9.5
5	50	e4.0	e5.0	e3.0	e3.5	e13	32	e8.0	e6.3	15	60	8.9
6	35	e4.0	e5.0	e2.5	e4.0	e14	36	e8.0	e5.5	16	76	8.0
7	54	e4.0	e4.5	e2.0	e4.5	e18	34	e7.5	e4.6	18	245	7.5
8	96	e3.5	e4.0	e2.5	e4.5	e17	35	e7.0	e4.2	20	209	7.4
9	136	e2.5	e3.5	e2.0	e4.0	e16	33	e7.0	4.0	20	144	6.8
10	147	e2.0	e4.0	e1.5	e4.5	e19	33	e6.5	2.8	23	107	6.6
11	152	e3.0	e4.5	e2.0	e5.0	e25	29	e6.5	2.6	45	84	6.4
12	e100	e3.5	e4.0	e2.5	e5.0	e27	31	e6.5	3.0	69	71	5.9
13	e60	e3.0	e4.5	e1.5	e5.0	e30	31	e6.0	2.4	82	62	6.2
14	e30	e4.0	e4.5	e1.0	e5.5	e30	30	e5.0	2.5	87	51	6.8
15	e15	e3.5	e5.0	e.80	e5.0	e35	29	3.3	2.5	85	40	11
16	e9.0	e4.5	e4.5	e.70	e4.0	e35	29	3.2	2.0	78	32	15
17	e9.0	e5.0	e5.0	e.80	e5.0	e30	27	5.7	1.9	73	30	17
18	e8.0	e4.5	e4.0	e.80	e6.0	e30	26	7.4	e3.0	74	31	14
19	e8.0	e6.0	e3.0	e.80	e7.0	e30	23	8.1	e4.4	72	32	12
20	e7.0	e5.0	e2.0	e.80	e6.0	e25	22	e8.5	e5.3	66	31	9.8
21	e6.0	e7.0	e2.0	e.90	e7.0	e25	22	e8.5	e6.5	63	27	8.7
22	e5.0	e9.0	e2.5	e.90	e6.5	e30	22	e8.4	e6.6	58	26	7.7
23	e5.0	e9.0	e3.0	e.80	e6.0	e35	18	e7.8	e6.1	54	e19	6.9
24	e5.0	e10	e3.0	e.90	e6.0	e35	15	e7.8	e7.5	49	e15	6.7
25	e5.0	e9.0	e2.5	e.90	e6.0	e35	13	e8.0	e7.4	46	16	6.5
26	e4.0	e7.0	e2.5	e1.0	e5.0	e30	e12	e7.0	e8.0	48	15	6.3
27	e4.0	e8.0	e2.5	e1.0	e6.0	e30	e11	e7.7	e8.4	51	e16	6.5
28	e4.0	e8.0	e3.0	e1.0	e5.0	e25	e10	e7.0	e8.5	52	e16	8.8
29	e4.0	e7.0	e3.0	e1.5	---	e30	e10	e8.0	e11	53	e14	8.0
30	e4.5	e7.0	e3.5	e1.5	---	e35	e10	e8.7	13	61	e14	7.4
31	e4.0	---	e3.0	e2.5	---	e40	---	e9.5	---	97	12	---
TOTAL	1196.5	158.0	121.5	48.60	137.0	779.0	748	229.6	171.4	1530	1797	263.2
MEAN	38.6	5.27	3.92	1.57	4.89	25.1	24.9	7.41	5.71	49.4	58.0	8.77
MAX	152	10	7.0	3.0	7.0	40	36	10	13	97	245	17
MIN	4.0	2.0	2.0	.70	2.5	6.0	10	3.2	1.9	12	12	5.9
AC-FT	2370	313	241	96	272	1550	1480	455	340	3030	3560	522

CAL YR 1986 TOTAL 11997.68 MEAN 32.9 MAX 800 MIN .00 AC-FT 23800
WTR YR 1987 TOTAL 7179.78 MEAN 19.7 MAX 245 MIN .70 AC-FT 14240

e Estimated

PERIOD OF RECORD.--Water years 1982 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)
APR											
06...	1415	36	0	0	1500	16.0	2.5	8.80	370	0	50
MAY											
14...	1500	6.3	0	0	1750	24.0	23.0	8.30	420	0	53
JUN											
24...	0800	7.5	0	0	1680	18.5	22.5	8.40	410	0	43
SEP											
08...	1030	7.4	40	1	1670	17.0	16.0	8.40	360	0	46

DATE	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
APR											
06...	60	200	5	7.7	395	450	13	0.20	5.0	1000	1.4
MAY											
14...	69	250	5	12	539	440	16	0.30	8.6	1200	1.6
JUN											
24...	73	310	7	13	593	490	12	0.40	3.8	1300	1.8
SEP											
08...	60	260	6	15	534	420	12	0.30	12	1100	1.6

DATE	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)
APR											
06...	99	<0.100	--	400	--	--	20	--	--	--	--
MAY											
14...	20	<0.100	12	560	<1	<10	27	<5	17	0.3	<1
JUN											
24...	26	<0.100	--	710	--	--	25	--	--	--	--
SEP											
08...	23	<0.100	--	690	--	--	33	--	--	--	--

06185500 MISSOURI RIVER NEAR CULBERTSON, MT

LOCATION.--Lat 48°07'30", long 104°28'20", in SE¼NW¼ sec.3, T.27 N., R.56 E., Richland County, Hydrologic Unit 10060005, on right bank at downstream side of bridge on State Highway 16, 2.5 mi southeast of Culbertson, 10 mi downstream from Big Muddy Creek, and at mile 1,620.76.

DRAINAGE AREA.--91,557 mi^2.

PERIOD OF RECORD.--July 1941 to December 1951, April 1958 to current year.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,883.4 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark). July 1 to Nov. 6, 1941, water-stage recorder at site 400 ft upstream at datum 0.11 ft. Nov. 7, 1941, to Aug. 17, 1950, water-stage recorder at site 580 ft downstream at present datum. Aug. 18, 1950, to Dec. 31, 1951, nonrecording gage on bridge at present datum. Apr. 1, 1958, to Nov. 1, 1967, waterstage recorder at site 580 ft downstream at present datum.

REMARKS.--Estimated daily discharges: Nov. 10 to Mar. 16. Records good except those for estimated daily discharges, which are poor. Flow partly regulated by Fort Peck Lake (station number 06131500) and many other reservoirs upstream from station. Diversions for irrigation of about 1,030,400 acres upstream from station.

AVERAGE DISCHARGE.--37 years (1943-51, 1958-87, after operational level at Fort Peck Lake was reached), 10,870 ft^3/s, 7,875,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 78,200 ft^3/s, Mar. 26, 1943, gage height, 14.80 ft, from rating curve extended above 30,000 ft^3/s; maximum gage height observed, 19.66 ft, Apr. 14, 1979 (backwater from ice jam); minimum daily discharge, 575 ft^3/s, Nov. 22, 1941.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 17,300 ft^3/s, Aug. 1, gage height, 8.22 ft; maximum gage height, 10.10 ft, Mar. 5, backwater from ice, but may have been higher during period of no gage height record, Dec. 3-11; minimum daily discharge, 5,500 ft^3/s, Nov. 12.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12500	8440	e6300	e7400	e11600	e11500	7860	5730	6850	7740	15900	6710
2	13200	8460	e6600	e7200	e11400	e11400	7540	5810	6950	7470	11000	6700
3	13600	8390	e6600	e7100	e11500	e11100	7510	5920	7190	7520	9400	6590
4	13800	8410	e6600	e7100	e11400	e11800	8190	5880	7060	7540	9230	6570
5	13100	8420	e6600	e7400	e11600	e11800	8880	5820	6790	7600	9410	6630
6	12400	8450	e6600	e7200	e11400	e11900	9790	5710	6940	7820	9290	6570
7	12500	8380	e6500	e7300	e11300	e11800	10100	5710	6820	7590	8720	6580
8	14000	8270	e6500	e7300	e11600	e9800	10300	5680	6890	7580	8240	6570
9	15400	8280	e6400	e7400	e11200	e7800	9880	5660	6920	7410	8270	6520
10	16100	e7000	e6400	e7200	e11300	e7000	9140	5640	6890	7450	8220	6810
11	16400	e5500	e6400	e7600	e11200	e6800	8440	5680	6810	7570	8120	6930
12	16000	e5600	e6300	e7600	e11100	e6800	7790	5750	6750	7570	8120	6730
13	15600	e6000	e6000	e7800	e11200	e7000	7570	5620	6820	7710	8020	6690
14	15300	e6500	e6000	e7400	e11300	e7500	7290	5840	7180	7630	8010	6600
15	15500	e7000	e6500	e7300	e11700	e7800	6770	6040	7500	7470	7860	6610
16	15500	e7000	e7000	e7100	e11600	e8100	6600	6690	7600	7420	7540	6700
17	15500	e7000	e7500	e7300	e11600	9220	6450	7340	7630	7400	7880	6810
18	15100	e6700	e7500	e7600	e11800	8800	6300	7080	7550	7600	8020	6780
19	14200	e6400	e7600	e7500	e11800	8500	6090	6900	7700	7720	7990	6850
20	12700	e6400	e7600	e7200	e11900	8290	6090	6800	7870	7690	7840	6760
21	11500	e6400	e7500	e8700	e11900	8220	6080	6770	7760	7690	7680	6660
22	10700	e6400	e7700	e10300	e11900	8360	5910	6830	7610	7940	7640	6690
23	10200	e6800	e7600	e10500	e12000	8520	5780	6590	7590	10500	7770	6530
24	9710	e6900	e7400	e10500	e11800	8680	5650	6500	7530	9560	7730	6670
25	9320	e6600	e7300	e10600	e11700	8500	5620	6520	7510	8240	7720	6620
26	8860	e6600	e7400	e10400	e11600	8280	5550	6390	7420	8110	7660	6580
27	8790	e6700	e7400	e10300	e11800	9140	5660	6500	7430	8200	7630	6610
28	8660	e6000	e7400	e10000	e11600	10500	5850	6900	7490	8200	7800	6910
29	8580	e7100	e7500	e10100	---	10800	5800	7120	7570	8160	7760	7110
30	8450	e6400	e7400	e10200	---	10700	5740	7160	7720	9030	7580	6860
31	8400	---	e7300	e10200	---	9240	---	6940	---	12300	7050	---
TOTAL	391570	212500	215400	258800	323800	285650	216220	195520	218340	249430	261100	200950
MEAN	12630	7083	6948	8348	11560	9215	7207	6307	7278	8046	8423	6698
MAX	16400	8460	7700	10600	12000	11900	10300	7340	7870	12300	15900	7110
MIN	8400	5500	6000	7100	11100	6800	5550	5620	6750	7400	7050	6520
AC-FT	776700	421500	427200	513300	642300	566600	428900	387800	433100	494700	517900	398600

CAL YR 1986 TOTAL 3647700 MEAN 9994 MAX 22000 MIN 5500 AC-FT 7235000
WTR YR 1987 TOTAL 3029280 MEAN 8299 MAX 16400 MIN 5500 AC-FT 6009000

e Estimated

06191000 GARDNER RIVER NEAR MAMMOTH, YELLOWSTONE NATIONAL PARK

LOCATION.--Lat 44°59'35", long 110°41'25", Yellowstone National Park, Hydrologic Unit 10070001, on left bank at Wyoming-Montana state line, 400 ft upstream from highway bridge, 0.5 mi downstream from Hot River (formerly Boiling River), 1.5 mi north of Mammoth, and at mile 2.9.

DRAINAGE AREA.--202 mi^2.

PERIOD OF RECORD.--October 1938 to September 1972, April 1984 to current year. Prior to October 1959, published as Gardiner River near Mammoth.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 5,620 ft, from topographic map.

REMARKS.--No estimated daily discharges this year. Records good. No regulation or diversion upstream of station.

AVERAGE DISCHARGE.--37 years (1938-72, 1985-87), 217 ft^3/s, 14.59 in/yr, 157,200 acre ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,080 ft^3/s, June 4, 1956, gage height, 4.46 ft; maximum gage height, 4.78 ft, June 16, 1962 (backwater from logs and debris); minimum discharge, 35 ft^3/s, Mar. 28, 1942, gage height, 1.08 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 1	0300	*445	*2.92	No peaks greater than base discharge this year.			

Minimum discharge, 46 ft^3/s, Mar. 29, gage height, 1.69 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	157	131	112	99	100	96	96	394	317	150	131	113
2	159	127	110	116	100	99	96	345	278	150	127	113
3	154	131	98	112	107	100	97	277	258	146	124	113
4	152	128	110	110	106	100	101	255	245	144	123	113
5	151	129	129	110	102	101	104	260	237	141	123	116
6	151	129	123	110	101	103	110	281	240	137	123	113
7	151	122	119	103	102	107	117	303	266	136	123	113
8	150	127	115	90	101	108	122	317	290	135	128	113
9	148	120	90	100	103	104	114	326	259	153	123	111
10	147	98	101	104	103	103	109	326	265	164	123	110
11	142	118	98	114	104	104	117	314	246	205	120	110
12	140	112	105	115	103	103	111	309	230	168	119	110
13	143	130	116	116	105	104	107	322	219	148	119	108
14	143	141	120	106	106	103	114	304	210	142	121	108
15	142	132	118	96	103	101	129	296	205	136	123	107
16	142	129	116	86	102	103	149	297	202	134	134	107
17	141	129	102	109	102	103	184	336	193	167	124	107
18	141	127	97	115	102	103	221	355	191	270	122	107
19	141	127	107	110	96	103	196	353	188	212	118	106
20	141	126	116	102	88	100	158	337	185	175	116	104
21	140	129	110	101	102	100	173	315	172	175	113	103
22	138	125	112	100	105	99	205	282	176	184	114	103
23	136	121	116	104	103	99	226	256	187	160	123	103
24	136	122	112	109	99	99	232	244	173	149	141	101
25	135	121	111	107	96	96	237	237	162	143	141	101
26	135	113	109	106	90	98	255	277	155	141	132	101
27	137	119	101	107	97	96	267	287	151	141	123	105
28	137	120	98	107	107	93	289	332	150	139	120	103
29	134	120	100	105	---	84	325	325	149	139	117	103
30	140	116	113	101	---	106	340	311	149	142	114	102
31	137	---	105	106	---	98	---	314	---	135	113	---
TOTAL	4441	3719	3389	3276	2835	3116	5101	9487	6348	4861	3815	3227
MEAN	143	124	109	106	101	101	170	306	212	157	123	108
MAX	159	141	129	116	107	108	340	394	317	270	141	116
MIN	134	98	90	86	88	84	96	237	149	134	113	101
AC-FT	8810	7380	6720	6500	5620	6180	10120	18820	12590	9640	7570	6400

CAL YR 1986 TOTAL 89124 MEAN 244 MAX 1630 MIN 65 AC-FT 176800
WTR YR 1987 TOTAL 53615 MEAN 147 MAX 394 MIN 84 AC-FT 106300

06191500 YELLOWSTONE RIVER AT CORWIN SPRINGS, MT

LOCATION.--Lat 45°06'43", long 110°47'37", in NW¼SE¼NW¼ sec.30, T.8 S., R.8 E., Park County, Hydrologic Unit 10070002, on left bank 20 ft downstream from county road bridge at Corwin Springs, 1.3 mi upstream from Mol Heron Creek, 7 mi northwest of Gardiner, and at mile 549.7.

DRAINAGE AREA.--2,623 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1889 to November 1893 (published as "at Horr"), September 1910 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1309: 1912. WSP 1509: 1889-94, 1911, 1913, 1916-18, 1920-21, 1925, 1927. WSP 1559: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 5,079.09 ft above National Geodetic Vertical Datum of 1929. Aug. 12, 1889, to Nov. 4, 1893, nonrecording gages at site 2 mi upstream at different datums. Sept. 2, 1910, to Apr. 19, 1935, nonrecording gages on bridge at present datum.

REMARKS.--Estimated daily discharges: Nov. 11-13, Dec. 4-16, Jan. 15 to Mar. 3. Water-discharge records good except those for estimated daily discharges, which are poor. Natural storage in Yellowstone Lake. Diversions for irrigation of about 960 acres of which 40 acres lies downstream from station.

AVERAGE DISCHARGE.--81 years, (1890-93, 1911-87) 3,110 ft^3/s, 16.10 in/yr, 2,253,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 32,000 ft^3/s, June 14, 15, 1918, gage height, 11.5 ft, from rating curve extended above 18,000 ft^3/s; minimum observed, 389 ft^3/s, Feb. 23, Mar. 5, 9, 1937, gage height, 0.05 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 12,000 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 8	0845	*7,620	*5.12	No peaks greater than base discharge this year.			

Minimum discharge, 600 ft^3/s, Mar. 29, gage height, 0.65 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2050	1490	1150	985	e1000	e910	884	6020	6300	3250	2320	1420
2	2040	1420	1140	966	e1000	e910	836	5570	5640	3240	2240	1400
3	1980	1470	1090	994	e1020	e910	869	4230	5210	3210	2170	1390
4	1950	1460	e1050	1010	e1000	910	907	3850	5000	3130	2090	1390
5	1940	1450	e1100	1040	e1000	906	956	4190	4950	3030	2060	1380
6	1950	1500	e1130	1020	e1000	923	1070	4820	4920	2940	2020	1360
7	1980	1380	e1110	999	e1020	941	1160	5330	5060	2860	2000	1330
8	1960	1380	e1080	949	e1050	984	1170	5660	6460	2790	2000	1300
9	1910	1370	e1040	913	e1050	939	1110	5690	5900	2860	1930	1280
10	1880	1250	e1000	957	e1050	929	1020	5670	5950	3000	1880	1260
11	1790	e1200	e1000	1030	e1050	929	1070	5550	5700	3720	1870	1240
12	1720	e1200	e1000	989	e1020	928	1060	5500	5340	3420	1830	1220
13	1740	e1250	e1010	986	e1020	923	1030	5910	5100	2960	1770	1210
14	1740	1420	e1020	965	e1000	943	1020	5680	4920	2790	1760	1190
15	1710	1420	e1050	e890	e1000	900	1120	5660	4760	2680	1760	1180
16	1690	1390	e1020	e800	e980	928	1330	5560	4630	2620	1830	1170
17	1670	1380	1000	e850	e970	896	1590	6260	4460	2700	1860	1150
18	1670	1320	996	e900	e960	916	2090	6720	4300	3490	1710	1130
19	1650	1390	1010	e910	e950	907	2190	6340	4290	3330	1650	1120
20	1630	1350	1020	e920	e940	843	1680	6000	4280	2870	1600	1100
21	1630	1360	1030	e930	e940	885	1650	5420	4080	2760	1570	1080
22	1620	1340	982	e940	e950	873	2000	4920	4020	3290	1550	1070
23	1580	1340	988	e950	e950	846	2640	4620	4120	2870	1550	1070
24	1570	1340	1040	e960	e920	870	3210	4370	3870	2690	1710	1050
25	1550	1320	1020	e970	e900	828	3620	4390	3700	2580	1860	1050
26	1540	1190	991	e980	e880	876	4060	4550	3570	2510	1870	1030
27	1530	1290	941	e1000	e880	834	4530	4910	3470	2450	1690	1040
28	1560	1300	940	e1050	e900	857	4970	6100	3390	2460	1590	1020
29	1510	1280	941	e1020	---	729	5330	6690	3320	2470	1530	1010
30	1540	1220	971	e1000	---	824	5510	6790	3260	2610	1480	996
31	1570	---	962	e1000	---	911	---	6450	---	2420	1450	---
TOTAL	53850	40470	31822	29873	27400	27708	61682	169420	139970	90000	56200	35636
MEAN	1737	1349	1027	964	979	894	2056	5465	4666	2903	1813	1188
MAX	2050	1500	1150	1050	1050	984	5510	6790	6460	3720	2320	1420
MIN	1510	1190	940	800	880	729	836	3850	3260	2420	1450	996
AC-FT	106800	80270	63120	59250	54350	54960	122300	336000	277600	178500	111500	70680

CAL YR 1986 TOTAL 1358760 MEAN 3723 MAX 20400 MIN 799 AC-FT 2695000
WTR YR 1987 TOTAL 764031 MEAN 2093 MAX 6790 MIN 729 AC-FT 1515000

e Estimated

06191500 YELLOWSTONE RIVER AT CORWIN SPRINGS, MT--Continued

WATER QUALITY RECORDS

PERIOD OF RECORD.--Water years 1965, 1969-74, 1977-1981, 1984 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: March 1984 to September 1985.
WATER TEMPERATURE: June 1977 to September 1981, March 1984 to September 1985.
SUSPENDED-SEDIMENT DISCHARGE: May 1985 to current year, seasonal.

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

EXTREMES FOR PERIOD OF DAILY RECORDS.--
SPECIFIC CONDUCTANCE (water years 1984-85): Maximum, 311 microsiemens, Feb. 5, 1985; minimum, 71 microsiemens, June 21, 22, 1984.
WATER TEMPERATURE (water years 1977-81, 1984-85): Maximum, 21.5°C, July 22, 23, 1977; minimum, 0.0°C, on many days during winter periods most years.
SEDIMENT CONCENTRATION: Maximum daily mean, 645 mg/L, May 28, 1986: minimum daily mean, 1 mg/L, on several days in September 1987.
SEDIMENT LOAD: Maximum daily, 29,200 tons, June 3, 1986; minimum daily, 2.7 tons, Sep. 29, 1987.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATION: Maximum daily mean, 350 mg/L, July 22; minimum daily mean, 1 mg/L, on several days in September.
SEDIMENT LOAD: Maximum daily, 3,450 tons, June 8; minimum daily, 2.7 tons, Sept. 29.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT								
22...	1110	1550	214	9.0	9.0	--	--	--
DEC								
04...	1148	1040	259	3.0	0.0	--	--	--
JAN								
14...	1200	952	272	-7.5	0.5	--	--	--
FEB								
26...	0950	874	290	-6.0	0.0	--	--	--
APR								
10...	1245	988	267	9.0	6.0	14	37	84
27...	1820	4130	--	--	8.5	88	981	76
MAY								
20...	1500	5970	111	4.0	8.5	36	580	56
JUN								
30...	1420	3260	168	20.0	19.0	8	70	56
AUG								
11...	1550	1880	--	--	19.5	5	25	78
SEP								
24...	1230	1080	262	20.5	15.0	--	--	--
30...	1520	992	--	--	14.0	3	8.0	62

06191500 YELLOWSTONE RIVER AT CORWIN SPRINGS, MT--Continued

SUSPENDED-SEDIMENT, APRIL 1987 TO SEPTEMBER 1987

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	6	14	123	2000	56	953	10	88	24	150	6	23
2	8	18	85	1280	29	442	10	87	11	67	7	26
3	8	19	30	343	21	295	9	78	9	53	4	15
4	9	22	24	249	22	297	8	68	9	51	4	15
5	6	15	34	385	19	254	9	74	12	67	4	15
6	8	23	53	690	19	252	10	79	7	38	4	15
7	14	44	59	849	26	355	8	62	8	43	4	14
8	15	47	61	932	198	3450	8	60	9	49	2	7.0
9	11	33	64	983	88	1400	9	69	7	36	2	6.9
10	8	22	58	888	55	884	13	105	6	30	2	6.8
11	6	17	59	884	32	492	47	472	6	30	2	6.7
12	9	26	54	802	32	461	22	203	6	30	2	6.6
13	4	11	64	1020	24	330	10	80	6	29	2	6.5
14	4	11	62	951	22	292	8	60	6	29	2	6.4
15	6	18	62	947	20	257	8	58	6	29	2	6.4
16	10	36	63	946	18	225	10	71	6	30	2	6.3
17	27	116	98	1660	16	193	11	80	6	30	2	6.2
18	53	299	113	2050	15	174	90	848	6	28	2	6.1
19	40	237	77	1320	15	174	47	423	5	22	2	6.0
20	18	82	47	761	14	162	14	108	5	22	1	3.0
21	14	62	32	468	15	165	26	194	5	21	3	8.7
22	20	108	27	359	13	141	350	3110	7	29	2	5.8
23	51	364	23	287	15	167	45	349	8	33	1	2.9
24	98	849	16	189	10	104	18	131	24	111	1	2.8
25	94	919	18	213	10	100	13	91	90	452	1	2.8
26	129	1410	19	233	12	116	10	68	101	510	1	2.8
27	136	1660	32	424	13	122	10	66	55	251	1	2.8
28	149	2000	75	1240	11	101	9	60	35	150	1	2.8
29	127	1830	128	2310	9	81	64	427	9	37	1	2.7
30	128	1900	95	1740	8	70	104	733	5	20	2	5.4
31	---	---	61	1060	---	---	106	693	6	23	---	---
TOTAL	---	12212	---	28463	---	12509	---	9095	---	2500	---	243.4

TOTAL LOAD FOR PERIOD: 65022.4 TONS

06192500 YELLOWSTONE RIVER NEAR LIVINGSTON, MT
(National stream quality accounting network station)

LOCATION.--Lat 45°35'50", long 110°33'55", in NE¼NW¼NW¼ sec. 12, T.3 S., R.9 E., Park County, Hydrologic Unit 10070002, on right bank 50 ft downstream from bridge on Montana Secondary Highway 540, 2 mi downstream from Suce Creek, 4 mi south of Livingston, and at mile 501.4.

DRAINAGE AREA.--3,551 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1897 to December 1905, August 1928 to September 1932, October 1937 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1309: 1899. WSP 1509: 1902. WSP 1629: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 4,542.49 ft above National Geodetic Vertical Datum of 1929. May 2, 1897, to Dec. 31, 1905, nonrecording gage on highway bridge at different datum. Aug. 23, 1928, to Sept. 30, 1932, and Mar. 14, 1938, to Feb. 3, 1951, nonrecording gage on highway bridge at present datum.

REMARKS.--Estimated daily discharges: Nov. 10-13, Jan. 8-25, and Feb. 22-26. Water-discharge records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 24,200 acres of which about 2,000 acres is downstream from station.

AVERAGE DISCHARGE.--62 years, 3,748 ft^3/s, 2,715,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 36,300 ft^3/s, June 17, 1974, gage height, 9.21 ft; maximum gage height, 9.34 ft, June 20, 1943; minimum daily discharge, 590 ft^3/s, Jan. 22, 1940.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 13,500 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan. 11	1700	ice jam	*5.61	June 8	1715	*7,450	4.21

Minimum discharge, 997 ft^3/s, Mar. 30, gage height, 0.89 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2560	2050	1670	1470	1310	1240	1220	6010	6820	3620	2640	1860
2	2560	1970	1650	1500	1320	1260	1190	5830	6180	3630	2560	1840
3	2540	1950	1590	1450	1310	1250	1170	4810	5630	3610	2500	1820
4	2460	1990	1530	1470	1330	1250	1210	4080	5330	3540	2430	1820
5	2460	1970	1690	1500	1310	1250	1260	4110	5220	3480	2380	1800
6	2460	2020	1730	1490	1290	1260	1320	4580	5180	3450	2340	1790
7	2460	1980	1690	1470	1280	1300	1440	5100	5240	3330	2300	1760
8	2490	1910	1650	e1460	1280	1340	1490	5470	6310	3140	2300	1740
9	2440	1950	1620	e1400	1280	1310	1480	5530	6280	3110	2270	1720
10	2400	e1950	1620	e1450	1280	1290	1400	5600	6240	3300	2200	1700
11	2360	e1900	1610	e1500	1290	1280	1370	5530	6140	3790	2170	1680
12	2270	e1900	1680	e1450	1290	1270	1420	5410	5730	3940	2160	1660
13	2240	e1950	1690	e1450	1280	1270	1380	5680	5450	3460	2120	1650
14	2250	1950	1650	e1400	1310	1290	1360	5680	5260	3210	2090	1640
15	2240	1950	1600	e1350	1300	1280	1400	5610	5110	3070	2110	1610
16	2210	1920	1600	e1250	1280	1250	1530	5520	4980	2980	2110	1610
17	2210	1900	1510	e1300	1250	1260	1740	6110	4780	2980	2160	1600
18	2200	1870	1500	e1350	1260	1240	2170	6560	4640	3490	2110	1570
19	2180	1850	1490	e1350	1250	1250	2490	6500	4580	3860	2020	1560
20	2160	1870	1440	e1400	1220	1230	2290	6190	4540	3400	1970	1550
21	2140	1860	1520	e1410	1180	1190	1960	5730	4450	3180	1930	1520
22	2140	1870	1430	e1450	e1200	1220	2090	5200	4320	3360	1930	1510
23	2130	1830	1460	e1600	e1250	1190	2640	4860	4410	3340	1920	1500
24	2100	1820	1500	e1700	e1300	1200	3260	4540	4260	3080	2060	1490
25	2090	1820	1480	e1580	e1300	1190	3650	4460	4080	2950	2250	1480
26	2060	1750	1440	1500	e1250	1180	4040	4570	3940	2850	2220	1480
27	2060	1720	1460	1480	1250	1200	4540	4870	3830	2790	2190	1480
28	2060	1780	1450	1440	1230	1170	5010	5930	3760	2750	2070	1470
29	2060	1790	1480	1360	---	1160	5360	6790	3690	2760	2010	1450
30	2030	1740	1500	1310	---	1090	5610	6920	3600	2820	1940	1430
31	2090	---	1430	1290	---	1210	---	6830	---	2790	1890	---
TOTAL	70110	56780	48360	44580	35680	38370	68490	170610	149980	101060	67350	48790
MEAN	2262	1893	1560	1438	1274	1238	2283	5504	4999	3260	2173	1626
MAX	2560	2050	1730	1700	1330	1340	5610	6920	6820	3940	2640	1860
MIN	2030	1720	1430	1250	1180	1090	1170	4080	3600	2750	1890	1430
AC-FT	139100	112600	95920	88420	70770	76110	135800	338400	297500	200500	133600	96770

CAL YR 1986 TOTAL 1553900 MEAN 4257 MAX 23000 MIN 1180 AC-FT 3082000
WTR YR 1987 TOTAL 900160 MEAN 2466 MAX 6920 MIN 1090 AC-FT 1785000

e Estimated

06192500 YELLOWSTONE RIVER NEAR LIVINGSTON, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

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

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1969 to September 1981.
WATER TEMPERATURE: October 1969 to September 1983.
SUSPENDED-SEDIMENT DISCHARGE: May 1985 to September 1986.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1969-81): Maximum daily, 398 microsiemens, Apr. 3, 1970; minimum daily, 73 microsiemens Jun. 14, 1979.
WATER TEMPERATURE (water years 1969-83): Maximum, 23.0°C, Jul. 9, 1976; minimum, 0.0°C on many days during winter.
SEDIMENT CONCENTRATION (water years 1985-86): Maximum daily mean, 790 mg/L, May 28, 1986; minimum daily mean, 4 mg/L on several days in August 1985 and September 1986.
SEDIMENT LOAD (water years 1985-86): Maximum daily, 33,700 tons, Jun. 2, 1986; minimum daily, 28 tons on several days in August and September of 1985 and 1986.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	DISCHARGE, IN CUBIC FEET PER SECOND (00060)	STREAMFLOW, INSTANTANEOUS (CFS) (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)
OCT								
22...	1530	--	2110	--	--	230	18.0	10.0
NOV								
13...	1630	E1950	--	100	2	240	4.5	0.5
DEC								
04...	1300	--	1380	--	--	258	8.5	0.5
JAN								
14...	1030	--	1340	--	--	301	-6.0	0.0
20...	1130	E1400	--	80	1	292	-7.0	0.0
FEB								
26...	1300	--	1250	--	--	290	-6.0	0.0
MAR								
10...	0800	--	1300	50	1	278	-1.0	3.5
APR								
09...	1730	--	1490	--	--	259	8.0	8.5
MAY								
12...	0900	--	5280	0	0	110	19.0	10.0
21...	0915	--	5770	--	--	125	1.5	7.0
JUL								
01...	0730	--	3570	--	--	190	15.0	16.0
08...	0945	--	3140	50	1	175	18.0	16.0
AUG								
11...	1020	--	2210	--	--	224	17.0	16.0
26...	1345	--	2230	70	1	225	14.5	15.0
SEP								
24...	0900	--	1530	--	--	277	6.0	11.5

DATE	BAROMETRIC PRESSURE (MM OF HG) (00025)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BICARBONATE WATER WHOLE IT-FLD (MG/L) (00450)	CARBONATE WATER WHOLE IT-FLD (MG/L) (00447)	ALKALINITY WH WAT TOTAL FIELD MG/L AS CACO3 (00410)
NOV								
13...	644	12.4	102	K1	K3	90	0	73
JAN								
20...	697	11.8	88	120	K5	111	0	87
MAR								
10...	648	10.6	94	K6	82	103	0	81
MAY								
12...	656	9.4	97	K17	K23	48	0	37
JUL								
08...	647	8.8	105	25	29	70	0	54
AUG								
26...	654	10.3	119	20	K8	92	0	72

06192500 YELLOWSTONE RIVER NEAR LIVINGSTON, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV 13...	1630	7.70	1.8	77	4	20	6.5	18	0.9	4.1
JAN 20...	1130	7.90	2.5	89	2	23	7.7	22	1	4.9
MAR 10...	0800	7.20	2.8	87	6	23	7.2	21	1	5.0
MAY 12...	0900	7.10	4.2	38	1	9.9	3.2	7.4	0.5	1.8
JUL 08...	0945	7.40	2.0	59	5	15	5.1	14	0.8	3.2
AUG 26...	1345	7.60	1.8	77	5	20	6.5	16	0.8	3.8

DATE	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
NOV 13...	77	30	9.9	0.80	24	160	160	0.22	E842	<0.010
JAN 20...	90	36	13	0.90	28	183	190	0.25	E692	<0.010
MAR 10...	85	35	12	0.90	27	173	180	0.24	607	0.010
MAY 12...	42	11	3.5	0.30	17	85	76	0.12	1210	<0.010
JUL 08...	64	19	6.9	0.50	18	113	110	0.15	958	<0.010
AUG 26...	76	24	7.9	0.60	23	137	150	0.19	825	<0.010

DATE	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, 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)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 13...	0.170	<0.010	0.020	0.60	0.020	<0.010	0.020	--	--	--
JAN 20...	0.280	0.090	0.100	0.50	0.190	0.070	0.030	--	--	--
MAR 10...	0.250	0.030	0.040	1.3	0.020	0.010	0.010	41	144	83
MAY 12...	<0.100	0.020	0.020	0.70	0.050	0.030	0.020	40	570	49
JUL 08...	<0.100	0.020	<0.010	0.50	0.040	0.010	0.010	10	85	43
AUG 26...	0.120	0.030	<0.010	<0.20	<0.010	0.010	<0.010	63	379	93

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 13...	1630	40	21	31	<0.5	<1	<1	<3	4	24	<5
MAR 10...	0800	60	18	35	<0.5	<1	<1	<3	3	28	<5
JUL 08...	0945	30	20	25	<0.5	<1	<1	<3	2	9	<5
AUG 26...	1345	30	14	33	<0.5	<1	<1	<3	4	21	<5

06192500 YELLOWSTONE RIVER NEAR LIVINGSTON, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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										
13...	87	5	<0.1	<10	3	<1	<1	130	<6	<3
MAR										
10...	98	6	<0.1	<10	4	<1	<1	140	<6	19
JUL										
08...	61	3	0.1	<10	1	<1	<1	97	<6	3
AUG										
26...	67	3	<0.1	<10	<1	<1	<1	120	<6	<3

YELLOWSTONE RIVER BASIN

06195600 SHIELDS RIVER NEAR LIVINGSTON, MT

LOCATION.--Lat 45°44'18", long 110°28'45", in NE¼SE¼NW¼ sec.22, T.1 S., R.10 E., Park County, Hydrologic Unit 10070003, on right bank 900 ft northeast of U.S. Highway 89, 0.2 mi downstream from private road bridge, 2.0 mi upstream from mouth, and 6.5 mi northeast of Livingston.

DRAINAGE AREA.--852 mi^2.

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

GAGE.--Water-stage recorder. Elevation of gage is 4,420 ft, from topographic map. Oct. 1, 1978, to Aug. 12, 1980, water-stage recorder at site 0.2 mi upstream at datum 7.89 ft higher.

REMARKS.--Estimated daily discharges: Nov. 8-19, Dec. 7-22, Dec. 27 to Jan. 23, Feb. 20-28. Records good except those for November through June, which are fair, and those for estimated daily discharges, which are poor. Diversions for irrigation of about 32,000 acres upstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--9 years, 306 ft^3/s, 221,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,600 ft^3/s, June 20, 1979, gage height, 6.80 ft, previous datum; minimum, 38 ft^3/s, May 14, 1987, gage height, 1.61 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 880 ft^3/s, May 28, gage height, 3.76 ft; minimum, 38 ft^3/s, May 14, gage height, 1.61 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	207	156	122	e80	98	83	116	280	610	110	92	118
2	222	150	142	e83	100	82	113	311	528	118	87	113
3	220	153	121	e85	92	85	113	259	467	131	84	109
4	213	151	90	e88	93	97	121	191	409	120	77	105
5	213	153	133	e85	92	111	130	125	356	114	77	106
6	212	168	126	e82	95	133	146	103	298	117	73	104
7	208	165	e95	e78	97	137	160	79	265	111	82	103
8	201	e120	e90	e75	104	132	161	68	264	109	86	101
9	198	e100	e85	e76	102	105	158	61	227	119	84	96
10	199	e80	e85	e78	96	100	146	58	233	140	87	95
11	197	e90	e90	e80	96	103	144	52	213	235	86	95
12	189	e85	e95	88	98	104	141	41	182	238	82	95
13	185	e110	e115	88	98	111	133	41	167	177	82	93
14	185	e160	e120	e80	103	122	131	41	168	136	89	89
15	182	e140	e115	e60	99	123	133	41	158	126	95	86
16	178	e150	e110	e45	99	121	149	42	158	115	101	84
17	175	e145	e105	e52	95	113	187	73	138	119	102	85
18	172	e140	e98	e65	98	113	243	93	129	218	99	88
19	169	e160	e98	e60	85	112	285	95	131	255	95	87
20	166	155	e98	e65	e75	102	285	124	130	185	89	84
21	165	167	e100	e70	e75	102	268	145	125	156	84	84
22	163	166	e98	e75	e78	88	233	152	126	160	78	83
23	160	152	113	e80	e75	91	242	148	122	154	80	79
24	160	158	113	95	e68	102	285	135	116	145	100	74
25	158	163	111	95	e66	95	307	135	114	135	118	73
26	154	129	111	97	e62	100	287	147	111	127	139	74
27	153	158	e95	104	e65	94	301	201	120	116	151	90
28	155	152	e95	104	e75	88	292	770	118	105	133	91
29	153	144	e98	99	---	74	270	804	114	95	126	89
30	153	124	e92	95	---	94	264	698	111	100	123	85
31	159	---	e86	98	---	117	---	610	---	98	123	---
TOTAL	5624	4244	3245	2505	2479	3234	5944	6123	6408	4384	3004	2758
MEAN	181	141	105	80.8	88.5	104	198	198	214	141	96.9	91.9
MAX	222	168	142	104	104	137	307	804	610	255	151	118
MIN	153	80	85	45	62	74	113	41	111	95	73	73
AC-FT	11160	8420	6440	4970	4920	6410	11790	12140	12710	8700	5960	5470

CAL YR 1986 TOTAL 91150 MEAN 250 MAX 1020 MIN 60 AC-FT 180800
WTR YR 1987 TOTAL 49952 MEAN 137 MAX 804 MIN 41 AC-FT 99080

e Estimated

YELLOWSTONE RIVER BASIN

06200000 BOULDER RIVER AT BIG TIMBER, MT

LOCATION.--Lat 45°50'03", long 109°56'17", in SE¼NE¼SE¼ sec.14, T.1 N., R.14 E., Sweet Grass County, Hydrologic Unit 10070002, on left bank 150 ft upstream from Old Boulder Bridge, 1 mi east of Big Timber, and at mile 1.6.

DRAINAGE AREA.--523 mi^2.

PERIOD OF RECORD.--April 1947 to December 1953, March 1955 to current year. Monthly discharge only for April 1947, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 4,056.39 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--Estimated daily discharges: Nov. 9-15, Dec. 9, 10, Jan. 2-10, 15-18, Feb. 25 to Mar. 1, Mar. 29, 30. Records good except those for periods of estimated daily discharges, which are poor. Diversions for irrigation of about 13,300 acres, of which about 250 acres is downstream of station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--38 years, 595 ft^3/s, 431,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,840 ft^3/s, May 28, 1956, gage height, 7.84 ft; maximum gage height, 8.25 ft July 8, 1975; minimum discharge, 10 ft^3/s, about Aug. 26 or 27, 1961.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 17	0900	*2,470	*4.66	No peak greater than base discharge this year.			

Minimum daily discharge, 50 ft^3/s, Jan. 16.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	224	177	173	101	127	e120	106	1470	1700	259	270	182
2	242	160	174	e80	125	116	105	1290	1270	238	245	161
3	230	162	163	e100	118	111	100	859	1060	245	228	151
4	221	173	125	e140	116	111	103	615	970	237	210	155
5	226	181	185	e140	114	110	106	560	1010	228	192	158
6	231	227	176	e130	113	111	112	709	1130	197	176	154
7	235	202	155	e90	113	114	122	909	1160	184	170	144
8	242	188	172	e80	114	127	127	1110	1710	173	171	139
9	239	e160	e115	e90	112	116	137	1070	1590	166	156	132
10	238	e100	e100	e145	112	109	127	1190	1720	265	153	127
11	234	e130	136	217	114	110	124	1200	1580	771	139	116
12	213	e120	166	174	112	108	124	1130	1280	700	147	113
13	211	e160	169	146	111	109	122	1380	1140	565	143	107
14	219	e230	176	111	112	112	120	1360	1050	493	137	102
15	212	e225	159	e80	111	111	120	1460	947	430	146	91
16	205	220	163	e50	108	108	121	1660	883	414	177	88
17	200	216	132	e70	105	109	143	2110	743	411	175	89
18	198	190	137	e200	107	106	176	1570	638	650	157	88
19	195	223	145	187	97	106	244	1380	591	729	144	87
20	192	204	164	215	91	103	239	1280	546	575	136	90
21	191	212	135	279	91	101	203	1010	503	530	130	98
22	189	211	163	262	116	102	190	842	485	591	128	101
23	186	196	154	241	109	102	229	719	502	523	139	97
24	181	195	143	204	97	102	311	679	488	467	173	90
25	178	195	151	173	e85	103	407	665	446	435	369	85
26	176	172	122	157	e70	101	544	768	398	420	366	71
27	172	186	136	141	e55	108	728	982	355	385	311	75
28	173	189	140	136	e110	105	902	1380	318	344	268	87
29	175	184	139	121	---	e70	1030	1420	310	372	238	85
30	177	177	151	117	---	e100	1250	1410	286	351	212	81
31	185	---	130	135	---	114	---	1550	---	292	199	---
TOTAL	6390	5565	4649	4512	2965	3335	8472	35737	26809	12640	6005	3344
MEAN	206	185	150	146	106	108	282	1153	894	408	194	111
MAX	242	230	185	279	127	127	1250	2110	1720	771	369	182
MIN	172	100	100	50	55	70	100	560	286	166	128	71
AC-FT	12670	11040	9220	8950	5880	6610	16800	70880	53180	25070	11910	6630

CAL YR 1986 TOTAL 172497 MEAN 473 MAX 4810 MIN 70 AC-FT 342100
WTR YR 1987 TOTAL 120423 MEAN 330 MAX 2110 MIN 50 AC-FT 238900

e Estimated

06202510 STILLWATER RIVER ABOVE NYE CREEK, NEAR NYE, MT

LOCATION.--45°23'46", long 109°52'14", in SW¼NE¼SW¼ sec.15, T.5 S., R.15 E., Stillwater County, Hydrologic Unit 10007005, at private bridge 200 ft above Nye Creek, 1.0 mi below Mountain View Creek, 4.3 mi southwest of Nye, and at mile 41.3.

DRAINAGE AREA.--193 mi^2.

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

GAGE.--Nonrecording gage and crest-stage gage. Elevation of gage is 4,880 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 7-15, Dec. 3-27, Dec. 31 to Jan. 10, 15-24, Feb. 4-5, Feb. 19 to Mar. 2, 9-12, 29-30, May 10, 11, 13-16, Aug. 16-22. Records fair except those for estimated daily discharges, which are poor. There are no known diversions or regulation upstream from gage. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--7 years, 361 ft^3/s, 261,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,400 ft^3/s, July 10, 1983, gage height, 7.60 ft; minimum observed, 23 ft^3/s, Mar. 6, 1981, Nov. 23, 1984, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,230 ft^3/s, June 4, gage height, 5.36 ft; minimum daily, 29 ft^3/s, Feb. 27.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	131	92	82	e54	58	e40	41	1010	1360	381	318	218
2	131	97	84	e57	56	e43	41	913	1480	376	296	201
3	131	97	e72	e57	56	42	42	658	1650	376	287	201
4	131	92	e70	e56	e54	41	42	537	1780	371	275	211
5	131	92	e66	e56	e56	45	46	560	1250	353	263	211
6	126	88	e66	e50	58	41	48	702	861	317	226	218
7	126	e75	e64	e35	58	44	49	935	977	295	218	201
8	122	e70	e64	e40	58	41	50	1040	1640	260	225	201
9	121	e60	e60	e45	58	e40	50	1090	1430	274	229	184
10	121	e45	e55	e50	65	e35	53	e1100	1250	486	225	169
11	121	e55	e60	54	84	e38	54	e1050	1110	518	218	168
12	121	e54	e64	54	65	e40	50	978	1140	464	218	162
13	116	e54	e70	52	65	42	45	e1100	1060	447	211	162
14	116	e80	e72	48	58	44	53	e1200	971	363	211	162
15	116	e110	e72	e43	58	41	56	e1300	937	376	218	154
16	113	111	e72	e37	56	41	74	e1400	881	362	e225	153
17	116	111	e60	e42	48	37	84	1530	733	381	e230	148
18	116	106	e60	e50	48	41	106	1160	676	410	e225	145
19	111	101	e68	e50	e45	42	134	1050	656	436	e220	145
20	108	101	e60	e48	e42	46	109	883	561	397	e220	139
21	106	99	e56	e50	e43	51	108	805	548	516	e225	134
22	104	95	e60	e54	e47	56	126	618	502	547	e230	129
23	104	95	e68	e56	e44	53	177	531	502	492	236	126
24	101	95	e74	e58	e42	51	250	485	469	388	247	126
25	97	95	e72	61	e40	41	317	501	437	362	491	126
26	97	92	e72	61	e35	51	430	519	431	353	438	123
27	97	86	e72	59	e29	56	721	846	406	339	411	121
28	99	86	72	59	e35	50	752	952	406	339	340	121
29	99	90	74	58	---	e30	818	836	396	339	276	116
30	97	95	74	59	---	e35	896	952	386	385	255	116
31	95	---	e62	58	---	38	---	1070	---	362	219	---
TOTAL	3521	2619	2097	1611	1461	1336	5822	28311	26886	12065	8126	4791
MEAN	114	87.3	67.6	52.0	52.2	43.1	194	913	896	389	262	160
MAX	131	111	84	61	84	56	896	1530	1780	547	491	218
MIN	95	45	55	35	29	30	41	485	386	260	211	116
AC-FT	6980	5190	4160	3200	2900	2650	11550	56150	53330	23930	16120	9500

CAL YR 1986 TOTAL 137840 MEAN 378 MAX 3460 MIN 44 AC-FT 273400
WTR YR 1987 TOTAL 98646 MEAN 270 MAX 1780 MIN 29 AC-FT 195700

e Estimated

06204050 WEST ROSEBUD CREEK NEAR ROSCOE, MT

LOCATION.--Lat 45°14'35", long 109°43'50", in NE¼ sec.10, T.7 S., R.16 E., Stillwater County, Hydrologic Unit 10070005, on left bank at Mystic Lake powerplant, 2.0 mi downstream from Mystic Lake, 13.5 mi southwest of Roscoe, and at mile 26.8.
DRAINAGE AREA.--52.1 mi^2.
PERIOD OF RECORD.--September 1965 to current year.
GAGE.--Water-stage recorder and rectangular weir. Datum of gage is 6,535.60 ft above National Geodetic Vertical Datum of 1929.
REMARKS.--Estimated daily discharges Mar. 9-24. Records good. Flow regulated by Mystic Lake (station number 06204000). 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.--22 years, 126 ft^3/s, 32.84 in/yr, 91,290 acre-ft/yr, adjusted for change in contents in Mystic Lake.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,630 ft^3/s, July 6, 1975, gage height, 4.71 ft; minimum daily, 2.5 ft^3/s, Apr. 3, 4, 6, 7, 1967.
EXTREMES FOR CURRENT YEAR.--Maximum discharge, 213 ft^3/s, May 29, gage height, 1.50 ft; minimum daily, 4.5 ft^3/s, Mar. 9.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	92	101	94	77	73	17	23	40	96	190	202	89
2	92	113	76	79	73	17	22	38	93	190	199	90
3	92	115	76	78	73	18	26	33	88	189	198	92
4	92	114	75	79	73	19	27	32	88	188	197	100
5	92	115	76	78	63	19	28	32	90	188	197	105
6	92	114	76	79	57	20	28	32	92	187	196	106
7	92	116	76	79	57	22	29	33	93	185	195	105
8	92	114	76	80	60	22	30	35	94	185	194	104
9	91	113	76	79	58	e4.5	29	37	94	185	193	103
10	92	112	77	79	58	e22	28	36	96	188	193	103
11	92	112	79	79	60	e22	29	35	163	193	193	102
12	90	112	77	79	60	e22	29	36	195	190	193	102
13	88	110	76	79	55	e22	28	52	195	189	193	102
14	87	109	76	79	45	e22	28	63	195	188	193	102
15	86	108	76	79	45	e22	29	64	189	188	192	101
16	89	108	77	79	45	e28	30	65	195	188	191	100
17	91	110	77	81	48	e22	31	68	194	189	188	99
18	91	108	78	80	44	e26	30	64	193	191	191	100
19	92	108	78	79	44	e24	31	77	193	190	193	101
20	92	105	79	79	41	e27	31	93	193	190	192	99
21	91	107	78	81	28	e23	30	92	193	192	192	96
22	91	106	79	79	28	e25	30	86	193	196	116	96
23	90	104	78	80	22	e26	31	85	192	195	81	77
24	90	104	79	83	18	e20	31	87	192	195	86	79
25	90	107	79	81	17	25	32	87	191	194	93	100
26	90	102	79	81	17	23	33	87	190	193	94	98
27	90	103	78	81	17	22	33	105	190	194	91	98
28	89	103	78	77	17	23	35	103	190	191	85	97
29	88	104	78	78	---	23	38	97	190	201	89	96
30	86	103	79	76	---	23	39	99	190	204	90	96
31	86	---	77	74	---	23	---	99	---	203	89	---
TOTAL	2798	3260	2413	2451	1296	673.5	898	1992	4740	5929	4989	2938
MEAN	90.3	109	77.8	79.1	46.3	21.7	29.9	64.3	158	191	161	97.9
MAX	92	116	94	83	73	28	39	105	195	204	202	106
MIN	86	101	75	74	17	4.5	22	32	88	185	81	77
AC-FT	5550	6470	4790	4860	2570	1340	1780	3950	9400	11760	9900	5830
MEAN †	48.0	29.7	21.3	17.7	11.7	12.5	46.6	224	276	209	149	88.9
CFSM †	.92	.57	.41	.34	.22	.24	.89	4.30	5.30	4.01	2.86	1.71
IN †	1.06	.64	.47	.39	.23	.28	1.00	4.95	5.92	4.63	3.29	1.90
AC-FT †	2950	1770	1310	1090	650	770	2770	13760	16450	12870	9150	5290

OBSERVED

CAL YR 1986	TOTAL	42,986	MEAN	118	MAX	549	MIN	22	AC-FT	85260
WTR YR 1987	TOTAL	34,377.5	MEAN	94.2	MAX	204	MIN	4.5	AC-FT	68190

ADJUSTED

CAL YR 1986	TOTAL	44,688	MEAN	122	CFSM	2.34	IN	31.90	AC-FT	88610
WTR YR 1987	TOTAL	34,701	MEAN	95.1	CFSM	1.83	IN	24.76	AC-FT	68820

† Adjusted for change in contents of Mystic Lake.

e Estimated

YELLOWSTONE RIVER BASIN

06205000 STILLWATER RIVER NEAR ABSAROKEE, MT

LOCATION.--Lat 45°33'04", long 109°23'12", in NE¼NE¼NW¼ sec.28, T.3 S., R.19 E., Stillwater County, Hydrologic Unit 10070005, on right bank 3 mi downstream from Rosebud Creek, 3.5 mi northeast of Absarokee, 9 mi southwest of Columbus, and at mile 9.4.

DRAINAGE AREA.--975 mi^2.

PERIOD OF RECORD.--July 1910 to September 1914 (no winter records), March 1935 to current year.

REVISED RECORDS.--WSP 1309: 1911(M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,873.8 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 1, 1914, nonrecording gage, and Mar. 26, 1935, to Sept. 30, 1942, nonrecording gage, at bridge 2 mi upstream at different datums.

REMARKS.--Estimated daily discharges: Nov. 5-18, Dec. 6-13, Dec. 31 to Jan. 10, Jan. 14-23, Feb. 24 to Mar. 2, Mar. 28-30. Records good except those for estimated daily discharges, which are poor. Flow partly regulated by Mystic Lake (station number 06204000). Diversions for irrigation of about 24,300 acres, of which 400 acres lies downstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--52 years (1935-87), 959 ft^3/s, 694,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft^3/s, June 15, 1967, gage height, 7.17 ft; minimum observed, 58 ft^3/s, Apr. 2, 1936.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,400 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 8	1230	*3,230	*4.08	No peaks greater than base discharge this year.			

Minimum daily discharge, 110 ft^3/s, Feb. 27.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	705	449	424	e190	293	e160	263	1700	2660	934	1150	687
2	708	454	407	e310	294	e180	233	1600	2280	960	1010	656
3	642	471	387	e280	277	203	225	1220	1920	1040	923	631
4	632	467	327	e320	278	240	225	1000	1610	1010	871	650
5	619	e450	406	e300	281	276	234	952	1610	961	818	669
6	599	e420	e370	e280	267	248	249	1080	1780	895	797	650
7	595	e400	e330	e240	268	258	270	1270	2010	860	807	650
8	595	e300	e360	e210	241	304	282	1460	2870	829	770	619
9	584	e270	e260	e230	238	231	293	1510	2940	853	720	592
10	616	e270	e280	e280	246	216	272	1640	2780	1070	652	589
11	602	e190	e310	357	255	217	261	1630	2540	1990	625	574
12	575	e220	e310	338	257	211	263	1500	2410	1660	702	563
13	574	e250	e340	307	256	247	258	1680	2310	1450	665	556
14	563	e330	386	e240	253	326	246	1590	2250	1330	644	532
15	547	e400	362	e190	241	285	242	1650	2110	1230	653	524
16	541	e500	358	e150	246	261	239	1750	2010	1150	658	516
17	530	e500	320	e180	244	246	262	2500	1780	1190	624	509
18	520	e400	308	e280	261	245	305	2040	1610	1370	580	500
19	515	505	303	e270	227	241	386	1810	1500	1460	559	482
20	513	481	320	e220	178	225	368	1850	1370	1300	542	474
21	510	546	298	e240	190	219	339	1560	1260	1220	511	459
22	495	525	365	e240	207	211	335	1340	1210	1390	525	439
23	490	481	351	e310	203	213	374	1190	1210	1360	439	426
24	481	495	329	314	e160	230	460	1100	1110	1250	513	388
25	476	505	332	301	e150	216	566	1150	1020	1160	859	378
26	472	433	302	298	e130	211	699	1330	964	1120	1110	387
27	471	458	308	310	e110	221	892	2090	924	1070	1040	388
28	472	467	309	300	e130	e180	1090	2380	947	1060	908	399
29	467	445	312	275	---	e140	1280	2170	1010	1110	814	405
30	467	428	311	263	---	e230	1490	2240	984	1310	761	397
31	467	---	e240	298	---	270	---	2380	---	1270	724	---
TOTAL	17043	12510	10325	8321	6381	7161	12901	50362	52989	36862	22974	15689
MEAN	550	417	333	268	228	231	430	1625	1766	1189	741	523
MAX	708	546	424	357	294	326	1490	2500	2940	1990	1150	687
MIN	467	190	240	150	110	140	225	952	924	829	439	378
AC-FT	33800	24810	20480	16500	12660	14200	25590	99890	105100	73120	45570	31120

CAL YR 1986 TOTAL 306673 MEAN 840 MAX 5190 MIN 90 AC-FT 608300
WTR YR 1987 TOTAL 253518 MEAN 695 MAX 2940 MIN 110 AC-FT 502900

e Estimated

06207500 CLARKS FORK YELLOWSTONE RIVER NEAR BELFRY, MT

LOCATION.--Lat 45°00'37", long 109°03'53", in NW¼SW¼NW¼ sec.32, T.9 S., R.22 E., Carbon County, Hydrologic Unit 10070006, on left bank 0.2 mi upstream from county road bridge and Big Sand Coulee, 0.8 mi north of Wyoming-Montana State line, 9.5 mi southwest of Belfry, and at mile 71.2.

DRAINAGE AREA.--1,154 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1921 to current year. Monthly discharge only for some periods, published in WSP 1309. Published as Clarks Fork at Chance prior to October 1956 and as Clarks Fork Yellowstone River at Chance October 1956 to September 1968.

REVISED RECORDS.--WSP 1309: 1922 (M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,986.24 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Nov. 15, 1934, nonrecording gage, and Nov. 15, 1934, to July 26, 1951, water-stage recorder at bridge 0.4 mi downstream of different datum. July 27, 1951 to Sept. 30, 1953, water-stage recorder at present site at datum 0.98 ft higher.

REMARKS.--Estimated daily discharges: Nov. 6-14, Dec. 2-13, Jan. 6-9, 14-23, Feb. 20-28, Mar. 28-30, Apr. 26-28, May 8-12. Water-discharge records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 11,100 acres upstream from station.

AVERAGE DISCHARGE.--66 years, 943 ft^3/s, 683,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,800 ft^3/s, June 9, 1981, gage height, 9.97 ft; minimum observed, 32 ft^3/s, Apr. 26, 1961, result of discharge measurement.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,400 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 17	0430	*4,340	*5.23	No peaks greater than base discharge this year.			

Minimum discharge, 108 ft^3/s, Sept. 30, gage height, 0.67 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	381	291	326	231	244	231	188	2480	2230	701	741	289
2	381	279	e310	260	256	234	188	2460	1880	705	614	270
3	384	260	e290	262	243	227	184	1900	1570	740	524	250
4	384	287	e260	268	246	226	196	1480	1380	723	458	244
5	401	279	e300	266	236	223	219	1410	1380	677	390	266
6	440	e270	e320	e250	234	231	269	1640	1470	578	346	255
7	468	e250	e300	e240	235	235	323	2030	1760	488	321	251
8	459	e230	e270	e210	240	252	336	e2200	3160	435	328	220
9	438	e200	e220	e210	244	236	339	e2500	3290	395	307	212
10	427	e170	e210	226	246	226	278	e2700	2990	463	277	206
11	425	e200	e230	247	242	225	267	e2650	2760	1380	244	194
12	374	e170	e250	271	241	227	284	e2500	2510	1510	246	188
13	362	e250	e270	265	235	227	260	2530	2350	1240	234	180
14	428	e400	296	e210	234	228	231	2970	2220	1090	225	174
15	417	450	301	e170	233	229	205	3030	2050	911	222	174
16	399	440	302	e140	223	223	276	2950	1870	740	219	171
17	386	415	283	e160	222	223	393	3740	1680	618	275	167
18	372	405	257	e190	218	215	552	3530	1460	702	226	160
19	371	439	249	e180	224	208	477	3070	1280	931	200	151
20	333	417	278	e170	e210	201	480	2630	1130	795	187	145
21	330	408	267	e180	e200	190	480	2100	1010	713	171	141
22	322	422	275	e200	e220	190	474	1730	944	1110	165	137
23	316	391	287	e220	e210	185	559	1470	907	842	167	135
24	304	388	284	239	e190	184	783	1270	832	762	220	129
25	296	388	279	245	e170	185	953	1200	753	671	359	126
26	294	368	268	244	e150	180	e1200	1270	684	596	541	119
27	290	360	265	258	e170	181	e1500	1820	624	529	598	117
28	289	372	251	259	e200	e150	e1900	1990	652	566	513	117
29	291	368	247	251	---	e120	2170	2120	700	614	432	117
30	287	367	267	237	---	e150	2300	2210	678	873	369	110
31	291	---	258	235	---	213	---	2170	---	852	321	---
TOTAL	11340	9934	8470	6994	6216	6455	18264	69750	48204	23950	10440	5415
MEAN	366	331	273	226	222	208	609	2250	1607	773	337	180
MAX	468	450	326	271	256	252	2300	3740	3290	1510	741	289
MIN	287	170	210	140	150	120	184	1200	624	395	165	110
AC-FT	22490	19700	16800	13870	12330	12800	36230	138300	95610	47500	20710	10740

CAL YR 1986 TOTAL 368231 MEAN 1009 MAX 8870 MIN 130 AC-FT 730400
WTR YR 1987 TOTAL 225432 MEAN 618 MAX 3740 MIN 110 AC-FT 447100

e Estimated

06207500 CLARKS FORK YELLOWSTONE RIVER NEAR BELFRY, MT--Continued

WATER-QUALITY RECORDS

LOCATION.--Samples collected at bridge on county road, 0.2 mi downstream from discharge station, just upstream from Big Sand Coulee, and at mile 71.0.

PERIOD OF RECORD.--Water years 1966 to current year (discontinued). Prior to October 1968 published as "at Chance".

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE:. October 1965 to September 1969.
WATER TEMPERATURE:. October 1965 to September 1969.
SUSPENDED-SEDIMENT DISCHARGE:. March to September 1984.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1966-69):. Maximum daily, 409 microsiemens, Oct, 24, 1966; minimum daily, 73 microsiemens June 6, 8, 1969.
WATER TEMPERATURE (water years 1966-69):. Maximum, 22.0 °C, Aug. 23, 24, 1969; minimum, 0.0 °C on many days during winter periods.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
NOV					
19...	1135	449	285	7.0	4.0
DEC					
17...	1105	262	310	-0.5	1.0
JAN					
29...	1040	238	325	3.0	3.0
MAR					
18...	1200	211	355	10.0	7.0
APR					
28...	1400	1920	116	15.0	14.5
MAY					
13...	1400	2960	95	27.0	13.0
26...	1730	1230	--	11.0	15.0
JUN					
09...	1425	3450	105	19.0	14.0
30...	1130	698	--	27.0	19.0
JUL					
07...	1400	489	--	26.0	18.0
24...	1130	797	170	22.5	15.5
AUG					
24...	1340	220	290	21.0	16.5

DATE	TIME	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)
MAY						
26...	1730	<0.100	0.010	0.59	0.60	0.180
JUN						
30...	1130	<0.100	0.020	0.58	0.60	0.020

DATE	TIME	DICAMBA (MED-IBEN) (BAN-VEL D) TOTAL (UG/L) (82052)	PICLO-RAM (TOR-DON) (AMDON) TOTAL (UG/L) (39720)	2,4-D, TOTAL (UG/L) (39730)	2, 4-DP TOTAL (UG/L) (82183)	2,4,5-T TOTAL (UG/L) (39740)	SILVEX, TOTAL (UG/L) (39760)
JUL							
07...	1400	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

06208500 CLARKS FORK YELLOWSTONE RIVER AT EDGAR, MT

LOCATION.--Lat 45°27'58", long 108°50'35", in SE¼SE¼SE¼ sec.23, T.4 S., R.23 E., Carbon County, Hydrologic Unit 10070006, on right bank 400 ft downstream from county bridge, 0.5 mi east of Edgar, 6 mi upstream from Rock Creek, and at mile 27.0.

DRAINAGE AREA.--2,032 mi^2.

PERIOD OF RECORD.--July 1921 to September 1969, October 1986 to September 1987.

REVISED RECORDS.--WSP 1509: 1924, 1932(M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,460 ft, from topographic map. Prior to Aug. 31, 1953, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Oct. 1 to Dec. 3, Dec. 9 to Feb. 6, Feb. 23 to Mar. 2, Mar. 28-30. Records good except those for Dec. 9 to Feb. 6, Feb. 23 to Mar. 2, Mar. 28-30, which are poor. Diversions for irrigation of about 41,500 acres, of which about 840 acres lies downstream from the station. In addition, about 6,300 acres of land upstream from the station are irrigated by diversions from the adjoining Rock Creek basin. Figures of discharge given herein have the flow of White Horse Canal subtracted. 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.--49 years (water years 1922-69, 1986-87), 1,039 ft^3/s, 752,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 10,900 ft^3/s, June 2, 1936, gage height, 8.62 ft; minimum, 36 ft^3/s, Apr. 22, 1961.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,300 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 28	0030	5,230	6.59	No peaks greater than base discharge this year.			

Minimum discharge, 126 ft^3/s, Aug. 22.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e845	e550	e540	e400	e420	e270	359	2230	2610	731	1030	565
2	e850	e557	e502	e450	e400	e330	313	2310	2400	669	881	460
3	e870	e541	e515	e420	e380	341	304	2090	2070	666	732	420
4	e846	e532	513	e420	e390	343	300	1570	1820	751	597	405
5	e852	e555	465	e400	e400	354	324	1240	1700	767	491	499
6	e839	e649	541	e370	e420	369	348	1250	1720	653	359	543
7	e843	e660	559	e350	389	377	413	1530	1910	476	329	538
8	e859	e560	516	e325	368	404	477	1870	2990	360	308	524
9	e837	e500	e400	e300	359	380	476	2200	3480	297	349	460
10	e801	e250	e300	e330	361	347	466	2400	3340	313	313	422
11	e799	e420	e400	e400	357	349	399	2400	3090	1440	256	392
12	e759	e300	e390	e450	353	344	397	2260	2780	2680	244	403
13	e746	e370	e480	e400	346	344	405	2310	2540	1660	236	396
14	e736	e520	e560	e350	342	344	368	2520	2370	1420	211	376
15	e755	e800	e520	e300	337	350	349	2580	2180	1240	235	377
16	e727	e739	e540	e250	329	344	379	2620	1950	1040	273	371
17	e754	e761	e510	e280	320	334	519	3140	1730	938	261	389
18	e728	e748	e520	e320	321	328	623	3590	1560	989	291	403
19	e717	e720	e500	e350	317	321	780	3180	1390	1200	243	395
20	e694	e703	e520	e340	319	314	809	2880	1280	1130	190	391
21	e666	e711	e540	e370	309	309	558	2580	1130	1010	160	387
22	e618	e651	e580	e350	306	302	493	2130	1030	1360	143	373
23	e616	e630	e600	e370	e290	303	545	1830	1010	1340	171	332
24	e603	e599	e550	e380	e270	299	770	1570	879	1110	203	331
25	e594	e593	e550	e400	e250	295	976	1440	771	972	372	317
26	e576	e585	e500	e420	e230	293	1170	1700	685	854	725	318
27	e566	e555	e500	e425	e200	309	1450	3100	612	703	927	346
28	e557	e559	e550	e410	e230	e250	1640	3940	554	583	926	362
29	e553	e560	e600	e390	---	e190	1900	2780	770	564	826	357
30	e559	e553	e550	e370	---	e250	2080	2830	703	787	746	349
31	e562	---	e500	e390	---	306	---	2570	---	909	683	---
TOTAL	22327	17431	15811	11480	9313	9993	20390	72640	53054	29612	13711	12201
MEAN	720	581	510	370	333	322	680	2343	1768	955	442	407
MAX	870	800	600	450	420	404	2080	3940	3480	2680	1030	565
MIN	553	250	300	250	200	190	300	1240	554	297	143	317
AC-FT	44290	34570	31360	22770	18470	19820	40440	144100	105200	58740	27200	24200

WTR YR 1987 TOTAL 287963 MEAN 789 MAX 3940 MIN 143 AC-FT 571200

e Estimated

06211000 RED LODGE CREEK ABOVE COONEY RESERVOIR, NEAR BOYD, MT

LOCATION.--Lat 45°26'16", long 109°15'11", in NE¼SE¼SE¼ sec.33, T.4 S., R.20 E., Carbon County, Hydrologic Unit 10070006, on right bank 0.6 mi upstream from Cooney Reservoir, 9.5 mi west of Boyd, and at mile 15.0.

DRAINAGE AREA.--143 mi^2.

PERIOD OF RECORD.--May 1937 to current year (no winter records most years).

REVISED RECORDS.--WSP 1729: Drainage area. WSP 2116: 1937(M), 1942(M), 1943(P), 1944(M), 1948(M), 1952(M), 1957(P), 1962(M), 1963(M).

GAGE.--Water-stage recorder. Datum of gage is 4,248.0 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges this year. Seasonal records good. Some return flow from lands irrigated by water diverted from Rock Creek and East Rosebud Creek basins. Diversions for irrigation of about 5,100 acres upstream from station. 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, 2,260 ft^3/s, June 15, 1967, gage height, 7.00 ft, from rating curve extended above 1,700 ft^3/s on basis of contracted-opening measurement of peak flow; no flow on many days in 1949.

EXTREMES FOR CURRENT SEASON.--Maximum discharge, 1,030 ft^3/s, May 27, gage height, 5.87 ft; minimum discharge, 3.8 ft^3/s, May 16.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	47	---	---	---	---	---	91	64	355	93	88	77
2	76	---	---	---	---	---	57	60	302	85	87	75
3	96	---	---	---	---	---	64	55	263	85	81	76
4	73	---	---	---	---	---	72	51	237	87	76	83
5	72	---	---	---	---	---	75	46	229	87	69	92
6	69	---	---	---	---	---	82	41	215	73	49	85
7	63	---	---	---	---	---	85	28	209	64	57	94
8	60	---	---	---	---	---	89	14	340	56	65	88
9	61	---	---	---	---	---	89	9.4	244	66	50	89
10	60	---	---	---	---	---	78	13	226	78	39	78
11	65	---	---	---	---	---	83	16	212	314	37	73
12	59	---	---	---	---	---	77	16	193	198	48	73
13	59	---	---	---	---	---	75	7.3	177	160	50	69
14	57	---	---	---	---	---	75	8.4	160	143	41	66
15	54	---	---	---	---	---	80	8.9	155	128	37	64
16	53	---	---	---	---	---	85	8.2	149	120	45	64
17	53	---	---	---	---	---	87	77	132	118	40	69
18	52	---	---	---	---	---	87	84	136	137	39	67
19	51	---	---	---	---	---	94	81	132	130	44	66
20	50	---	---	---	---	---	89	158	134	117	49	64
21	50	---	---	---	---	---	85	169	118	118	48	56
22	49	---	---	---	---	---	82	157	118	141	43	49
23	47	---	---	---	---	---	80	142	125	124	42	43
24	47	---	---	---	---	---	78	133	113	121	49	41
25	47	---	---	---	---	---	74	136	93	110	128	44
26	44	---	---	---	---	---	71	207	88	105	128	43
27	44	---	---	---	---	---	66	709	84	99	111	43
28	44	---	---	---	---	---	64	751	84	94	102	43
29	44	---	---	---	---	---	65	553	111	90	95	42
30	43	---	---	---	---	---	68	464	98	92	93	40
31	43	---	---	---	---	---	---	395	---	91	85	---
TOTAL	1732	---	---	---	---	---	2347	4662.2	5232	3524	2015	1956
MEAN	55.9	---	---	---	---	---	78.2	150	174	114	65.0	65.2
MAX	96	---	---	---	---	---	94	751	355	314	128	94
MIN	43	---	---	---	---	---	57	7.3	84	56	37	40
AC-FT	3440	---	---	---	---	---	4660	9250	10380	6990	4000	3880

06211500 WILLOW CREEK NEAR BOYD, MT

LOCATION.--Lat 45°25'20", long 109°13'47", in SW¼SW¼SW¼ sec.2, T.5 S., R.20 E., Carbon County, Hydrologic Unit 10070006, on left bank 0.5 mi upstream from Cooney Reservoir, 8 mi west of Boyd, and at mile 2.1.

DRAINAGE AREA.--53.3 mi^2.

PERIOD OF RECORD.--June 1937 to current year (no winter records most years).

REVISED RECORDS.--WSP 1729: Drainage area. WSP 2116: 1957, 1962.

GAGE.--Water-stage recorder. Elevation of gage is 4,260 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Apr. 23, 1948, at site 0.5 mi downstream at different datum.

REMARKS.--No estimated daily discharges this year. Records good. Diversions for irrigation of about 1,800 acres upstream from station. Some return flow from lands irrigated by water diverted from Rock Creek basin. Several observations of water temperatures 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, 1,720 ft^3/s, June 15, 1967, gage height, 7.08 ft, from rating curve extended above 400 ft^3/s on basis of slope-area measurement of peak flow; maximum gage height, 7.24 ft, May 29, 1942 (backwater from Cooney Reservoir), site and datum then in use; no flow May 29, 30, 1969.

EXTREMES FOR CURRENT SEASON.--Peak discharges greater than base discharge of 150 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 28	0900	*394	*5.03	July 12	0100	328	4.58

Minimum discharge, 11 ft^3/s, May 13-16.

REVISIONS.--The maximum discharge reported for water year 1986 has been revised to 304 ft^3/s, May 10, 1986, gage height, 4.41 ft, superseding figure published in the report for 1986. Peak discharge for June 5, 1986, (2230 hours) has been revised to 232 ft^3/s, gage height, 3.85 ft; June 10, 1986, (0030 hours) 237 ft^3/s, gage height, 3.89 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	40	---	---	---	---	---	33	26	107	56	64	52
2	57	---	---	---	---	---	22	26	104	56	63	51
3	61	---	---	---	---	---	29	27	95	60	60	47
4	50	---	---	---	---	---	49	26	91	64	52	49
5	49	---	---	---	---	---	54	23	80	72	51	56
6	43	---	---	---	---	---	73	21	79	62	49	49
7	41	---	---	---	---	---	78	20	90	55	48	52
8	41	---	---	---	---	---	71	19	129	54	49	48
9	41	---	---	---	---	---	61	14	107	55	41	48
10	41	---	---	---	---	---	46	15	101	61	37	47
11	42	---	---	---	---	---	57	18	97	225	36	47
12	39	---	---	---	---	---	44	17	87	169	43	47
13	38	---	---	---	---	---	37	14	78	100	47	45
14	39	---	---	---	---	---	38	11	78	86	51	39
15	35	---	---	---	---	---	44	11	72	84	50	35
16	35	---	---	---	---	---	48	11	66	87	59	35
17	35	---	---	---	---	---	45	49	57	84	57	37
18	34	---	---	---	---	---	43	35	58	97	51	37
19	33	---	---	---	---	---	42	34	62	95	50	35
20	33	---	---	---	---	---	40	101	66	79	50	34
21	33	---	---	---	---	---	39	84	58	79	47	33
22	31	---	---	---	---	---	36	74	55	96	42	32
23	30	---	---	---	---	---	34	62	63	80	41	28
24	29	---	---	---	---	---	34	58	59	79	52	27
25	28	---	---	---	---	---	33	61	56	73	110	26
26	28	---	---	---	---	---	31	96	53	67	92	26
27	28	---	---	---	---	---	28	232	51	66	68	26
28	27	---	---	---	---	---	27	304	57	69	62	26
29	27	---	---	---	---	---	25	164	73	68	58	28
30	27	---	---	---	---	---	26	141	66	71	57	27
31	26	---	---	---	---	---	---	115	---	66	56	---
TOTAL	1141	---	---	---	---	---	1267	1909	2295	2515	1693	1169
MEAN	36.8	---	---	---	---	---	42.2	61.6	76.5	81.1	54.6	39.0
MAX	61	---	---	---	---	---	78	304	129	225	110	56
MIN	26	---	---	---	---	---	22	11	51	54	36	26
AC-FT	2260	---	---	---	---	---	2510	3790	4550	4990	3360	2320

06212500 RED LODGE CREEK BELOW COONEY RESERVOIR, NEAR BOYD, MT

LOCATION.--Lat 45°26'59", long 109°11'06", in NE¼NW¼NW¼ sec.31, T.4 S., R.21 E., Carbon County, Hydrologic Unit 10070006, on right bank 250 ft upstream from Cottonwood Creek, 1.5 mi downstream from Cooney Dam, 6 mi west of Boyd, and at mile 10.5.

DRAINAGE AREA.--210 mi^2.

PERIOD OF RECORD.--September 1937 to current year.

REVISED RECORDS.--WSP 1309: 1942(M), 1944(M). WSP 2116: 1957(M).

GAGE.--Water-stage recorder. Datum of gage is 4,139.12 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Jan. 14-28. Records good. Some return flow from lands irrigated by water diverted from Rock Creek and East Rosebud Creek basins. Flow completely regulated by Cooney Reservoir (station number 06212000). Diversions for irrigation of about 6,900 acres upstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--50 years, 102 ft^3/s, 73,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,470 ft^3/s, June 15, 1967, gage height, 10.17 ft; no flow Oct. 6, 7, 1948, Oct. 7, 8, 12, 16, 17, 1975.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 699 ft^3/s, May 29, gage height, 4.77 ft; minimum daily, 1.3 ft^3/s, Oct. 12, when gates at Cooney Dam were closed.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	71	105	45	14	4.9	11	105	493	201	155	157
2	65	71	105	45	14	4.9	7.4	89	471	210	153	135
3	84	71	105	45	14	5.2	8.4	80	461	207	153	126
4	78	72	104	45	14	13	11	70	459	200	136	128
5	105	73	104	45	14	22	17	72	458	199	128	129
6	122	73	105	44	14	13	17	97	391	199	129	127
7	121	73	105	44	14	9.6	30	64	375	206	125	125
8	121	73	105	44	15	8.3	41	100	442	213	117	125
9	62	73	105	44	15	6.1	41	102	455	210	110	127
10	1.4	73	104	44	15	6.1	53	108	467	211	98	128
11	1.4	73	103	44	15	6.0	69	87	486	242	122	130
12	1.3	73	103	42	16	5.5	84	123	485	243	136	129
13	98	73	103	42	9.9	13	105	150	398	238	136	127
14	192	72	91	e40	5.9	13	106	146	295	235	136	128
15	191	72	82	e30	5.5	8.2	105	140	248	206	145	127
16	190	73	82	e23	5.3	7.2	106	153	219	190	153	125
17	151	73	82	e23	5.2	6.5	106	81	218	193	153	125
18	127	68	82	e23	5.2	6.8	106	29	219	194	132	127
19	101	62	82	e23	5.0	6.8	107	39	219	191	114	125
20	69	62	70	e23	5.2	6.2	107	69	212	190	117	125
21	57	62	58	e23	5.0	5.8	111	77	205	192	120	123
22	46	62	58	e23	4.9	5.4	117	75	204	193	121	123
23	46	62	58	e23	5.0	5.5	121	76	188	192	121	123
24	46	67	58	e22	5.5	6.1	132	82	209	193	123	123
25	46	73	58	e20	5.1	5.6	132	100	232	193	113	153
26	46	73	58	e17	5.5	5.7	132	116	232	194	99	176
27	46	72	58	e17	5.7	7.3	128	288	231	196	98	176
28	52	73	53	e16	5.4	4.9	119	503	233	199	106	176
29	58	73	45	15	---	5.4	118	660	181	170	140	175
30	59	84	45	14	---	5.2	111	642	168	152	160	144
31	64	---	46	14	---	9.1	---	559	---	154	157	---
TOTAL	2482.1	2125	2522	962	263.3	238.3	2458.8	5082	9554	6206	4006	4067
MEAN	80.1	70.8	81.4	31.0	9.40	7.69	82.0	164	318	200	129	136
MAX	192	84	105	45	16	22	132	660	493	243	160	176
MIN	1.3	62	45	14	4.9	4.9	7.4	29	168	152	98	123
AC-FT	4920	4210	5000	1910	522	473	4880	10080	18950	12310	7950	8070

CAL YR 1986 TOTAL 36732.5 MEAN 101 MAX 456 MIN .08 AC-FT 72860
WTR YR 1987 TOTAL 39966.5 MEAN 109 MAX 660 MIN 1.3 AC-FT 79270

e Estimated

YELLOWSTONE RIVER BASIN

06214000 ROCK CREEK AT ROCKVALE, MT

LOCATION.--Lat 45°31'05", long 108°51'42", in NW¼SW¼NW¼ sec.2, T.4 S., R.23 E., Carbon County, Hydrologic Unit 10070006, on left bank just downstream from bridge on U.S. Highway 310, 0.3 mi southwest of Rockvale, and at mile 2.7.

DRAINAGE AREA.--569 mi^2.

PERIOD OF RECORD.--October 1920 to September 1922 (no winter record 1922), April 1932 to March 1933, February 1934 to September 1940, October 1984 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WDR MT-85-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,470 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Sept. 30, 1940, nonrecording gage in same vicinity at different datum. Flow is equivalent.

REMARKS.--Estimated daily discharges: Nov. 10-15, Jan. 15-27, Feb. 24 to Mar. 21, Mar. 29-31. Records good except those for estimated daily discharges, which are poor. Flow partly regulated by Cooney Reservoir. Diversions for irrigation of about 57,500 acres of which about 1,500 acres is downstream from station and about 2,500 acres is in the Clarks Fork Yellowstone River basin. Some return flow through Red Lodge Creek from lands irrigated by water diverted from East Rosebud Creek basin. Several observations of water temperatures 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 (water years 1921, 1935-40, 1985-87), 139 ft^3/s, 100,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,310 ft^3/s, June 8, 1932, gage height, 8.10 ft, site and datum then in use; no flow July 14-16, 1935.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,460 ft^3/s, May 28, gage height, 4.78 ft; minimum daily, 0.81 ft^3/s, May 8.

SUBJECT TO REVISION

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	222	234	237	116	112	e90	165	225	889	2.0	201	294
2	339	227	248	155	112	99	134	163	785	3.0	173	267
3	411	229	237	154	106	102	131	122	711	70	117	233
4	330	230	211	157	106	119	147	71	630	99	76	245
5	318	229	237	164	105	244	155	25	546	81	45	273
6	343	267	236	157	108	278	161	2.1	477	43	33	242
7	331	250	226	149	114	249	161	1.1	421	15	45	264
8	337	240	228	108	116	195	173	.81	594	5.8	43	243
9	320	225	214	99	114	139	163	10	680	6.4	38	240
10	223	e200	192	113	114	127	150	44	630	34	19	247
11	219	e195	233	165	117	123	160	32	610	575	7.3	250
12	202	e185	232	175	120	119	156	9.7	580	732	23	233
13	213	e195	245	148	119	136	174	33	513	567	24	237
14	360	e250	240	115	110	230	171	29	340	462	20	229
15	355	e270	218	e100	101	167	170	11	236	375	57	219
16	342	259	218	e60	98	145	170	11	177	300	68	223
17	330	248	209	e50	97	130	173	207	132	286	64	231
18	311	235	200	e80	96	131	173	50	102	359	67	244
19	302	234	192	e125	97	131	180	4.5	64	418	55	243
20	255	235	190	e110	84	124	196	12	55	361	52	222
21	250	244	167	e120	90	117	187	37	39	326	42	216
22	226	250	181	e115	94	110	177	20	16	425	34	202
23	221	231	190	e135	96	107	171	10	4.1	447	32	182
24	219	232	181	e135	e80	120	186	9.9	2.8	423	53	166
25	214	245	184	e130	e75	111	190	9.9	3.6	388	220	175
26	213	228	171	e120	e70	110	195	41	2.9	345	412	202
27	215	231	166	e120	e65	108	195	617	6.8	285	382	202
28	219	232	167	122	e80	103	224	1200	7.6	234	318	209
29	228	230	155	112	---	e80	288	1020	9.0	221	309	217
30	229	225	161	110	---	e110	297	1020	2.7	241	310	198
31	228	---	148	105	---	e130	---	946	---	229	300	---
TOTAL	8525	6985	6314	3824	2796	4284	5373	5994.01	9266.5	8358.2	3639.3	6848
MEAN	275	233	204	123	99.9	138	179	193	309	270	117	228
MAX	411	270	248	175	120	278	297	1200	889	732	412	294
MIN	202	185	148	50	65	80	131	.81	2.7	2.0	7.3	166
AC-FT	16910	13850	12520	7580	5550	8500	10660	11890	18380	16580	7220	13580

CAL YR 1986 TOTAL 73362.30 MEAN 201 MAX 983 MIN 3.4 AC-FT 145500
WTR YR 1987 TOTAL 72206.94 MEAN 198 MAX 1200 MIN .81 AC-FT 143200

e Estimated

06214500 YELLOWSTONE RIVER AT BILLINGS, MT
(National stream quality accounting network)

LOCATION.--Lat 45°47'48", long 108°28'12", in NE¼NE¼ sec.34, T.1 N., R.26 E., Yellowstone County, Hydrologic Unit 10070007, on left bank 30 ft downstream from bridge on U.S. Highway 87, 1 mi northeast of Billings, 10 mi upstream from Pryor Creek, and at mile 360.6.

DRAINAGE AREA.--11,795 mi^2. Area at site used Jan. 10, 1963, to Dec. 2, 1967, 11,783 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1904 to December 1905 (gage heights only January to March, December 1905), August 1928 to current year. Monthly discharge only for some periods, published in WSP 1309. Published as "near Billings" 1904-5.

REVISED RECORDS.--WDR MT 1968: 1967 (M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,081.36 ft above National Geodetic Vertical Datum of 1929. May 1904 to December 1905, nonrecording gage at bridge 30 ft upstream at different datum. Aug. 24, 1928, to June 30, 1932, nonrecording gage at bridge 30 ft upstream at datum 2.0 ft higher. July 1, 1932, to Oct. 12, 1937, waterstage recorder at old diversion dam 3 mi upstream at different datum. Oct. 13, 1937, to Jan. 9, 1963, waterstage recorder at present site at datum 2.0 ft higher. Jan. 10, 1963, to Dec. 2, 1967, water-stage recorder at city of Billings Water Department intake, 1.8 mi upstream at datum 3,096.09 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Nov. 6-19, Dec. 6-10, Jan. 15-26, Feb. 23-28, Mar. 26-31. Water-discharge records fair except those for estimate daily discharges, which are poor. Diversions for irrigation of about 350,000 acres upstream from station.

AVERAGE DISCHARGE.--59 years (1928-87), 7,026 ft^3/s, 5,090,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 69,500 ft^3/s, June 19, 1974, gage height, 14.60 ft; maximum gage height, 14.76 ft, June 16, 1967, present datum, from floodmark; minimum discharge, 430 ft^3/s, Dec. 12, 1932.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 17,100 ft^3/s, May 28, gage height, 7.01 ft; maximum gage height, 10.28 ft, Nov. 14 (backwater from ice); minimum daily discharge, 1,800 ft^3/s, Jan. 16.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5180	4620	4090	2780	2900	2550	2530	10400	16400	4690	5160	4130
2	5310	4630	3980	2590	2980	2790	2620	11200	15800	4580	4970	3910
3	5710	4540	3910	3060	2980	2670	2560	10900	13900	4570	4480	3680
4	5470	4470	3800	3030	2930	2630	2530	8550	12200	4790	4010	3610
5	5280	4500	3550	3220	2880	2760	2530	6390	11000	4910	3720	3800
6	5270	e4400	e3400	3240	2840	2910	2570	5810	10600	4670	3460	3780
7	5210	e4200	e3200	3070	2920	2890	2670	6460	10700	4120	3310	3730
8	5250	e4000	e3100	2810	2870	2990	2850	7520	11900	3890	3330	3650
9	5360	e3800	e2900	2480	2860	3020	3030	8540	15600	3730	3350	3490
10	5200	e3600	e3000	2410	2760	2810	3060	9040	15600	3920	3340	3410
11	5130	e3400	3060	2400	2760	2700	2960	9470	15000	5920	3210	3330
12	5020	e3300	3130	2790	2730	2680	2820	9160	13900	10800	3090	3270
13	4850	e3600	3170	3120	2730	2680	2820	8820	12500	9710	3110	3240
14	4890	e4000	3270	3080	2720	2790	2810	9550	11400	8020	3120	3170
15	5020	e4500	3330	e2500	2710	2840	2740	9720	10500	6860	3380	3100
16	5040	e4700	3420	e1800	2680	2800	2710	10000	9710	6120	3480	3080
17	4990	e5000	3430	e2100	2640	2740	2780	11700	9100	5740	3520	3050
18	4890	e5200	3270	e2500	2580	2690	3100	14400	8820	6410	3500	3080
19	4860	e5400	3050	e2500	2610	2690	3560	13500	8350	7770	3470	3090
20	4820	5850	2810	e2300	2530	2630	4350	13200	8040	8390	3310	3000
21	4770	4960	2920	e2600	2480	2590	4330	12500	7460	7280	3120	2940
22	4690	4750	3130	e2900	2450	2540	3640	11200	7090	7120	3030	2880
23	4620	4680	3240	e3000	e2400	2510	3490	9820	6800	7610	2990	2770
24	4600	4530	3200	e3200	e2300	2520	3790	8690	6590	7330	3000	2610
25	4590	4450	3230	e3400	e2200	2500	4730	8090	6260	6610	3980	2510
26	4550	4400	3170	e3500	e2100	e2400	5640	8170	5810	6100	5560	2520
27	4530	4260	3100	3190	e1900	e2400	6470	10600	5420	5550	5840	2540
28	4520	4160	3030	3170	e2000	e2300	7430	16800	5070	5070	5600	2630
29	4510	4160	2970	3150	---	e2100	8510	16100	4920	4790	5180	2700
30	4560	4150	2980	2980	---	e2000	9540	16800	4930	4880	4730	2630
31	4570	---	2950	2910	---	e2400	---	16300	---	5150	4450	---
TOTAL	153260	132210	100790	87780	73440	81520	115170	329400	301370	187100	119800	95330
MEAN	4944	4407	3251	2832	2623	2630	3839	10630	10050	6035	3865	3178
MAX	5710	5850	4090	3500	2980	3020	9540	16800	16400	10800	5840	4130
MIN	4510	3300	2810	1800	1900	2000	2530	5810	4920	3730	2990	2510
AC-FT	304000	262200	199900	174100	145700	161700	228400	653400	597800	371100	237600	189100

CAL YR 1986 TOTAL 2803830 MEAN 7682 MAX 44800 MIN 1100 AC-FT 5561000
WTR YR 1987 TOTAL 1777170 MEAN 4869 MAX 16800 MIN 1800 AC-FT 3525000

e Estimated

06214500 YELLOWSTONE RIVER AT BILLINGS, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1946, 1950-58, 1963 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1965 to September 1981.
WATER TEMPERATURE: December 1950 to September 1958, July 1963 to September 1979.
SUSPENDED-SEDIMENT DISCHARGE: October 1976 to September 1981.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1965-81): Maximum daily, 720 microsiemens, Jan. 12, 1980; minimum daily, 111 microsiemens, June 9, 1973.
WATER TEMPERATURE (water years 1951-58, 1963-79): Maximum, 26.5°C, July 24, 1955; minimum, 0.0°C, on many days during winter.
SEDIMENT CONCENTRATION (water years 1977-81): Maximum daily mean, 4,260 mg/L, May 18, 1978; minimum daily mean, 1 mg/L, Oct. 27, 30, 1976, Jan. 11, 12, 1978.
SEDIMENT LOAD (water years 1977-81): Maximum daily, 493,000 tons, May 19, 1978; minimum daily, 11 tons, Jan. 12, 1978.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)
NOV								
20...	1000	5850	0	0	383	9.5	1.5	678
JAN								
28...	1100	3100	--	--	426	3.0	0.0	--
MAR								
16...	0930	2790	100	13	442	2.5	6.5	683
18...	0920	2650	--	--	467	5.5	7.5	--
MAY								
13...	0910	8680	--	--	275	17.5	15.5	--
21...	1035	12600	--	--	190	7.0	8.5	--
JUN								
17...	1040	9060	40	1	223	25.5	19.0	686
JUL								
14...	0930	8370	--	--	403	21.0	19.5	--
SEP								
01...	1100	4230	--	--	408	19.0	19.5	--
02...	0900	3960	30	1	395	22.5	19.5	683

DATE	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BICAR-BONATE WATER WHOLE IT-FLD (MG/L) (00450)	CAR-BONATE WATER WHOLE IT-FLD (MG/L) (00447)	ALKA-LINITY WH WAT TOTAL FIELD MG/L AS CACO3 (00410)
NOV							
20...	12.1	97	27	130	158	8	142
JAN							
28...	--	--	--	--	--	--	--
MAR							
16...	10.0	91	K10	K10	155	0	130
18...	--	--	--	--	--	--	--
MAY							
13...	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--
JUN							
17...	8.4	101	67	83	87	0	69
JUL							
14...	--	--	--	--	--	--	--
SEP							
01...	--	--	--	--	--	--	--
02...	7.1	87	160	170	156	0	124

06214500 YELLOWSTONE RIVER AT BILLINGS, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV										
20...	1000	8.20	9.3	150	9	39	13	24	0.9	2.9
MAR										
16...	0930	8.00	3.2	170	36	43	14	31	1	3.5
JUN										
17...	1040	8.20	5.0	78	9	20	6.7	12	0.6	1.9
SEP										
02...	0900	8.10	6.4	150	22	37	13	24	0.9	2.8

DATE	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
NOV										
20...	119	69	6.5	0.40	14	244	250	0.33	3850	<0.010
MAR										
16...	133	94	9.4	0.50	14	279	290	0.38	2100	<0.010
JUN										
17...	74	28	3.2	0.30	12	134	130	0.18	3280	<0.010
SEP										
02...	129	74	5.7	0.50	8.7	232	240	0.32	2480	<0.010

DATE	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN,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)	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)
NOV										
20...	0.260	0.030	0.030	0.60	0.020	<0.010	<0.010	10	9	45
MAR										
16...	0.190	0.030	0.040	0.60	0.040	0.010	<0.010	10	13	54
JUN										
17...	<0.100	0.040	0.060	0.90	0.080	0.020	<0.010	<10	7	32
SEP										
02...	0.110	0.020	0.030	<0.20	0.060	<0.010	<0.010	20	8	49

DATE	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)
NOV										
20...	<0.5	1	<1	<3	7	5	<5	46	6	0.1
MAR										
16...	<0.5	<1	<1	<3	1	11	<5	59	15	<0.1
JUN										
17...	<0.5	<1	2	<3	5	15	<5	28	3	<0.1
SEP										
02...	<0.5	<1	<1	<3	2	7	<5	37	7	<0.1

06214500 YELLOWSTONE RIVER AT BILLINGS, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV										
20...	<10	<1	<1	<1	320	<6	8	54	853	57
MAR										
16...	<10	1	<1	<1	380	<6	13	31	234	56
JUN										
17...	<10	<1	<1	<1	180	<6	6	38	930	68
SEP										
02...	<10	<1	1	<1	360	<6	6	45	481	84

DATE	TIME	GROSS ALPHA, DIS-SOLVED (UG/L AS U-NAT) (80030)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT) (80040)	GROSS BETA, DIS-SOLVED (PCI/L AS CS-137) (03515)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137) (03516)	GROSS BETA, DIS-SOLVED (PCI/L AS SR/YT-90) (80050)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/YT-90) (80060)	RADIUM 226, DIS-SOLVED, RADON METHOD (PCI/L) (09511)	URANIUM NATURAL DIS-SOLVED (UG/L AS U) (22703)	URANIUM DIS-SOLVED, EXTRAC-TION (UG/L) (80020)
JUN										
17...	1040	5.0	0.5	2.7	0.8	2.2	0.8	0.06	--	0.75
SEP										
02...	0900	2.6	0.5	3.8	0.6	2.8	0.6	0.07	1.5	--

06215000 PRYOR CREEK ABOVE PRYOR, MT

LOCATION.--Lat 45°20'26", long 108°34'07", in SW¼NE¼ sec.6, T.6 S., R.26 E., Bighorn County, Hydrologic Unit 10070008, 1.2 mi upstream from headworks of Pryor Ditch No. 1, 6.7 mi south of Pryor, and at site of former gaging station.

DRAINAGE AREA.--39.6 mi2.

PERIOD OF RECORD.--April to September 1987.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
APR												
30...	1430	4.5	70	1	297	23.5	16.0	8.56	190	4	46	18
JUN												
02...	1515	7.1	10	1	345	14.0	14.0	8.40	200	32	48	20
JUL												
23...	1245	1.4	50	1	357	19.0	18.5	8.20	200	14	47	21
SEP												
03...	1200	1.1	100	2	350	15.5	11.5	8.20	--	--	--	--

DATE	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)
APR											
30...	1.0	0.0	0.50	185	8.0	0.60	0.50	6.1	190	0.26	2.3
JUN											
02...	0.80	0.0	0.70	170	8.3	0.70	0.40	6.7	190	0.26	3.6
JUL											
23...	0.80	0.0	0.70	190	9.9	0.60	0.50	6.7	200	0.27	0.76
SEP											
03...	--	--	0.70	137	10	1.3	0.60	--	--	--	--

DATE	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)
APR											
30...	<0.100	<1	<10	<1	<10	<3	<5	1	<0.1	<1	<1
JUN											
02...	<0.100	--	<10	--	--	6	--	--	--	--	--
JUL											
23...	<0.100	--	10	--	--	<3	--	--	--	--	--
SEP											
03...	<0.100	--	<10	--	--	--	--	--	--	--	--

06216000 PRYOR CREEK AT PRYOR, MT

LOCATION.--Lat 45°26'06", long 108°32'01", in NE¼NW¼NE¼ sec.5, T.5 S., R.26 E., Big Horn County, Hydrologic Unit 10070008, on left bank 60 ft upstream from county bridge, 0.5 mi north of Pryor, 1.4 mi downstream from Lost Creek, and at mile 82.7.

DRAINAGE AREA.--117 mi^2.

PERIOD OF RECORD.--June 1921 to September 1924 (no winter records), October 1966 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 4,007.35 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 14, 1966, nonrecording gage at approximately same site at different datum.

REMARKS.--Estimated daily discharges: Nov. 6-15, 18, 19, Jan. 8-17, Feb. 21-28, and Mar. 29. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 1,100 acres upstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--21 years (water years 1967-87), 37.8 ft^3/s, 27,390 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,280 ft^3/s, May 19, 1978, gage height, 8.88 ft, from floodmark, from rating curve extended above 410 ft^3/s on basis of contracted-opening measurement of peak flow; minimum observed, 3.4 ft^3/s, June 24, 1921, gage height, 0.86 ft, site and datum then in use.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 330 ft^3/s, May 28, gage height, 5.21 ft; minimum, 10 ft^3/s, May 13, 14.

REVISIONS.--The maximum discharges for some water years have been revised, as shown in the following table. They supersede figures published in reports for 1982, 1983, and 1986.

Water year	Date	Discharge (ft^3/s)	Gage height (ft)
1982	Feb. 14, 1982	86	3.76
1983	May 15, 1983	70	3.50
1986	May 10, 1986	79	3.65

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	32	26	28	26	26	27	32	24	36	22	17	30
2	32	25	27	26	27	28	30	24	33	19	21	30
3	34	26	27	26	26	29	29	24	33	24	25	29
4	31	26	27	26	27	29	30	24	32	21	31	31
5	31	26	27	27	27	28	29	20	30	21	30	34
6	30	e22	27	27	27	27	28	18	30	22	28	31
7	29	e18	27	24	27	26	27	19	33	21	29	30
8	29	e15	27	e24	27	28	26	20	34	19	29	30
9	29	e17	24	e25	26	27	27	20	34	17	31	29
10	29	e19	27	e26	26	26	27	19	36	19	31	30
11	30	e21	26	e27	26	26	26	17	30	36	31	30
12	29	e17	26	e27	26	26	26	16	29	34	32	28
13	28	e22	26	e25	26	28	26	12	27	23	31	28
14	29	e23	26	e22	26	27	25	11	26	20	31	28
15	28	e26	26	e18	26	26	25	12	27	16	31	28
16	28	30	26	e22	26	26	25	11	26	18	32	27
17	28	29	27	e23	25	27	25	12	25	18	31	28
18	27	e27	26	27	25	26	25	14	24	20	30	28
19	27	e26	26	26	25	26	26	16	27	20	30	28
20	27	31	26	26	24	25	27	17	27	19	29	28
21	27	36	26	27	e23	25	26	15	25	19	29	27
22	27	33	26	26	e22	26	25	15	28	24	29	28
23	27	31	26	27	e22	25	25	15	29	20	29	27
24	27	31	26	27	e21	26	25	15	26	19	32	27
25	26	30	26	27	e21	25	25	15	26	19	42	26
26	26	29	26	27	e22	25	24	15	25	20	52	25
27	26	28	26	27	e23	27	24	76	24	18	36	26
28	26	28	26	27	e24	26	24	146	25	17	33	26
29	26	28	26	27	---	e20	24	57	27	29	31	26
30	26	28	26	27	---	26	24	44	24	44	30	26
31	26	---	26	26	---	29	---	38	---	16	30	---
TOTAL	877	774	815	795	699	818	787	801	858	674	953	849
MEAN	28.3	25.8	26.3	25.6	25.0	26.4	26.2	25.8	28.6	21.7	30.7	28.3
MAX	34	36	28	27	27	29	32	146	36	44	52	34
MIN	26	15	24	18	21	20	24	11	24	16	17	25
AC-FT	1740	1540	1620	1580	1390	1620	1560	1590	1700	1340	1890	1680

CAL YR 1986 TOTAL 9074 MEAN 24.9 MAX 59 MIN 10 AC-FT 18000
WTR YR 1987 TOTAL 9700 MEAN 26.6 MAX 146 MIN 11 AC-FT 19240

e Estimated

06216900 PRYOR CREEK NEAR HUNTLEY, MT

LOCATION.--Lat 45°49'19", long 108°17'23", in NE¼SE¼NW¼ sec.19, T.1 N., R.28 E., Yellowstone County, Hydrologic Unit 10070008, on left bank 250 ft upstream from county bridge on Indian Creek road, 1.9 mi downstream from Indian Creek, 4.9 mi south of Huntley, and at mile 11.2.

DRAINAGE AREA.--582 mi^2.

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

GAGE.--Water-stage recorder. Elevation of gage is 3,140 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 6 to Mar. 4, Mar. 29, 30. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 3,200 acres upstream 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.--9 years, 75.1 ft^3/s, 54,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,410 ft^3/s, May 17, 1981, gage height, 3.46 ft, but was known to be higher during ice jamming Mar. 12, 1979; maximum gage height, 7.54 ft, Mar. 12, 1979 (ice jam); minimum discharge, 0.62 ft^3/s, Aug. 10, 1986.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 19, 1978, reached a discharge of 18,200 ft^3/s from slope-area measurement of peak flow at site 10.5 mi downstream. Floodmarks at this site not recovered.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 29	1300	*986	*3.50	No other peak greater than base discharge.			

Minimum discharge, 3.1 ft^3/s, May 8.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	40	43	e68	e28	e56	e50	142	39	101	29	44	42
2	42	43	e60	e30	e52	e54	140	38	83	18	28	42
3	49	44	e52	e32	e50	e62	80	33	75	28	25	40
4	64	45	e45	e31	e50	e76	69	40	70	22	28	39
5	62	44	e40	e32	e52	85	67	32	66	25	26	54
6	51	e40	e42	e30	e55	70	62	31	62	26	27	75
7	48	e40	e45	e27	e62	62	58	29	58	22	27	50
8	45	e35	e42	e25	e69	57	55	21	57	18	29	43
9	43	e25	e37	e26	e64	56	55	22	59	17	32	41
10	41	e18	e40	e27	e66	55	54	23	88	21	27	41
11	40	e22	e43	e30	e66	57	54	28	108	52	18	39
12	40	e19	e45	e32	e64	61	52	24	88	274	18	39
13	45	e21	e45	e30	e60	63	50	17	71	223	13	40
14	42	e25	e44	e25	e66	72	51	13	62	72	17	39
15	41	e31	e43	e20	e58	69	49	16	53	47	29	37
16	40	e40	e41	e25	e58	57	47	12	50	35	35	38
17	42	e40	e40	e30	e59	51	47	17	57	26	35	36
18	41	e26	e39	e37	e56	49	46	21	51	35	28	38
19	41	e30	e38	e35	e52	52	46	23	47	33	32	40
20	41	e40	e39	e31	e58	51	49	40	47	39	28	40
21	41	e60	e40	e35	e56	49	52	100	51	31	28	39
22	41	e54	e41	e40	e56	49	49	66	51	44	25	39
23	41	e45	e42	e43	e54	48	44	50	51	74	28	38
24	41	e80	e42	e47	e50	51	42	42	54	46	32	37
25	44	e60	e40	e50	e45	58	43	39	55	35	191	37
26	44	e65	e40	e54	e44	61	44	40	46	34	215	38
27	43	e70	e40	e60	e40	62	44	54	34	33	170	37
28	43	e60	e39	e57	e50	54	44	504	24	30	81	36
29	44	e54	e38	e54	---	e40	46	704	20	28	56	38
30	44	e62	e35	e52	---	e45	41	216	27	28	48	39
31	44	---	e31	e52	---	79	---	133	---	66	44	---
TOTAL	1368	1281	1316	1127	1568	1805	1722	2467	1766	1511	1464	1231
MEAN	44.1	42.7	42.5	36.4	56.0	58.2	57.4	79.6	58.9	48.7	47.2	41.0
MAX	64	80	68	60	69	85	142	704	108	274	215	75
MIN	40	18	31	20	40	40	41	12	20	17	13	36
AC-FT	2710	2540	2610	2240	3110	3580	3420	4890	3500	3000	2900	2440

CAL YR 1986 TOTAL 18991 MEAN 52.0 MAX 562 MIN .97 AC-FT 37670
WTR YR 1987 TOTAL 18626 MEAN 51.0 MAX 704 MIN 12 AC-FT 36940

e Estimated

YELLOWSTONE RIVER BASIN

06279500 BIGHORN RIVER AT KANE, WY

LOCATION.--Lat 44°45'31", long 108°10'51", in NW¼NE¼SW¼ sec.9, T.55 N., R.94 W., Big Horn County, Hydrologic Unit 10080010, on right bank 180 ft upstream from Bighorn Canyon National Recreation Area boundary, 0.5 mi upstream from normal high-water line of Bighorn Lake at elevation 3,660 ft, 1.3 mi upstream from Five Springs Creek, and 5.9 mi south of Kane.

DRAINAGE AREA.--15,765 mi^2. Area at sites used prior to May 17, 1956, 15,846 mi^2.

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1309: 1929(M). WSP 1509: 1929. WSP 1709: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,660 ft above National Geodetic Vertical Datum of 1929, from topographic map. Aug. 29, 1928 to Apr. 25, 1932, nonrecording gage, and Apr. 25, 1932 to May 16, 1956, water-stage recorder at site 12.5 mi downstream at different datum.

REMARKS.--Estimated daily discharges: Nov. 10-16 and Dec. 11 to Mar. 3. Records good except those for estimated daily discharges, which are poor. Some regulation by Boysen Reservoir (station 06258900) since October 1951. Diversions for irrigation of about 376,000 acres upstream from station. U.S. Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--59 years, 2,283 ft^3/s, 1,654,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 25,200 ft^3/s, June 16, 1935, gage height, 11.10 ft, site and datum then in use; minimum daily, 179 ft^3/s, July 22, 1934.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1923, 14.8 ft, Sept. 30, 1923, site and datum in use April 1932 to May 1956.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 9,670 ft^3/s, June 9, gage height, 7.08 ft; maximum gage height, 8.42 ft, Nov. 14 (backwater from ice); minimum daily discharge, 687 ft^3/s, July 9.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2510	2380	2350	1700	1550	2210	2550	3200	2810	802	1170	1450
2	2690	2370	2260	1700	1670	2300	2540	3220	2890	821	1060	1390
3	2970	2360	1830	1680	1900	2530	2500	3120	3020	774	965	1370
4	2970	2360	1840	1680	2450	2900	2470	2690	2800	906	900	1410
5	2660	2360	1840	1680	2500	3070	2440	2390	2480	858	837	1520
6	2560	2370	1790	1670	2500	3680	2470	2240	1830	875	844	1830
7	2500	2440	1880	1650	2500	3810	2490	2230	1830	794	910	1790
8	2470	2410	1820	1600	2500	3570	2510	2270	3680	748	1010	1810
9	2470	2370	1950	1500	2500	3020	2520	2290	8170	687	1560	1860
10	2500	2370	1840	1450	2500	2790	2420	2120	6290	691	1210	1800
11	2510	2370	1880	1400	2500	2750	2280	1910	5050	1080	1140	1760
12	2520	2340	1900	1400	2400	2720	2260	1690	3940	2000	1070	1740
13	2460	2300	1910	1400	2300	2690	2310	1550	3420	1840	1030	1710
14	2470	2300	1930	1300	2300	2670	2280	1530	2890	1480	1060	1670
15	2490	2330	1940	1250	2300	2660	2250	1450	2680	1270	1080	1630
16	2450	2400	2000	1250	2300	2660	2190	1470	2370	1140	1210	1600
17	2440	2400	2050	1250	2300	2630	2130	1860	2080	1120	1670	1680
18	2440	2330	2000	1250	2350	2650	2080	2900	1840	1170	1260	1790
19	2430	2360	1930	1250	2320	2650	2210	2470	1650	1470	1150	1830
20	2420	2390	1800	1130	2250	2600	2410	2120	1620	1350	1090	1820
21	2420	2390	1810	1080	2250	2550	2410	1930	1460	1260	1050	1840
22	2410	2470	1810	1100	2250	2480	2230	2020	1360	1150	1040	1820
23	2430	2490	1810	1100	2230	2470	2130	1790	1350	1190	1090	1760
24	2430	2410	1810	1140	2250	2440	2100	1630	1340	1150	1090	1750
25	2440	2400	1810	1170	2210	2430	2260	1570	1210	1080	1310	1730
26	2440	2380	1800	1280	2200	2520	2580	1550	1070	1080	1500	1730
27	2440	2350	1800	1380	2200	2540	3010	3340	991	1100	1670	1720
28	2410	2360	1800	1390	2200	2540	3290	6960	908	1140	1730	1690
29	2380	2370	1790	1400	---	2480	3480	3860	853	1270	1630	1710
30	2360	2370	1770	1400	---	2450	3320	3440	833	1490	1580	1750
31	2370	---	1700	1450	---	2500	---	3030	---	1380	1540	---
TOTAL	77460	71300	58450	43080	63680	83960	74120	75840	74715	35166	37456	50960
MEAN	2499	2377	1885	1390	2274	2708	2471	2446	2491	1134	1208	1699
MAX	2970	2490	2350	1700	2500	3810	3480	6960	8170	2000	1730	1860
MIN	2360	2300	1700	1080	1550	2210	2080	1450	833	687	837	1370
AC-FT	153600	141400	115900	85450	126300	166500	147000	150400	148200	69750	74290	101100

CAL YR 1986	TOTAL	1018236	MEAN	2790	MAX	10900	MIN	911	AC-FT	2020000
WTR YR 1987	TOTAL	746187	MEAN	2044	MAX	8170	MIN	687	AC-FT	1480000

06279500 BIGHORN RIVER AT KANE, WY--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1947 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)
NOV								
17...	1100	2440	920	8.2	0.5	644	12.0	99
DEC								
15...	1200	1940	1020	--	0.0	--	--	--
FEB								
02...	1600	1640	840	8.2	0.0	660	12.6	100
MAR								
16...	1130	2630	880	--	7.0	--	--	--
APR								
22...	1100	2290	930	8.1	11.0	667	9.9	103
MAY								
29...	0850	4110	--	--	15.0	--	--	--
JUN								
02...	1030	2710	860	--	14.5	--	--	--
30...	1210	900	--	--	23.0	--	--	--
JUL								
07...	0830	793	1190	8.2	19.5	662	7.8	98
AUG								
20...	1100	1080	1080	--	19.0	--	--	--
SEP								
22...	1145	1840	940	--	15.0	--	--	--
30...	1300	1780	920	--	14.5	--	--	--

DATE	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS, TOTAL (MG/L AS P)	SEDI-MENT, SUS-PENDED (MG/L)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY)	SEDI. SUSP. FALL DIAM. % FINER THAN .004 MM	SED. SUSP. FALL DIAM. % FINER THAN .008 MM	SED. SUSP. FALL DIAM. % FINER THAN .016 MM
NOV											
7...	150	0.1	<0.01	--	0.3	0.02	60	395	--	--	--
DEC											
15...	--	--	--	--	--	--	90	471	--	--	--
FEB											
02...	77	0.2	0.08	0.62	0.7	0.10	40	177	--	--	--
MAR											
16...	--	--	--	--	--	--	146	1040	--	--	--
APR											
22...	120	0.2	0.04	0.56	0.6	0.03	262	1620	--	--	--
MAY											
29...	--	1.5	0.16	19	19	9.50	--	--	--	--	--
JUN											
02...	--	--	--	--	--	--	1140	8340	74	79	85
30...	--	0.6	0.04	4.6	4.6	0.08	--	--	--	--	--
JUL											
07...	230	0.9	0.19	1.7	1.9	0.03	706	1510	--	--	--
AUG											
20...	--	--	--	--	--	--	563	1640	--	--	--
SEP											
22...	--	--	--	--	--	--	236	1170	--	--	--
30...	--	--	--	--	--	--	110	529	--	--	--

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	TEMPER-ATURE WATER (DEG C)	DICAMBA (MED-IBEN) (BAN-VEL D) TOTAL (UG/L)	PICLO-RAM (TOR-DON) (AMDON) TOTAL (UG/L)	2,4-D, TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
MAY									
01...	1120	3230	15.0	0.01	0.01	0.02	<0.01	<0.01	<0.01
JUN									
02...	1030	2710	14.5	0.01	<0.01	0.02	<0.01	<0.01	<0.01
JUL									
07...	0830	793	19.5	0.05	0.01	0.08	<0.01	<0.01	<0.01
AUG									
20...	1100	1080	19.0	0.02	0.02	0.03	<0.01	<0.01	<0.01
SEP									
30...	1300	1780	14.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

06285100 SHOSHONE RIVER NEAR LOVELL, WY

LOCATION.--Lat 44°50'20", long 108°26'00", in NW¼NE¼NE¼ sec.17, T.56 N., R.96 W., Big Horn County, Hydrologic Unit 10080014, on left bank 20 ft upstream from bridge on County Road 9 and 1.5 mi west of Lovell. Prior to Nov. 15, 1986, at site 500 ft downstream.

DRAINAGE AREA.--2,350 mi^2, approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1966 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,850 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Oct. 1, 1976, at site 500 ft downstream, at datum 2.00 ft higher. Oct. 1, 1976 to Sept. 30, 1980, at site 500 ft downstream, at datum 1.00 ft higher. Oct. 1, 1981 to Nov. 13, 1986, at site 500 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Nov. 10-15, Nov. 19 to Feb. 2, May 16-29, and June 8, 9. Records fair except those for estimated daily discharges, which are poor. Flow regulated by Buffalo Bill Reservoir. Natural flow of stream affected by storage reservoirs, power development, diversions upstream from station for irrigation of about 143,000 acres, of which about 8,000 acres are downstream from station, and return flow from irrigated areas.

AVERAGE DISCHARGE.--21 years, 978 ft^3/s, 708,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,400 ft^3/s, June 10, 1981, gage height, 9.16 ft, site then in use, at present datum; maximum gage height, 10.09 ft, Feb. 3, 1972 (backwater from ice), site then in use, at present datum; minimum daily discharge, 27 ft^3/s, May 31, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,980 ft^3/s, June 9, gage height, 7.31 ft; minimum daily, 204 ft^3/s, Apr. 14.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	670	682	590	500	370	408	364	286	515	375	823	418
2	660	666	580	500	400	436	355	319	420	346	798	326
3	754	682	580	500	424	506	350	367	373	478	591	316
4	655	694	580	500	414	602	355	356	420	462	469	435
5	525	683	570	500	404	511	363	308	340	553	340	514
6	462	761	570	460	401	506	363	293	451	506	356	585
7	424	753	570	450	401	509	366	293	806	426	476	612
8	437	718	540	450	408	560	328	298	2030	382	476	610
9	443	695	520	460	417	479	313	314	3390	384	542	551
10	475	540	530	470	420	455	273	343	3810	397	502	531
11	546	545	540	480	436	485	276	384	3590	1450	482	565
12	541	550	540	480	463	464	371	396	3570	1660	489	619
13	541	560	542	460	451	459	307	414	3490	1090	469	643
14	540	565	544	450	448	444	204	298	3460	980	495	664
15	528	620	546	430	425	426	209	288	3340	891	584	479
16	672	649	510	400	418	396	371	444	2730	814	687	435
17	719	649	480	400	414	394	349	495	1700	814	671	499
18	923	649	500	400	414	389	298	671	902	944	598	557
19	730	635	500	400	414	385	488	612	610	926	489	526
20	657	620	500	400	400	385	572	664	486	749	471	518
21	665	620	500	400	402	376	502	679	468	741	382	496
22	660	615	500	400	408	379	351	725	579	656	386	455
23	674	610	500	400	412	369	209	576	612	535	481	423
24	653	605	500	400	395	288	228	556	563	495	565	389
25	680	600	500	400	404	349	233	522	717	605	627	401
26	652	600	500	400	423	284	368	508	569	515	738	435
27	640	600	500	400	404	367	412	556	508	438	753	451
28	633	600	500	370	410	363	356	1410	425	556	766	480
29	650	600	500	360	---	355	235	1040	412	806	690	444
30	700	600	500	340	---	365	259	935	370	702	647	339
31	686	---	500	350	---	339	---	649	---	953	605	---
TOTAL	19195	18966	16332	13310	11600	13033	10028	15999	41656	21629	17448	14716
MEAN	619	632	527	429	414	420	334	516	1389	698	563	491
MAX	923	761	590	500	463	602	572	1410	3810	1660	823	664
MIN	424	540	480	340	370	284	204	286	340	346	340	316
AC-FT	38070	37620	32390	26400	23010	25850	19890	31730	82620	42900	34610	29190

CAL YR 1986	TOTAL	445968	MEAN	1222	MAX	7330	MIN	327	AC-FT	884600
WTR YR 1987	TOTAL	213912	MEAN	586	MAX	3810	MIN	204	AC-FT	424300

WATER-QUALITY RECORDS

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

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1966 to September 1983.
WATER TEMPERATURES: October 1966 to September 1983.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	TEMPER-ATURE WATER (DEG C)	HARD-NESS (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO
NOV									
14...	1100	565	920	0.0	300	62	36	99	3
FEB									
02...	1030	510	1040	1.0	390	100	34	79	2
APR									
23...	1130	283	1000	11.0	270	70	22	81	2
MAY									
29...	1200	1250	1150	15.0	--	--	--	--	--
JUN									
10...	1130	3860	860	9.0	--	--	--	--	--
30...	1345	432	760	21.0	--	--	--	--	--
JUL									
09...	1000	366	960	17.0	250	61	23	82	2
AUG									
20...	1330	540	860	18.5	--	--	--	--	--
SEP									
22...	1100	462	855	13.5	--	--	--	--	--
30...	1140	293	870	13.0	--	--	--	--	--

DATE	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY LAB (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)
NOV								
14...	3.5	240	240	8.1	0.6	15	610	0.83
FEB								
02...	5.8	250	270	13	0.7	14	670	0.91
APR								
23...	4.4	170	240	16	0.5	15	550	0.75
MAY								
29...	--	--	--	--	--	--	--	--
JUN								
10...	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--
JUL								
09...	3.5	180	220	9.3	0.5	13	520	0.71
AUG								
20...	--	--	--	--	--	--	--	--
SEP								
22...	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--

DATE	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS, TOTAL (MG/L AS P)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)
NOV								
14...	928	--	1.1	--	--	--	--	0.01
FEB								
02...	918	--	1.0	--	--	--	--	0.02
APR								
23...	421	--	0.5	--	--	--	--	0.03
MAY								
29...	--	1.7	--	0.12	16	16	7.9	--
JUN								
10...	--	--	--	--	--	--	--	--
30...	--	1.3	--	0.06	1.1	1.2	0.07	--
JUL								
09...	514	--	1.5	--	--	--	--	0.06
AUG								
20...	--	--	--	--	--	--	--	--
SEP								
22...	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--

06286200 SHOSHONE RIVER AT KANE, WY

LOCATION.--Lat 44°51'31", long 108°19'52", in NE¼SE¼SE¼ sec.6, T.56 N., R.95 W., Big Horn County, Hydrologic Unit 10080014, at bridge on county road, 3.4 mi northeast of Lovell, 6.5 mi west of Kane, 6.6 mi upstream from high-water line of Bighorn Lake at elevation 3,640 ft, and 7.8 mi upstream from former discharge station.

DRAINAGE AREA.--2,989 mi^2, at former discharge station.

PERIOD OF RECORD.--Water years 1976 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)
NOV							
14...	1320	580	950	8.2	0.0	658	12.9
FEB							
02...	0730	540	1140	8.2	0.5	647	12.4
APR							
23...	1330	337	1140	8.0	11.0	664	9.8
JUL							
09...	0805	404	1090	8.2	17.0	655	7.9

DATE	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS, TOTAL (MG/L AS P)
NOV							
14...	103	360	0.9	0.03	1.3	1.3	0.18
FEB							
02...	102	310	0.1	0.10	0.80	0.9	0.15
APR							
23...	103	K170	0.9	0.15	0.85	1.0	0.06
JUL							
09...	96	700	1.4	0.09	0.71	0.8	0.25

06286400 BIGHORN LAKE NEAR ST. XAVIER, MT

LOCATION.--Lat 45°18'27", long 107°57'26", in SW¼SE¼ sec.18, T.6 S., R.31 E., Big Horn County, Hydrologic Unit 10080010, in block 13 of Yellowtail Dam on Bighorn River, 1.3 mi upstream from Grapevine Creek, 15.5 mi southeast of St. Xavier, and at mile 86.6.

DRAINAGE AREA.--19,626 mi^2.

PERIOD OF RECORD.--November 1965 to current year (monthend contents only). Prior to October 1969, published as "Yellowtail Reservoir." Records of daily elevations and contents on file in Helena district office.

GAGE.--Water-stage recorder in powerhouse control room. Datum of gage is referenced to National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

REMARKS.--Reservoir is formed by thin concrete-arch dam; construction began in 1961; completed in 1967. Storage began Nov. 3, 1965. Usable capacity, 1,356,000 acre-ft between elevation 3,296.50 ft, river outlet invert, and 3,657.00 ft, top of flood control. Elevation of spillway crest, 3,593.00 ft. Normal maximum operating level, 1,097,000 acre-ft, elevation, 3,640.00 ft. Minimum operating level, 483,400 acre-ft, elevation, 3,547.00 ft. Dead storage, 16,010 acre-ft, below elevation 3,296.50 ft. Figures given herein represent usable contents. Water is used for power production, flood control, irrigation, and recreation.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,346,000 acre-ft, July 6, 1967, elevation, 3,656.43 ft; minimum since first filling, 660,700 acre-ft, Mar. 11, 1970, elevation 3,584.45 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,025,000 acre-ft, Oct. 3,5, elevation, 3,637.66 ft; minimum, 781,300 acre-ft, Apr. 19, elevation, 3,609.05 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	3,637.60	1,025,000	---
Oct. 31	3,634.74	992,200	-32,800
Nov. 30	3,630.10	944,500	-47,700
Dec. 31	3,621.71	871,000	-73,500
CAL YR 1986			+144,700
Jan. 31	3,614.79	819,200	-51,800
Feb. 28	3,613.76	812,200	-7,200
Mar. 31	3,613.05	807,200	-4,800
Apr. 30	3,610.94	793,200	-14,000
May 31	3,620.10	858,300	+65,100
June 30	3,628.31	927,600	+69,300
July 31	3,625.44	901,900	-25,700
Aug. 31	3,624.71	895,700	- 6,200
Sept. 30	3,628.96	933,600	+37,900
WTR YR 1987			-91,400

YELLOWSTONE RIVER BASIN

06287000 BIGHORN RIVER NEAR ST. XAVIER, MT

LOCATION.--Lat 45°19'00", long 107°55'05", in NW¼NW¼NE¼ sec.16, T.6 S., R.31 E., Big Horn County, Hydrologic Unit 10080015, on right bank 800 ft downstream from Yellowtail afterbay dam, 1,500 ft downstream from Lime Kiln Creek, 14 mi southwest of St. Xavier, and at mile 83.9.

DRAINAGE AREA.--19,667 mi^2. Area at site used prior to Apr. 16, 1963, 19,626 mi^2.

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

GAGE.--Water-stage recorder. Datum of gage is 3,158.38 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Apr. 16, 1963, and June 13, 1964, to Mar. 31, 1965, water-stage recorder at site 1.2 mi upstream at different datum. Apr. 1, 1965, to July 31, 1966, water-stage recorder at site 1,300 ft downstream at present datum.

REMARKS.--No estimated daily discharges during year. Records good. Figures of discharge given herein are sum of river flow and flow of Bighorn Canal. Some regulation by 14 reservoirs in Wyoming with combined capacity of 1,400,000 acre-ft and complete regulation by Bighorn Lake (see preceding page) since Nov. 3, 1965. Diversions for irrigation of about 375,000 acres upstream from station. 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.--53 years, 3,582 ft^3/s, 2,595,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,400 ft^3/s, June 16, 1935; minimum observed, 49 ft^3/s, Mar. 29, 1966, result of discharge measurement (dam closure); minimum daily, 112 ft^3/s, Apr. 2, 1967.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,650 ft^3/s, Mar. 29; minimum daily, 1,360 ft^3/s, Oct. 16.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3930	3960	3790	3230	2890	2850	3920	2800	2250	3220	2460	2240
2	3940	3960	3800	3220	2890	2850	3930	2780	2290	3220	2460	2230
3	3960	3960	3790	3220	2890	2850	3920	2770	2340	3240	2470	2220
4	3970	3970	3790	3230	2890	2840	3920	2770	2730	3230	2480	2200
5	3980	3970	3810	3230	2880	2840	3890	2760	2760	3240	2480	2180
6	4000	3970	3800	3220	2870	2840	3910	2750	2750	3260	2480	2180
7	4020	3970	3800	3230	2870	2840	3910	2770	2760	3250	2470	2170
8	4030	3970	3810	3230	2880	2830	3910	2770	2780	3250	2440	2130
9	4050	3970	3820	3230	2880	2830	3900	2750	2800	3250	2440	2050
10	4060	3970	3810	3230	2870	2890	2950	2740	2790	3160	2420	2050
11	4080	3970	3820	3230	2880	2950	2900	2710	2800	3040	2430	2040
12	4090	3970	3810	3220	2860	2950	2890	2710	2800	3050	2410	2030
13	4110	3970	3810	3210	2860	2950	2880	2710	3100	3070	2400	2020
14	4130	3970	3810	3210	2860	2940	2860	2720	3110	2580	2390	2010
15	3040	3980	3810	2940	2860	2940	2860	2680	3130	2570	2380	2010
16	1360	3990	3810	2930	2860	2940	2860	2700	3160	2550	2370	1990
17	4170	3990	3810	2930	2860	2940	2870	2690	3140	2550	2360	1980
18	4360	3990	3830	2920	2850	2940	2850	2700	3140	2380	2340	1980
19	4360	3990	3530	2920	2850	2940	2850	2670	3160	2380	2340	1960
20	4350	3980	3520	2910	2850	2940	2850	2670	3160	2380	2330	1950
21	4360	3980	3510	2920	2850	2940	2840	2500	3170	2390	2410	1940
22	4370	3990	3510	2920	2860	2940	2840	2410	3160	2400	2400	1930
23	4370	3990	3510	2920	2850	2940	2830	2320	3170	2390	2390	1920
24	4370	3990	3520	2900	2840	2950	2850	2310	3170	2400	2390	1910
25	3950	3790	3510	2900	2840	2930	2840	2310	3180	2410	2350	1900
26	3950	3780	3520	2900	2840	2920	2830	2310	3190	2410	2290	1890
27	3960	3780	3520	2900	2830	3870	2840	2280	3210	2430	2280	1870
28	3950	3790	3530	2910	2840	3930	2820	2270	3210	2440	2270	1850
29	3950	3790	3530	2900	---	3930	2810	2260	3210	2450	2260	1840
30	3960	3790	3520	2900	---	3920	2800	2250	3210	2440	2250	1830
31	3960	---	3530	2890	---	3920	---	2260	---	2450	2240	---
TOTAL	123140	118140	114290	94650	80150	95080	95130	80100	88830	85480	73880	60500
MEAN	3972	3938	3687	3053	2862	3067	3171	2584	2961	2757	2383	2017
MAX	4370	3990	3830	3230	2890	3930	3930	2800	3210	3260	2480	2240
MIN	1360	3780	3510	2890	2830	2830	2800	2250	2250	2380	2240	1830
AC-FT	244200	234300	226700	187700	159000	188600	188700	158900	176200	169500	146500	120000

CAL YR 1986 TOTAL 1474090 MEAN 4039 MAX 7740 MIN 1360 AC-FT 2924000
WTR YR 1987 TOTAL 1109370 MEAN 3039 MAX 4370 MIN 1360 AC-FT 2200000

YELLOWSTONE RIVER BASIN

06288500 BIGHORN RIVER NEAR HARDIN, MT

LOCATION.--Lat 45°43'46", long 107°34'52", in NE¼SE¼ sec.24, T.1 S., R.33 E., Big Horn County, Hydrologic Unit 10080015, at site of former gaging station, 1/2 mi upstream from Little Bighorn River, and 2 mi east of Hardin.

DRAINAGE AREA.--20,722 mi^2.

PERIOD OF RECORD.--Water years 1951, 1969-74, June to September 1987.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE:. December 1962 to September 1974.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE (water years 1963-74):. Maximum (1962-64, 1967-74), 26.0°C, Aug. 10, 1963, July 21, 22, 1964; minimum, 0.0°C, on many days during winter periods most years.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)
JUN 02...	1015	2160	0	0	870	17.0	10.0	8.40	300	130	72
JUL 29...	0820	2320	60	1	832	29.0	17.5	8.20	280	130	66
AUG 19...	0915	2220	0	0	865	19.5	15.0	8.30	280	110	70
SEP 09...	0810	2400	0	0	840	11.5	15.0	8.40	280	130	71

DATE	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
JUN 02...	28	75	2	4.0	163	300	16	0.40	6.3	600	0.82
JUL 29...	27	79	2	3.8	148	270	10	0.50	4.5	550	0.75
AUG 19...	25	73	2	3.7	165	250	11	0.20	6.3	540	0.73
SEP 09...	25	77	2	3.5	150	270	11	0.40	8.1	560	0.76

DATE	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)
JUN 02...	3500	0.110	2	120	<1	<10	7	<5	16	1
JUL 29...	3440	<0.100	--	110	--	--	<3	--	--	--
AUG 19...	3230	0.320	--	120	--	--	8	--	--	--
SEP 09...	3600	0.330	--	100	--	--	5	--	--	--

06288600 LITTLE BIGHORN RIVER BELOW DAYTON GULCH, NEAR BURGESS JUNCTION, WY

LOCATION.--Lat 44°50'23", long 107°45'18", in SW¼SE¼SW¼ sec.12, T.56 N., R.91 W., Sheridan County, Hydrologic Unit 10080016, Big Horn National Forest, on left bank 150 ft downstream from Dayton Gulch and 12 mi northwest of Burgess Junction.
DRAINAGE AREA.--15.9 mi^2.
PERIOD OF RECORD.--October 1982 to September 1987 (discontinued).
GAGE.--Water-stage recorder. Elevation of gage is 8,240 ft above National Geodetic Vertical Datum of 1929, from topographic map.
REMARKS.--Estimated daily discharges: Oct. 10-29, 31, Nov. 1-12, 18, 22, 23, 26, 27, Dec. 17-23, 25, 26, 28-31, Jan. 19, 29, 30, Feb. 1, 2, 25, 26, Mar. 18-23, 25-29, and Apr. 3-10, 12-14, 20,21. Records good except those for estimated daily discharges, which are poor, No diversion upstream from station.
AVERAGE OF DISCHARGE.--5 years, 17.1 ft^3/s, 12,400 acre-ft/yr.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 373 ft^3/s, June 2, 1986, gage height, 3.63 ft; minimum daily, 2.3 ft^3/s, Mar. 27, 1985.
Peak discharges for water years 1983-86 greater than base discharge of 100 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage Height (ft)	Date	Time	Discharge (ft^3/s)	Gage Height (ft)
May 28, 1983	1900	154	2.61	May 8, 1985	1800	*114	*2.33
June 3, 1983	1830	147	2.56	May 24, 1985	1800	101	2.21
June 11, 1983	2130	*368	*3.61				
May 20, 1984	1930	127	2.39	June 2, 1986	1700	*373	*3.63
May 31, 1984	1830	302	3.31				
June 15, 1984	1700	*329	*3.42				

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 100 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage Height (ft)	Date	Time	Discharge (ft^3/s)	Gage Height (ft)
Apr. 30	1830	*173	*2.72	May 7	1930	130	2.45

Minimum daily discharge, 2.6 ft^3/s, Mar. 27, Apr. 3.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.4	6.8	5.3	4.5	3.6	3.3	2.7	102	54	18	11	7.5
2	10	6.4	5.3	4.6	3.5	3.2	2.7	69	48	18	10	7.5
3	8.1	6.6	5.2	4.6	3.5	3.1	2.6	44	44	17	10	7.4
4	8.4	6.6	5.3	4.6	3.5	3.1	3.0	46	42	17	10	8.3
5	8.2	6.2	5.3	4.3	3.4	3.2	3.3	67	39	16	9.9	9.1
6	8.2	5.8	5.3	4.3	3.4	3.1	3.6	81	36	16	9.9	7.8
7	8.3	5.2	5.2	4.2	3.5	3.1	3.8	79	36	15	10	10
8	8.7	5.0	5.2	4.2	3.4	3.1	3.7	75	40	15	10	8.1
9	8.5	5.6	5.3	4.2	3.4	3.1	3.6	72	41	16	9.8	7.6
10	8.1	5.8	5.4	4.2	3.3	2.9	3.3	55	38	19	9.7	7.5
11	7.7	6.0	5.3	4.3	3.3	2.8	3.0	55	33	30	9.6	7.4
12	7.1	6.2	5.1	4.2	3.3	2.8	2.9	54	31	19	9.4	7.2
13	7.6	6.6	5.1	4.2	3.2	2.9	2.8	49	29	17	9.2	7.2
14	8.1	6.6	5.1	3.9	3.3	2.9	3.0	44	28	15	9.1	7.1
15	8.2	6.5	5.0	3.7	3.1	2.8	3.3	40	28	15	9.4	7.1
16	8.1	6.3	5.0	3.7	3.2	2.8	4.1	43	27	15	9.6	7.1
17	7.8	6.3	5.0	3.7	3.2	2.8	5.3	48	26	16	8.8	7.0
18	7.7	6.2	4.9	3.7	3.1	2.7	6.4	44	25	16	8.6	7.0
19	7.6	6.3	5.0	4.0	3.1	2.8	7.6	38	27	14	8.5	6.8
20	7.7	6.3	5.0	4.2	3.1	2.7	6.4	39	24	14	8.1	7.1
21	7.7	6.3	5.0	4.2	3.2	2.7	5.4	35	23	13	7.7	7.2
22	7.6	6.0	4.9	4.1	3.2	2.7	6.5	34	25	14	7.6	7.2
23	7.7	6.2	4.9	3.9	3.1	2.7	12	31	24	13	7.9	7.2
24	7.6	6.2	4.9	3.8	3.1	2.7	22	33	22	13	8.1	7.1
25	7.6	6.1	4.9	3.7	3.1	2.7	29	37	21	13	16	7.1
26	7.6	6.0	4.9	3.7	3.1	2.7	48	33	20	13	11	7.1
27	7.6	6.0	5.0	3.7	3.1	2.6	78	36	20	12	8.8	7.1
28	7.4	5.8	4.8	3.7	3.3	2.7	85	46	19	13	8.2	6.9
29	7.2	5.6	4.8	3.7	---	2.7	90	50	19	12	7.8	6.9
30	7.1	5.6	4.7	3.7	---	2.8	103	56	18	11	7.7	6.9
31	7.0	---	4.6	3.7	---	2.8	---	60	---	11	7.6	---
TOTAL	244.6	183.1	156.7	125.2	91.6	89.0	556.0	1595	907	476	289.0	222.5
MEAN	7.89	6.10	5.05	4.04	3.27	2.87	18.5	51.5	30.2	15.4	9.32	7.42
MAX	10	6.8	5.4	4.6	3.6	3.3	103	102	54	30	16	10
MIN	7.0	5.0	4.6	3.7	3.1	2.6	2.6	31	18	11	7.6	6.8
AC-FT	485	363	311	248	182	177	1100	3160	1800	944	573	441

CAL YR 1986	TOTAL	7569.4	MEAN	20.7	MAX	319	MIN	2.7	AC-FT	15010
WTR YR 1987	TOTAL	4935.7	MEAN	13.5	MAX	103	MIN	2.6	AC-FT	9790

06288700 DRY FORK BELOW LICK CREEK, NEAR BURGESS JUNCTION, WY

LOCATION.--Lat 44°53'06", long 107°36'48", in SW¼NW¼SE¼ sec.28, T.57 N., R.89 W., Sheridan County, Hydrologic Unit 10080016, Bighorn National Forest, on left bank 15 ft downstream from Lick Creek, 5.2 mi upstream from mouth, and 9 mi northwest of Burgess Junction.

DRAINAGE AREA.--54.1 mi^2.

PERIOD OF RECORD.--October 1982 to September 1987 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 6,100 ft above National Geodetic Vertical Datum of 1929, from topographic map. Supplementary gage on right bank 15 ft downstream at datum 0.49 ft higher.

REMARKS.--No estimated daily discharges. Records good. No diversion upstream from station.

AVERAGE DISCHARGE.--5 years, 43.4 ft^3/s, 31,440 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 429 ft^3/s, May 31, 1984, gage height, 3.23 ft; minimum daily, 11 ft^3/s, Nov. 10, 1986.

Peak discharges for water years 1983-86 greater than base discharge of 100 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage Height (ft)	Date	Time	Discharge (ft^3/s)	Gage Height (ft)
May 28, 1983	2030	208	2.29	May 3, 1985	2300	*102	*1.58
June 12, 1983	0030	*325	*2.77				
May 20, 1984	2400	281	a2.12	May 4, 1986	2400	101	a1.00
May 31, 1984	2200	*429	a*2.89	May 21, 1986	2400	121	a1.15
June 16, 1984	0200	360	a2.55	June 4, 1986	0400	*296	a*2.23

a Supplementary gage datum.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 100 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage Height (ft)	Date	Time	Discharge (ft^3/s)	Gage Height (ft)
Apr. 28	1930	*127	*1.74	No other peak greater than base discharge.			

Minimum daily discharge, 11 ft^3/s, Nov. 10.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	23	23	20	19	18	18	89	67	46	38	28
2	28	23	23	21	19	18	17	75	64	46	37	28
3	28	26	19	21	19	18	18	60	62	45	37	28
4	28	25	19	21	19	18	19	57	61	45	36	31
5	30	25	25	20	19	19	19	60	62	45	35	30
6	28	21	24	20	18	18	21	63	61	44	35	28
7	27	22	23	20	18	18	21	68	60	44	36	33
8	27	19	23	19	18	18	22	71	63	44	35	29
9	27	13	19	19	18	18	21	71	64	44	34	28
10	26	11	20	20	18	18	20	68	62	45	34	28
11	25	22	24	21	18	18	20	67	59	54	34	27
12	23	20	23	20	18	17	19	68	59	46	34	27
13	27	25	22	20	18	18	19	67	58	44	34	26
14	28	27	22	20	19	18	19	65	59	43	34	26
15	27	27	22	16	19	18	21	63	57	42	33	26
16	27	29	22	16	18	18	24	64	57	43	33	26
17	26	29	20	21	18	18	28	70	56	43	32	26
18	26	26	21	23	19	17	33	65	55	42	32	26
19	26	25	22	21	19	18	34	64	56	41	31	26
20	26	25	23	20	17	17	29	64	54	40	31	26
21	26	25	21	20	19	17	27	60	53	40	31	25
22	26	24	22	20	19	17	31	58	53	41	31	25
23	26	24	22	20	19	17	38	58	52	39	31	25
24	26	24	22	20	18	18	48	59	51	38	32	25
25	26	24	22	20	18	17	59	59	50	38	39	25
26	26	23	22	19	17	18	72	58	49	38	34	25
27	26	24	22	19	20	16	83	64	48	42	31	25
28	26	24	21	19	18	15	88	65	48	40	30	25
29	25	24	21	19	---	13	89	67	47	39	29	24
30	26	23	21	19	---	18	90	66	46	39	29	24
31	25	---	20	20	---	19	---	68	---	39	28	---
TOTAL	822	702	675	614	516	543	1067	2021	1693	1319	1030	801
MEAN	26.5	23.4	21.8	19.8	18.4	17.5	35.6	65.2	56.4	42.5	33.2	26.7
MAX	30	29	25	23	20	19	90	89	67	54	39	33
MIN	23	11	19	16	17	13	17	57	46	38	28	24
AC-FT	1630	1390	1340	1220	1020	1080	2120	4010	3360	2620	2040	1590

CAL YR 1986	TOTAL	16461	MEAN	45.1	MAX	276	MIN	11	AC-FT	32650
WTR YR 1987	TOTAL	11803	MEAN	32.3	MAX	90	MIN	11	AC-FT	23410

06288975 ELKHORN CREEK ABOVE FULLER RANCH DITCH, NEAR PARKMAN, WY

LOCATION.--Lat 44°59'01", long 107°36'53", in SE¼NE¼SW¼ sec.21, T.58 N., R.89 W., Sheridan County, Hydrologic Unit 10080016, on right bank 68 ft upstream from Fuller Ranch Ditch, 1.5 mi upstream from mouth, and 15 mi west of Parkman.
DRAINAGE AREA.--4.58 mi^2.
PERIOD OF RECORD.--October 1982 to September 1987 (discontinued). No winter records during 1985.
GAGE.--Water-stage recorder. Elevation of gage is 4,840 ft above National Geodetic Vertical Datum of 1929, from topographic map.
REMARKS.--Estimated daily discharges: Nov. 10-14, Dec. 4, 5, 9-11, Jan. 1, 2, 9-11, 15-19, Feb. 20-28, Mar. 1-4, 27-30, and Apr. 16-28. Records good except those for November to April, which are poor. No diversions upstream from station.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 82 ft^3/s, May 15, 1984, gage height, 2.40 ft, from floodmarks; maximum gage height, 3.19 ft, Apr. 28, 1984 (backwater from ice); minimum daily discharge, 0.82 ft^3/s, Nov. 24, 1985.
REVISIONS.--Peak discharges for water years 1983-86 greater than base discharge of 8.0 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 29, 1983	0700	*18	*1.47	No peak greater than base discharge in 1985.			
June 6, 1983	1230	13	1.37				
Apr. 19, 1984	1700	8.6	1.22	May 22, 1986	1600	10	1.27
May 15, 1984	b2000	*82	c*2.40	June 4, 1986	1400	15	1.41
May 31, 1984	0500	30	1.74	June 10, 1986	0030	*23	*1.59
June 15, 1984	2400	22	1.56				

b-About
c-From floodmark

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8.0 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 18	unknown	8.6	a1.23	May 28	0430	*12	*1.35
Apr. 30	1100	9.5	1.25				

a-From recorded range-in-stage

Minimum daily discharge, 1.1 ft^3/s, Nov. 10, Jan. 16, Feb. 26, 27.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.5	1.6	1.6	1.2	1.2	1.3	1.6	9.8	7.7	2.7	2.1	1.7
2	1.6	1.6	1.6	1.3	1.3	1.4	1.6	9.5	6.7	2.6	2.1	1.7
3	1.6	1.6	1.6	1.4	1.3	1.4	1.6	8.3	6.2	2.7	2.1	1.7
4	1.6	1.6	1.5	1.4	1.3	1.4	1.7	7.0	5.8	2.7	2.1	1.9
5	2.1	1.6	1.6	1.4	1.3	1.4	1.9	6.2	5.5	2.7	2.1	2.1
6	1.9	1.6	1.6	1.4	1.3	1.4	2.1	5.8	5.5	2.7	2.1	1.8
7	1.8	1.7	1.6	1.4	1.3	1.4	2.4	6.0	5.1	2.6	2.1	2.4
8	1.8	1.6	1.6	1.4	1.3	1.4	2.7	6.2	4.9	2.4	2.1	2.2
9	1.9	1.4	1.5	1.3	1.3	1.4	3.0	7.0	4.7	2.6	1.8	2.1
10	1.9	1.1	1.3	1.3	1.3	1.4	3.0	7.5	4.5	2.6	1.8	2.1
11	1.8	1.2	1.5	1.4	1.3	1.4	3.0	7.2	4.1	4.1	1.8	2.1
12	1.7	1.4	1.6	1.4	1.3	1.4	3.0	6.6	3.9	3.1	1.8	2.1
13	1.7	1.5	1.6	1.4	1.2	1.4	2.8	6.2	3.8	2.8	1.8	2.1
14	1.7	1.5	1.6	1.3	1.2	1.4	2.8	5.8	3.8	2.7	1.8	1.9
15	1.7	1.5	1.5	1.2	1.2	1.4	2.8	5.5	3.8	2.6	1.8	2.0
16	1.7	1.5	1.5	1.1	1.2	1.4	3.2	5.3	3.6	2.6	1.8	2.1
17	1.7	1.5	1.5	1.2	1.2	1.4	6.6	5.2	3.4	2.6	1.7	1.9
18	1.7	1.5	1.5	1.2	1.2	1.4	8.6	4.9	3.3	2.4	1.7	1.9
19	1.7	1.5	1.5	1.3	1.2	1.4	8.0	4.7	3.4	2.4	1.7	1.9
20	1.7	1.4	1.4	1.3	1.2	1.4	6.8	4.5	3.3	2.3	1.7	1.9
21	1.7	1.4	1.4	1.3	1.2	1.4	5.4	4.3	3.3	2.3	1.7	1.8
22	1.7	1.4	1.4	1.2	1.2	1.6	4.8	4.1	3.1	2.2	1.7	1.8
23	1.7	1.4	1.4	1.2	1.2	1.5	5.0	3.9	3.1	2.1	1.7	1.8
24	1.7	1.4	1.4	1.2	1.2	1.4	5.2	3.8	2.8	1.9	1.7	1.8
25	1.7	1.5	1.4	1.2	1.2	1.4	5.6	3.8	2.7	1.9	2.4	1.8
26	1.7	1.5	1.4	1.2	1.1	1.5	6.8	4.5	2.7	1.9	3.0	1.9
27	1.7	1.5	1.4	1.2	1.1	1.3	7.6	7.8	2.7	2.1	2.3	1.9
28	1.7	1.5	1.4	1.3	1.2	1.2	8.5	12	2.7	2.1	2.2	1.9
29	1.7	1.5	1.4	1.3	---	1.6	8.9	10	2.7	2.2	2.1	1.9
30	1.6	1.5	1.4	1.2	---	1.9	9.2	9.2	2.7	2.2	1.9	1.9
31	1.6	---	1.4	1.2	---	2.1	---	8.9	---	2.2	1.7	---
TOTAL	53.3	44.5	46.1	39.8	34.5	44.8	136.2	201.5	121.5	77.0	60.4	58.1
MEAN	1.72	1.48	1.49	1.28	1.23	1.45	4.54	6.50	4.05	2.48	1.95	1.94
MAX	2.1	1.7	1.6	1.4	1.3	2.1	9.2	12	7.7	4.1	3.0	2.4
MIN	1.5	1.1	1.3	1.1	1.1	1.2	1.6	3.8	2.7	1.9	1.7	1.7
AC-FT	106	88	91	79	68	89	270	400	241	153	120	115

CAL YR 1986	TOTAL	928.70	MEAN	2.54	MAX	21	MIN	.92	AC-FT	1840
WTR YR 1987	TOTAL	917.7	MEAN	2.51	MAX	12	MIN	1.1	AC-FT	1820

06288990 WEST FORK LITTLE BIGHORN RIVER NEAR PARKMAN, WY

LOCATION.--Lat 44°59'54", long 107°37'58", in SW¼NW¼SE¼ sec.17, T.58 N., R.89 W., Sheridan County, Hydrologic Unit 10080016, on right bank 0.3 mi upstream from mouth and 16 mi west of Parkman.

DRAINAGE AREA.--38.2 mi^2.

PERIOD OF RECORD.--October 1969 to September 1972, October 1982 to September 1987, discontinued (no winter record during 1987).

GAGE.--Water-stage recorder. Elevation of gage is 4,430 ft above National Geodetic Vertical Datum of 1929, from topographic map. October 1969 to September 1972, at site 0.2 mi downstream at different datum.

REMARKS.--Estimated daily discharges: Apr. 1, 11, 19. Records good except those for April, which are fair. No diversions upstream from station.

AVERAGE DISCHARGE.--7 years (water years 1970-72, 1983-86), 29.0 ft^3/s, 21,010 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.-- Maximum discharge observed, 395 ft^3/s, June 10, 1970, gage height, 2.65 ft, site and datum then in use; maximum gage height recorded, 3.09 ft (backwater from ice, site and datum then in use) from recorded range in stage, during period Dec. 26, 1971 to Jan. 11, 1972, but may have been higher during periods of no gage-height record; minimum daily discharge, 6.0 ft^3/s, Jan. 5, 1970, Feb. 8, 1971.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base of 210 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 2	0130	*66	*1.77	No peak greater than base discharge.			

Minimum daily discharge during period of operation, 10 ft^3/s, Apr. 1-3.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15						10	62	50	20	16	13
2	15						10	62	47	20	16	13
3	15						10	49	43	19	16	13
4	14						11	42	39	19	16	14
5	16						13	43	37	19	15	15
6	15						13	45	36	19	15	14
7	15						13	48	34	18	16	16
8	14						14	50	32	18	16	15
9	14						14	52	31	18	16	14
10	13						13	51	32	19	16	14
11	13						13	48	30	25	16	13
12	13						12	45	29	21	16	13
13	14						12	45	28	20	16	14
14	14						12	43	27	19	16	14
15	14						13	41	27	18	15	13
16	14						14	40	26	18	15	13
17	14						16	39	25	18	14	13
18	14						19	38	24	18	14	13
19	13						19	36	25	18	14	13
20	13						18	35	23	17	14	13
21	13						16	33	23	17	14	13
22	13						17	30	22	18	14	13
23	13						18	29	22	17	13	13
24	13						22	28	21	17	13	12
25	13						29	27	20	16	16	12
26	13						36	27	20	16	15	12
27	13						41	35	20	17	14	12
28	13						50	34	20	16	14	12
29	13						53	39	20	16	14	12
30	13						54	44	20	16	14	12
31	13						---	49	---	16	14	---
TOTAL	425						605	1289	853	563	463	396
MEAN	13.7						20.2	41.6	28.4	18.2	14.9	13.2
MAX	16						54	62	50	25	16	16
MIN	13						10	27	20	16	13	12
AC-FT	843						1200	2560	1690	1120	918	785

06289000 LITTLE BIGHORN RIVER AT STATE LINE, NEAR WYOLA, MT

LOCATION.--Lat 45°00'25", long 107°36'52", in SW¼NW¼ sec.36, T.9 S., R.33 E., Bighorn County, Hydrologic Unit 10080016, on right bank 20 ft downstream from county bridge, 0.5 mi north of Wyoming-Montana State line, 1 mi downstream from West Fork, 13 mi southwest of Wyola, and at mile 115.2.

DRAINAGE AREA.--193 mi^2.

PERIOD OF RECORD.--March 1939 to current year. Prior to October 1940, published as Little Horn River at State Line, near Wyola.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 4,350 ft above National Geodetic Vertial Datum of 1929, from topographic map.

REMARKS.--No estimated daily discharges this year. 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. Diversions for irrigation of 163 acres upstream from station.

AVERAGE DISCHARGE.--48 years, 153 ft^3/s, 110,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,730 ft^3/s, June 3, 1944, gage height, 4.87 ft, from rating curve extended above 1,400 ft^3/s; maximum gage height recorded, 5.93 ft, June 9, 1944 (log jam); minimum discharge, 19 ft^3/s, Mar. 29, 1987, result of ice jam upstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 510 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 30	2100	*546	*2.61	No other peak greater than base discharge this year.			

Minimum discharge, 19 ft^3/s, Mar. 29, result of ice jam upstream.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	83	66	62	60	59	57	57	429	312	136	93	75
2	88	65	65	60	58	56	54	378	283	138	91	75
3	82	74	55	60	58	55	55	277	267	131	90	76
4	81	69	65	63	58	55	56	255	257	129	90	83
5	87	69	66	63	57	56	59	280	249	130	88	88
6	82	69	62	63	57	57	63	311	242	124	88	79
7	82	63	63	60	57	57	68	324	234	123	91	98
8	81	64	70	54	57	57	70	325	243	117	91	83
9	79	51	64	52	57	55	68	323	244	120	88	79
10	81	32	63	60	57	55	64	306	251	127	85	78
11	73	60	62	72	57	54	65	291	229	193	86	77
12	68	47	60	65	57	54	63	288	216	148	87	76
13	80	68	60	65	57	55	60	283	208	127	85	76
14	80	86	57	62	58	56	61	268	204	120	85	74
15	78	78	55	43	57	56	65	258	200	115	85	74
16	78	74	57	36	56	56	77	255	195	114	88	75
17	76	73	62	62	56	55	92	305	190	119	82	75
18	76	69	59	69	56	55	111	265	185	120	81	74
19	74	69	62	66	56	56	122	253	194	112	80	73
20	73	68	62	63	53	55	98	257	186	107	78	72
21	74	68	60	65	56	55	89	239	178	107	77	71
22	74	66	60	60	55	53	99	227	173	111	77	71
23	74	65	59	63	56	53	131	218	186	105	78	70
24	73	66	59	64	54	54	172	215	168	101	81	70
25	73	66	58	62	51	52	215	231	158	99	113	71
26	71	62	60	60	44	53	266	219	152	98	103	70
27	71	65	60	60	55	50	339	264	148	105	86	72
28	71	63	60	60	54	49	382	289	144	104	81	70
29	69	65	60	59	---	37	403	313	144	100	78	70
30	73	65	60	58	---	55	418	308	141	96	77	69
31	68	---	60	59	---	59	---	316	---	95	76	---
TOTAL	2373	1965	1887	1868	1563	1682	3942	8770	6181	3671	2659	2264
MEAN	76.5	65.5	60.9	60.3	55.8	54.3	131	283	206	118	85.8	75.5
MAX	88	86	70	72	59	59	418	429	312	193	113	98
MIN	68	32	55	36	44	37	54	215	141	95	76	69
AC-FT	4710	3900	3740	3710	3100	3340	7820	17400	12260	7280	5270	4490

CAL YR 1986 TOTAL 51626 MEAN 141 MAX 1320 MIN 29 AC-FT 102400
WTR YR 1987 TOTAL 38825 MEAN 106 MAX 429 MIN 32 AC-FT 77010

06289100 RED CANYON CREEK NEAR PARKMAN, WY

LOCATION.--Lat 44°58'42", long 107°35'09", in NW¼NE¼NE¼ sec.27, T.58 N., R.89 W., Sheridan County, Hydrologic Unit 10080016, on right bank 0.2 mi upstream from bridge on county road, 1.7 mi upstream from Fuller Ranch, 2.1 mi upstream from the Wyoming-Montana State line, 2.5 mi upstream from mouth (Powers Upper Ditch), and 13 mi west of Parkman.
DRAINAGE AREA.--3.20 mi^2.
PERIOD OF RECORD.--October 1982 to current year (no winter records during 1985, 1987).
GAGE.--Water-stage recorder. Elevation of gage is 4,810 ft above National Geodetic Vertical Datum of 1929, from topographic map.
REMARKS.--Estimated daily discharges: Mar. 1-4, 22, 27-31, and Apr. 1, 2. Records good except those for estimated daily discharges, which are poor. No diversions upstream from station.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 90 ft^3/s, May 15, 1984, gage height, 2.45 ft, from floodmarks; minimum daily, 0.14 ft^3/s, Dec. 19, 28-31, 1985, Jan. 1-7, 16, 17, 1986.
REVISIONS.--Peak discharges for water years 1983-86 greater than base discharge of 5.0 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 24, 1983	2100	9.2	1.65	No peak greater than base discharge in 1985			
May 9, 1983	0600	6.3	1.57				
May 27, 1983	0600	*12	*1.71				
Apr. 20, 1984	1530	12	1.69	May 5, 1986	0600	6.6	1.41
May 15, 1984	2330	*90	a*2.45	May 22, 1986	0200	6.6	1.41
May 31, 1984	0200	20	1.69	June 3, 1986	2400	8.6	1.46
June 15, 1984	2200	14	1.55	June 9, 1986	2130	*15	*1.59

a-From floodmarks

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5.0 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 18	1400	9.0	1.48	May 27	2200	*10	*1.50
Apr. 28	1600	7.4	1.43				

Minimum daily discharge during period of record, 0.31 ft^3/s, Aug. 23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.35					.40	.60	6.6	5.3	.64	.57	.51
2	.64					.44	.66	6.0	4.5	.71	.51	.57
3	.64					.45	.71	4.8	4.0	.71	.51	.57
4	.57					.45	.78	4.0	3.5	.64	.51	.78
5	1.1					.45	1.1	3.7	3.3	.57	.51	1.3
6	.71					.45	1.4	3.5	2.9	.57	.45	.87
7	.64					.45	2.1	3.5	2.7	.51	.51	1.4
8	.63					.40	2.5	3.5	2.5	.51	.51	1.2
9	.45					.35	3.1	3.3	2.5	.51	.45	1.1
10	.45					.40	3.3	3.3	2.3	.57	.45	.88
11	.45					.40	3.3	3.1	2.1	2.7	.51	.78
12	.35					.37	3.3	2.9	1.8	1.3	.51	.78
13	.35					.35	3.1	2.7	1.7	.87	.51	.78
14	.40					.35	2.9	2.5	1.5	.78	.51	.78
15	.40					.35	3.0	2.3	1.5	.77	.51	.70
16	.40					.35	3.5	2.3	1.5	.78	.51	.64
17	.40					.35	6.3	2.5	1.4	.78	.45	.64
18	.40					.35	8.6	2.3	1.3	.78	.45	.64
19	.45					.35	7.9	2.1	1.3	.78	.40	.64
20	.40					.40	6.0	2.1	1.2	.71	.35	.71
21	.40					.40	5.1	1.8	1.2	.64	.35	.64
22	.40					.40	4.6	1.8	1.2	.64	.35	.64
23	.36					.40	4.8	1.8	1.1	.64	.31	.64
24	.35					.45	4.8	2.0	.96	.64	.35	.64
25	.35					.45	5.1	2.0	.87	.64	.95	.64
26	.35					.45	6.0	2.1	.87	.57	2.1	.59
27	.35					.42	6.3	6.8	.78	.57	.88	.57
28	.35					.39	7.0	10	.78	.64	.64	.57
29	.35					.48	7.0	9.4	.78	.64	.64	.57
30	.35					.60	7.0	8.1	.73	.64	.57	.57
31	.35					.70	---	7.0	---	.57	.57	---
TOTAL	14.14					13.00	121.85	119.8	58.07	23.02	17.40	22.34
MEAN	.46					.42	4.06	3.86	1.94	.74	.56	.74
MAX	1.1					.70	8.6	10	5.3	2.7	2.1	1.4
MIN	.35					.35	.60	1.8	.73	.51	.31	.51
AC-FT	28					26	242	238	115	46	35	44

06289600 WEST PASS CREEK NEAR PARKMAN, WY

LOCATION.--Lat 44°59'16", long 107°28'56", in NE¼NE¼SE¼ sec.21, T.58 N., R.88 W., Sheridan County, Hydrologic Unit 10080016, on right bank, anchored to concrete headwall of culvert on county road and 7.6 mi northwest of Parkman. Prior to Mar. 27, 1986, at site 300 ft upstream.
DRAINAGE AREA.--15.4 mi^2.
PERIOD OF RECORD.--October 1982 to current year (no winter records since 1985).
GAGE.--Water-stage recorder. Elevation of gage is 4,550 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Apr. 2, 1985, at site 100 ft north (on abandoned channel) at datum 3.28 ft lower. Apr. 2, 1985 to Mar. 27, 1986, at site 300 ft upstream at datum 1.95 ft higher.
REMARKS.--Estimated daily discharge Oct. 31 and Mar. 1-5. Records good. Natural flow of stream affected by diversions for irrigation upstream from station.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 195 ft^3/s, May 16, 1984, gage height, 4.62 ft, site and datum then in use; maximum gage height, 4.76 ft, Apr. 28, 1984 (backwater from ice and snow), site and datum then in use; minimum daily discharge during periods of seasonal record, 3.8 ft^3/s, Aug. 26, 27, 1985.
Peak discharges for water years 1983-86 greater than base discharge of 20 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 26, 1982	--	--	a,b*2.74	Apr. 2, 1985	1630	24	a*2.55
May 6, 1983	2130	35	a2.29	May 2, 1985	1000	*25	a*2.55
May 27, 1983	2200	*50	a2.64				
Apr. 28, 1984	--	--	a,b*4.76	May 10, 1986	1600	27	1.21
May 4, 1984	1900	53	a2.82	June 4, 1986	0100	*45	*1.73
May 9, 1984	1600	132	a4.08	June 9, 1986	0900	43	1.66
May 16, 1984	0200	*195	a4.62				
May 31, 1984	1800	83	a3.17				

a - site and datum then in use.
b Backwater from ice.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 20 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 2	0900	*29	*1.22	July 11	1130	27	1.19
May 29	1400	26	1.17				

Minimum daily discharge during period of operation, 5.1 ft^3/s, Mar. 27.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.4					6.2	10	28	18	8.5	7.9	7.3
2	11					6.2	8.2	28	17	8.7	7.9	7.2
3	9.0					6.2	10	26	16	9.1	7.8	7.0
4	8.2					6.4	10	23	15	9.0	7.7	8.2
5	9.9					6.4	9.6	22	14	8.7	7.5	8.4
6	8.5					6.4	9.3	22	14	8.5	7.3	7.4
7	8.2					6.1	9.2	21	14	8.4	7.6	9.9
8	8.1					6.2	9.6	20	13	8.4	7.5	8.0
9	8.0					5.7	10	20	13	8.7	7.2	7.8
10	9.0					6.1	10	19	13	9.3	7.1	7.9
11	8.5					6.1	11	19	12	17	7.1	7.9
12	7.9					6.2	11	18	11	10	7.4	7.9
13	8.3					6.3	11	17	11	9.4	7.4	7.8
14	8.1					6.2	11	16	11	9.0	7.3	7.8
15	7.8					6.1	12	14	11	8.6	7.4	7.7
16	7.8					6.2	13	14	11	8.2	7.4	7.7
17	7.7					6.6	14	16	11	8.9	7.1	7.8
18	7.6					6.4	16	15	9.7	9.0	7.1	8.0
19	7.4					7.1	18	14	9.7	8.2	7.0	7.6
20	7.2					6.7	17	14	9.4	7.8	6.5	7.3
21	7.2					6.3	16	14	9.2	8.0	6.4	7.2
22	7.2					5.9	17	13	9.3	8.1	6.6	7.2
23	7.2					6.4	18	13	9.1	8.0	6.6	7.3
24	7.2					6.4	19	12	8.9	7.8	6.9	7.5
25	7.2					6.7	22	12	8.7	7.9	10	7.4
26	7.2					6.6	25	12	8.6	8.0	12	7.1
27	7.0					5.1	27	20	8.3	8.2	7.9	7.0
28	7.2					5.2	27	19	8.4	8.3	7.7	7.8
29	7.2					5.5	27	20	8.5	8.3	7.6	7.6
30	7.1					7.3	27	20	8.4	7.9	7.6	7.3
31	7.0					13	---	19	---	8.0	7.4	---
TOTAL	245.3					200.2	454.9	560	341.2	271.9	233.9	230.0
MEAN	7.91					6.46	15.2	18.1	11.4	8.77	7.55	7.67
MAX	11					13	27	28	18	17	12	9.9
MIN	7.0					5.1	8.2	12	8.3	7.8	6.4	7.0
AC-FT	487					397	902	1110	677	539	464	456

YELLOWSTONE RIVER BASIN

06289820 EAST PASS CREEK NEAR DAYTON, WY

LOCATION.--Lat 44°59'23", long 107°25'20", in SE¼SE¼NE¼ sec.24, T.58 N., R.88 W., Sheridan County, Hydrologic Unit 10080016, on left bank 0.3 mi downstream from bridge on county road, 5.0 mi northwest of Parkman, and 11.2 mi northwest of Dayton.

DRAINAGE AREA.--21.7 mi^2.

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

GAGE.--Water-stage recorder. Elevation of gage is 4,410 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 9-14, 18, 19, Dec. 1, 4, 9-12, 15, 17-21, 26, Jan. 1-27, Feb. 20-22, 24-28, Mar. 1, 22, 28-31, and Apr. 1, 2. Records good except those for estimated daily discharges, which are poor. Several small reservoirs upstream from station, combined capacity, 415 acre-ft, for irrigation. Diversions for irrigation of about 2,900 acres upstream from station.

AVERAGE DISCHARGE.--5 years, 14.4 ft^3/s, 10,420 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 197 ft^3/s, May 16, 1984, gage height, 3.14 ft; maximum gage height, 3.47 ft, Dec. 18, 1984 (backwater from ice); minimum daily discharge, 2.5 ft^3/s, Aug. 10, 11, 1987.

Date	Time	(ft^3/s)	(ft)	Date	Time	(ft^3/s)	(ft)
Apr. 25, 1983	0900	26	1.68	Dec. 18, 1974	--	--	a*3.47
May 29, 1983	0930	*81	*2.37	No peak greater than base discharge in 1985.			
June 12, 1983	0800	66	2.16				
Apr. 20, 1984	1030	43	1.87	Feb. 24, 1986	1430	43	1.78
May 16, 1984	0230	*197	*3.14	May 22, 1986	1800	48	1.86
May 31, 1984	2130	115	2.47	June 4, 1986	0130	75	2.16
June 16, 1984	0430	101	2.34	June 9, 1986	2400	*104	*2.42

a Backwater from ice.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 25 ft^3/s and maximum (*):

Date	Time	(ft^3/s)	(ft)	Date	Time	(ft^3/s)	(ft)
Jan. 22	2030	ice jam	*2.22	May 2	0230	*36	1.69
Apr. 19	0900	27	1.54	June 1	1630	27	1.54

Minimum daily discharge, 2.5 ft^3/s, Aug. 10, 11.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	8.6	10	7.9	8.5	8.2	11	33	26	7.4	3.2	9.0
2	12	8.7	10	8.1	8.6	8.5	11	36	26	7.3	3.1	8.9
3	12	8.5	10	8.2	8.4	8.7	12	32	24	7.5	3.0	9.5
4	11	8.7	10	8.5	8.4	9.2	13	28	23	7.2	3.0	11
5	12	8.8	10	8.3	8.1	9.2	13	26	22	6.5	2.7	11
6	11	9.7	9.6	8.1	8.5	9.2	14	25	21	6.4	2.7	10
7	9.9	8.8	9.3	7.8	9.2	9.0	14	24	20	5.5	3.1	13
8	9.9	8.5	9.8	7.7	9.1	9.5	15	25	20	5.4	2.9	12
9	9.9	7.8	9.5	7.8	8.9	9.1	15	23	19	5.7	2.7	11
10	11	7.0	9.2	8.1	8.7	9.1	15	23	18	6.4	2.5	10
11	10	8.0	9.4	8.5	8.6	9.4	16	22	15	13	2.5	10
12	9.6	9.0	9.6	8.8	8.6	9.4	15	20	13	8.6	2.8	9.9
13	9.7	9.0	9.7	8.6	8.7	9.9	15	19	12	7.2	2.7	9.8
14	9.7	9.4	9.5	8.3	8.9	9.7	15	18	11	7.0	2.8	9.7
15	9.5	9.7	9.2	8.2	8.7	9.5	15	17	11	10	2.8	9.8
16	9.4	9.6	9.1	8.0	8.4	9.4	16	17	11	6.1	2.9	9.8
17	9.2	9.3	8.7	8.3	8.4	9.5	19	19	11	6.8	2.7	9.9
18	9.3	9.0	8.5	8.4	8.4	9.3	24	18	12	8.2	2.6	9.9
19	9.3	9.4	8.6	8.1	8.4	9.7	26	18	13	7.7	3.6	9.8
20	9.3	9.6	8.6	8.1	8.3	9.9	23	18	10	5.5	6.5	9.4
21	8.9	11	8.6	8.1	8.2	9.9	20	17	9.1	3.4	6.2	9.1
22	8.7	11	8.7	8.2	8.2	9.8	19	16	9.3	3.4	6.3	9.1
23	8.8	9.9	8.9	8.3	8.2	9.9	19	15	9.0	3.3	6.1	9.0
24	9.2	11	8.7	8.5	8.0	9.8	19	15	8.8	3.0	6.4	8.9
25	8.7	12	8.7	8.7	7.9	9.9	22	15	8.4	3.1	12	9.0
26	8.4	10	8.5	8.6	7.7	9.9	25	14	7.2	3.0	14	8.7
27	8.8	9.9	8.7	8.7	7.7	9.8	27	20	6.4	3.0	11	8.7
28	9.5	10	8.8	8.7	7.9	9.6	30	20	6.4	3.6	9.9	8.8
29	8.8	9.8	8.8	8.7	---	9.4	31	23	6.4	3.4	9.4	8.6
30	8.9	10	8.4	8.5	---	10	33	24	6.8	3.4	9.3	8.6
31	8.9	---	8.2	8.3	---	11	---	25	---	3.4	9.1	---
TOTAL	301.3	281.7	283.3	257.1	235.6	294.4	562	665	415.8	181.4	160.5	291.9
MEAN	9.72	9.39	9.14	8.29	8.41	9.50	18.7	21.5	13.9	5.85	5.18	9.73
MAX	12	12	10	8.8	9.2	11	33	36	26	13	14	13
MIN	8.4	7.0	8.2	7.7	7.7	8.2	11	14	6.4	3.0	2.5	8.6
AC-FT	598	559	562	510	467	584	1110	1320	825	360	318	579

CAL YR 1986	TOTAL	5019.0	MEAN	13.8	MAX	100	MIN	5.6	AC-FT	9960
WTR YR 1987	TOTAL	3930.0	MEAN	10.8	MAX	36	MIN	2.5	AC-FT	7800

YELLOWSTONE RIVER BASIN

06289870 TWIN CREEK NEAR PARKMAN, WY

LOCATION.--Lat 44°59'37", long 107°21'18", in SE¼NW¼NW¼ sec.22, T.58 N., R.87 W., Sheridan County, Hydrologic Unit 10080016, on right bank 0.5 mi downstream from culvert on county road, 0.7 mi northwest of intersection of county road and U.S. Highway 87, and 2.8 mi north of Parkman.

DRAINAGE AREA.--27.0 mi^2.

PERIOD OF RECORD.--October 1982 to current year (no winter records since 1985).

REVISED RECORDS.--WDR WY-86: 1984(M).

GAGE.--Water-stage recorder. Elevation of gage is 4,120 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Oct. 31, Mar. 1-3, 28-30, and June 23-30. Records good except those for estimated daily discharges, which are poor. Natural flow of stream affected by diversions for irrigation upstream from station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 377 ft^3/s, Feb. 24, 1986, gage height, 7.44 ft (affected by backwater from trash and snow), from floodmark, from rating curve extended above 160 ft^3/s on basis of culvert measurement of peak flow; minimum daily discharge during period of operation, 0.23 ft^3/s, Aug. 8, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 36 ft^3/s, Apr. 1, gage height, 1.63 ft; minimum daily during period of operation, 0.32 ft^3/s, Aug. 5.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.2					1.4	30	5.9	5.8	1.4	.44	1.2
2	1.7					2.4	22	7.1	3.7	2.9	.39	.91
3	2.3					5.2	15	7.0	2.9	3.0	.37	.84
4	1.9					9.2	19	6.4	2.2	2.9	.37	1.1
5	2.0					13	18	5.8	.92	2.5	.32	2.1
6	1.7					9.4	15	5.1	.68	2.6	.35	2.2
7	1.4					7.1	12	4.7	.69	3.5	.38	3.9
8	1.3					6.2	9.4	4.3	.84	3.4	.43	5.1
9	1.2					5.5	8.6	3.7	2.5	3.4	.36	4.1
10	1.2					4.7	8.4	3.1	3.4	2.7	.34	2.7
11	1.3					4.5	7.0	2.8	3.1	3.3	.36	2.0
12	1.3					4.4	7.0	1.9	2.8	4.8	.36	1.5
13	1.3					4.2	6.8	1.2	.88	4.9	.38	1.1
14	1.3					4.0	6.4	.72	2.3	4.5	.38	.96
15	1.1					3.9	6.1	1.4	1.6	4.2	.35	.81
16	1.1					3.6	5.8	.86	2.0	4.0	.39	.78
17	1.1					4.2	5.9	3.1	1.9	4.2	.37	.74
18	1.1					4.8	7.0	4.5	1.5	4.8	.34	.69
19	1.1					5.2	7.9	4.4	1.1	4.1	.34	.57
20	1.1					7.0	8.1	4.7	1.1	3.8	.34	.57
21	1.0					7.9	7.5	4.7	.90	3.5	.37	.57
22	1.1					7.1	7.1	4.7	1.6	3.5	.37	.47
23	1.0					5.3	6.9	4.4	2.0	2.7	.37	.47
24	1.0					3.9	6.8	4.0	1.4	.64	.57	.44
25	.99					4.8	6.6	3.6	1.3	.64	2.3	.57
26	.99					5.6	6.3	3.5	1.2	.61	6.7	.67
27	1.0					6.1	6.1	5.3	1.1	.58	9.2	.68
28	1.0					5.0	6.0	8.8	1.0	.55	6.1	.69
29	.99					4.3	5.9	8.7	1.1	.50	3.6	.52
30	1.0					4.8	5.9	10	.90	.47	2.2	.49
31	1.0					7.5	---	7.7	---	.44	1.5	---
TOTAL	38.77					172.2	290.5	144.08	54.41	85.03	40.64	39.44
MEAN	1.25					5.55	9.68	4.65	1.81	2.74	1.31	1.31
MAX	2.3					13	30	10	5.8	4.9	9.2	5.1
MIN	.99					1.4	5.8	.72	.68	.44	.32	.44
AC-FT	77					342	576	286	108	169	81	78

06290000 PASS CREEK NEAR WYOLA, MT

LOCATION.--Lat 45°03'23", long 107°21'19", in NE¼NE¼SE¼ sec.13, T.9 S., R.35 E., Big Horn County, Hydrologic Unit 10080016, on right bank 125 ft downstream from bridge on U.S. Highway 87, 2.0 mi downstream of Twin Creek, 5.5 mi south of Wyola, and at mile 10.2.

DRAINAGE AREA.--111 mi^2. Drainage area at site used prior to Sept. 30, 1956, 119 mi^2.

PERIOD OF RECORD.--June 1935 to September 1956 (no winter records prior to 1939), October 1982 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,920 ft above National Geodetic Vertical Datum of 1929, from topographic map. Dec. 21, 1950, to Sept. 30, 1956, water-stage recorder, and June 4, 1935, to Dec. 20, 1950, nonrecording gage at site 0.3 mi upstream at different datum. Flow is equivalent.

REMARKS.--Estimated daily discharges: Oct. 9-12, Nov. 6 to Mar. 6, Mar. 29, 30, May 10-26. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 2,500 acres upstream of station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--23 years (water years 1939-56, 1983-87), 36.1 ft^3/s, 26,150 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 1,150 ft^3/s, June 4, 1944, gage height, 4.82 ft, from rating curve extended above 400 ft^3/s; maximum gage height observed, 6.22 ft, Mar. 25, 1943 (ice jam); no flow Aug. 3, 9, 10, 1935.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 100 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 1	0400	*118	*3.24	No other peak greater than base discharge this year.			

Minimum discharge, 6.0 ft^3/s, Aug. 14.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	19	e16	e14	e21	e20	97	73	53	14	6.9	15
2	30	19	e23	e16	e20	e20	62	77	50	12	6.7	14
3	31	20	e17	e15	e22	e20	50	79	44	12	7.2	13
4	25	19	e14	e17	e20	e26	64	67	43	14	8.3	15
5	28	19	e16	e16	e18	e29	58	62	38	13	8.5	23
6	24	e17	e15	e16	e20	e28	51	59	36	12	6.9	19
7	22	e12	e14	e13	e25	26	47	56	36	12	6.9	24
8	21	e11	e14	e11	e35	23	43	54	36	11	8.6	24
9	e20	e8.0	e11	e16	e29	22	42	62	37	12	7.9	21
10	e19	e6.2	e11	e22	e23	21	41	e90	41	14	8.0	19
11	e19	e9.0	e15	e27	e20	22	39	e60	38	32	7.5	17
12	e20	e9.0	e14	e30	e19	22	41	e45	33	37	7.1	17
13	21	e10	e15	e27	e18	23	40	39	29	20	7.3	16
14	21	e15	e14	e22	e19	24	40	e35	25	18	6.7	15
15	21	e14	e16	e10	e18	23	39	e45	25	16	8.4	15
16	20	e13	e15	e10	e18	23	38	e60	27	14	9.7	14
17	20	e17	e14	e12	e17	26	43	e80	25	14	8.8	15
18	19	e16	e14	e15	e17	28	48	e70	23	23	7.5	15
19	19	e19	e13	e14	e16	30	52	e70	24	20	7.3	15
20	19	e16	e13	e13	e17	35	52	e75	22	18	7.5	14
21	19	e16	e13	e15	e16	33	47	e70	18	15	8.1	13
22	19	e21	e15	e15	e16	36	45	e60	18	15	8.0	13
23	20	e19	e14	e22	e17	35	45	e50	19	14	8.1	13
24	20	e17	e14	e16	e16	32	47	e70	17	12	8.9	15
25	21	e19	e14	e19	e16	29	51	e80	18	9.3	26	16
26	20	e17	e14	e21	e16	31	56	e90	16	9.3	37	16
27	19	e19	e14	e22	e15	32	62	86	15	9.9	33	15
28	19	e21	e13	e22	e16	27	64	76	16	10	25	15
29	19	e19	e14	e22	---	e21	65	60	15	10	20	16
30	20	e17	e15	e18	---	e32	67	64	14	11	18	16
31	20	---	e14	e21	---	48	---	56	---	8.5	16	---
TOTAL	658	473.2	448	549	540	847	1536	2020	851	462.0	361.8	488
MEAN	21.2	15.8	14.5	17.7	19.3	27.3	51.2	65.2	28.4	14.9	11.7	16.3
MAX	31	21	23	30	35	48	97	90	53	37	37	24
MIN	19	6.2	11	10	15	20	38	35	14	8.5	6.7	13
AC-FT	1310	939	889	1090	1070	1680	3050	4010	1690	916	718	968

CAL YR 1986 TOTAL 11814.9 MEAN 32.4 MAX 520 MIN 5.3 AC-FT 23430
WTR YR 1987 TOTAL 9234.0 MEAN 25.3 MAX 97 MIN 6.2 AC-FT 18320

e Estimated

06290500 LITTLE BIGHORN RIVER BELOW PASS CREEK, NEAR WYOLA, MT

LOCATION.--Lat 45°10'38", long 107°23'36", in W½SW¼ sec.35, T.7 S., R.35 E., Big Horn County, Hydrologic Unit 10080016, on right bank 3.5 mi north of Wyola, 6 mi downstream from Pass Creek, and at mile 92.3.

DRAINAGE AREA.--428 mi^2.

PERIOD OF RECORD.--March 1939 to December 1958, August 1959 to September 1975, October 1976 to current year. Prior to October 1940, published as Little Horn River below Pass Creek, near Wyola.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,600 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Oct. 10, 11, Nov. 6-17, Dec. 9-22, Dec. 28 to Jan. 4, Jan. 8, 9, 14-16, 24, 25, Mar. 29, 30. Records good except those for estimated daily discharges, 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 8,300 acres upstream from station.

AVERAGE DISCHARGE.--46 years, 211 ft^3/s, 152,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,010 ft^3/s, May 19, 1978, gage height, 10.02 ft, from rating curve extended above 2,800 ft^3/s on basis of slope-area measurement of peak flow; minimum, 12 ft^3/s, Aug. 5, 7, 8, 1961, gage height, 0.89 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 1	0630	*588	*3.40	No peaks greater than base discharge this year.			

Minimum daily discharge, 45 ft^3/s, Nov. 10.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	138	116	110	e100	95	96	210	514	349	132	105	104
2	163	111	114	e120	99	99	169	505	334	128	101	102
3	189	115	110	e110	98	101	141	396	307	135	101	100
4	147	117	103	e100	101	111	153	339	287	148	101	105
5	157	116	108	93	96	118	152	339	269	133	97	143
6	148	e110	112	96	98	115	144	367	250	130	96	129
7	138	e100	109	95	105	109	135	365	245	122	98	125
8	134	e80	107	e100	119	108	131	385	255	117	105	138
9	132	e60	e105	e105	117	104	137	363	260	116	98	123
10	e130	e45	e100	120	112	100	130	336	282	127	93	116
11	e128	e80	e100	131	106	101	127	297	258	272	90	112
12	128	e70	e100	127	103	100	130	274	232	247	95	110
13	129	e100	e100	119	102	99	124	265	211	163	96	108
14	131	e140	e96	e96	104	101	119	240	196	145	95	107
15	129	e135	e94	e60	103	99	118	228	197	134	103	106
16	128	e130	e96	e75	100	98	121	215	192	126	111	105
17	126	e125	e98	106	97	103	130	258	191	135	105	108
18	125	125	e100	158	97	105	149	252	195	171	100	109
19	125	125	e96	152	96	105	171	241	202	142	98	108
20	124	136	e100	187	90	112	175	261	193	129	97	107
21	124	144	e98	176	89	111	160	257	175	121	90	105
22	123	159	e98	192	90	102	151	236	170	130	91	103
23	123	142	98	212	98	106	161	214	186	127	98	101
24	123	138	96	e180	91	108	188	202	165	123	100	98
25	123	143	95	e150	85	103	228	207	156	117	139	95
26	121	127	99	134	87	109	272	210	145	118	185	97
27	119	128	95	112	88	114	340	278	139	115	156	96
28	117	123	e92	97	94	104	444	385	137	121	134	94
29	117	119	e90	100	---	e86	459	378	141	114	121	94
30	118	119	e90	97	---	e80	492	365	138	112	113	93
31	118	---	e90	94	---	132	---	353	---	108	110	---
TOTAL	4075	3478	3099	3794	2760	3239	5761	9525	6457	4258	3322	3241
MEAN	131	116	100	122	98.6	104	192	307	215	137	107	108
MAX	189	159	114	212	119	132	492	514	349	272	185	143
MIN	117	45	90	60	85	80	118	202	137	108	90	93
AC-FT	8080	6900	6150	7530	5470	6420	11430	18890	12810	8450	6590	6430

CAL YR 1986 TOTAL 69832 MEAN 191 MAX 1620 MIN 45 AC-FT 138500
WTR YR 1987 TOTAL 53009 MEAN 145 MAX 514 MIN 45 AC-FT 105100

e Estimated

YELLOWSTONE RIVER BASIN

06291000 OWL CREEK NEAR LODGE GRASS, MT

LOCATION.--Lat 45°16'05", long 107°18'03", in NW¼NE¼SE¼, sec.33, T.6 S., R.36 E., Big Horn County, Hydrologic Unit 10080016, on right bank 1.4 mi downstream from Sioux Pass Creek, 5.0 mi southeast of Lodge Grass, and at mile 7.0.

DRAINAGE AREA.--163 mi^2.

PERIOD OF RECORD.--April 1939 to September 1945, October 1979 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,460 ft, from topographic map. April 1939 to September 1945, recording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 4 to Mar. 13, Mar. 30, 31. Records fair except those for estimated daily discharges, which are poor. Numerous diversions for irrigation upstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous waterquality data in the back of this report.

AVERAGE DISCHARGE.--14 years (water years 1940-45, 1980-87), 10.7 ft^3/s, 7,750 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,020 ft^3/s, June 18, 1944, gage height, 14.18 ft; maximum gage height, 14.50 ft Mar. 18, 1944 (ice jam); no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 60 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 29	0245	*117	*5.34	No other peak greater than base discharge this year.			

Minimum discharge, 0.95 ft^3/s, Aug. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.6	4.5	e5.8	e7.0	e9.5	e10	24	3.9	13	3.3	3.1	1.9
2	5.1	4.5	e7.4	e7.6	e9.5	e11	29	5.0	9.8	3.9	2.6	2.3
3	6.8	4.5	e6.4	e7.0	e9.5	e13	15	6.4	7.8	2.0	2.2	1.8
4	8.8	e4.3	e6.8	e7.6	e10	e16	20	5.7	7.8	2.8	2.1	2.0
5	7.3	e4.3	e6.8	e7.0	e9.0	e18	28	4.3	6.3	3.2	2.1	5.7
6	5.7	e3.7	e6.6	e6.6	e9.5	e16	26	3.6	6.2	2.8	1.8	6.6
7	5.0	e3.0	e6.6	e5.5	e11	e14	20	3.6	5.7	3.5	1.5	6.6
8	4.5	e3.0	e6.6	e4.5	e11	e12	15	3.2	5.7	2.3	1.8	4.8
9	4.1	e2.3	e5.4	e5.0	e10	e10	13	3.0	6.1	2.2	2.0	4.2
10	4.0	e1.8	e5.4	e5.8	e10	e8.5	13	2.9	6.4	2.5	1.7	3.7
11	4.3	e2.2	e6.8	e7.0	e10	e8.0	12	2.8	6.4	6.6	1.8	3.0
12	5.0	e2.3	e6.4	e9.0	e9.5	e8.5	9.9	3.4	6.1	24	1.3	2.7
13	5.0	e2.6	e7.0	e8.0	e9.5	e9.0	9.4	3.2	5.9	24	1.4	2.7
14	4.7	e3.5	e6.4	e7.0	e11	9.4	8.0	2.6	5.3	11	1.4	2.5
15	5.2	e3.3	e7.6	e5.0	e11	9.6	7.1	2.8	5.2	7.8	1.6	2.5
16	4.5	e3.2	e6.8	e5.0	e10	9.0	6.7	4.2	5.0	5.8	2.1	2.0
17	4.3	e4.2	e6.0	e6.0	e10	8.2	6.4	9.6	5.4	5.2	2.2	2.2
18	4.3	e3.8	e6.0	e7.0	e10	8.8	6.0	8.4	5.7	6.8	2.3	2.3
19	4.2	e5.0	e6.0	e6.6	e9.5	9.0	5.6	7.7	5.4	19	2.0	2.5
20	4.3	e4.0	e6.4	e6.4	e9.5	10	5.5	8.5	5.8	11	1.8	2.7
21	4.3	e4.3	e6.2	e6.8	e9.5	11	5.5	8.9	5.6	7.2	1.5	2.7
22	4.4	e5.6	e6.8	e6.8	e10	9.8	5.3	8.6	5.2	7.2	1.2	2.6
23	4.3	e5.0	e7.0	e9.0	e10	9.0	5.2	7.4	5.2	5.4	1.3	2.5
24	4.4	e4.5	e6.8	e6.0	e9.0	9.2	4.8	5.9	5.7	5.4	1.1	2.5
25	4.3	e5.4	e6.6	e7.0	e8.0	9.2	4.6	5.1	4.8	4.7	6.4	2.7
26	4.2	e4.5	e6.8	e8.0	e7.0	9.9	3.9	5.9	4.2	4.5	15	2.4
27	4.3	e6.0	e7.0	e8.6	e7.0	13	4.2	11	3.5	4.4	14	2.3
28	4.2	e7.0	e6.4	e9.0	e7.5	12	4.0	56	2.9	4.3	7.4	2.4
29	4.3	e6.2	e7.0	e9.0	---	9.4	3.7	86	2.7	3.9	4.2	2.7
30	4.4	e6.0	e9.0	e8.0	---	e8.0	3.6	37	2.8	3.4	2.7	2.9
31	4.4	---	e8.0	e9.5	---	e10	---	23	---	3.3	2.1	---
TOTAL	150.2	124.5	206.8	218.3	267.0	328.5	324.4	349.6	173.6	203.4	95.7	90.4
MEAN	4.85	4.15	6.67	7.04	9.54	10.6	10.8	11.3	5.79	6.56	3.09	3.01
MAX	8.8	7.0	9.0	9.5	11	18	29	86	13	24	15	6.6
MIN	4.0	1.8	5.4	4.5	7.0	8.0	3.6	2.6	2.7	2.0	1.1	1.8
AC-FT	298	247	410	433	530	652	643	693	344	403	190	179

CAL YR 1986 TOTAL 4768.0 MEAN 13.1 MAX 250 MIN 1.1 AC-FT 9460
WTR YR 1987 TOTAL 2532.4 MEAN 6.94 MAX 86 MIN 1.1 AC-FT 5020

e Estimated

06291200 LODGE GRASS CREEK AT STATE LINE, NEAR WYOLA, MT

LOCATION.--Lat 45°00'21", long 107°46'27", in NW¼NW¼SE¼ sec.34, T.9 S., R.32 E., Big Horn County, Hydrologic Unit 10080016, on left bank 4.2 mi upstream from North Fork Lodge Grass Creek, 25 mi southwest of Wyola, 32 mi southwest of Lodge Grass, and at mile 58.4.
DRAINAGE AREA.--16.7 mi^2.
PERIOD OF RECORD.--October 1982 to current year (no winter record in water year 1986).
GAGE.--Water-stage recorder. Elevation of gage is 6,060 ft above National Geodetic Vertical Datum of 1929, from topographic map.
REMARKS.--Estimated daily discharges: Oct. 12, Nov. 6-14, 18, 25, 26, 30, Dec. 1-5, 7-11, 17-19, Jan. 1, 6-11, 14-19, Feb. 16, 17, 19-28, Mar. 9, 20-31, and Apr. 2. Records good except those November to March, which are poor. No diversion upstream from station.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 349 ft^3/s, June 4, 1986, gage height, 2.84 ft; minimum daily, 2.0 ft^3/s, Dec. 11, 1982, result of freezeup.

Peak discharges for water years 1983-86 greater than base discharge of 70 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 28, 1983	2000	158	2.00	May 24, 1985	1800	*74	*1.54
June 11, 1983	2300	*225	*2.33				
June 18, 1983	1800	166	2.04				
May 15, 1984	2000	151	1.97	May 21, 1986	2100	81	1.77
May 31, 1984	1600	*240	*2.38	June 4, 1986	0300	*349	*2.84
June 16, 1984	1700	228	2.33				

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 70 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 30	2100	90	1.61	May 31	1800	*115	*1.77
May 8	1900	87	1.60				

Minimum daily discharge, 3.5 ft^3/s, Jan. 15.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.4	6.7	6.1	4.5	4.2	4.4	4.4	81	69	22	12	8.4
2	8.7	6.8	6.0	4.6	4.4	4.4	4.3	66	64	21	11	8.3
3	8.3	7.4	6.0	4.5	4.4	4.3	4.6	49	64	20	11	8.3
4	8.6	7.3	6.0	4.4	4.4	4.5	4.8	48	60	19	11	8.3
5	9.9	7.3	6.2	4.2	4.4	4.7	5.2	57	57	19	11	9.5
6	9.1	6.8	6.0	4.1	4.5	4.6	6.0	62	56	17	11	8.8
7	8.9	6.4	6.0	4.1	4.6	4.5	6.5	65	54	17	11	11
8	9.0	6.0	5.8	4.0	4.5	4.2	6.9	67	52	17	11	9.0
9	8.8	5.2	5.4	3.7	4.6	4.1	6.6	68	54	17	10	8.7
10	8.3	5.6	5.0	3.9	4.7	4.2	6.5	65	56	20	10	8.1
11	7.6	5.8	5.8	3.9	4.6	4.2	6.4	62	50	28	9.9	8.0
12	8.8	6.2	5.8	3.9	4.6	4.3	6.6	62	45	21	9.9	8.0
13	8.5	6.6	5.8	3.9	4.6	4.5	6.1	60	43	18	9.9	7.6
14	8.2	6.8	5.6	3.8	4.6	4.5	6.4	57	41	17	9.9	7.6
15	8.2	7.0	5.5	3.5	4.6	4.4	7.0	56	40	16	9.9	7.6
16	8.1	7.0	5.5	3.7	4.4	4.4	8.2	56	39	15	9.9	7.6
17	8.0	7.0	5.4	3.9	4.6	4.4	11	59	36	15	9.8	7.6
18	7.8	7.0	5.4	4.0	4.6	4.4	13	51	35	15	9.5	7.6
19	7.8	7.0	5.4	4.2	4.5	4.5	14	48	37	15	9.5	7.3
20	7.8	6.8	5.5	4.3	4.2	4.4	11	47	33	14	9.1	7.0
21	7.7	6.9	5.5	4.3	4.4	4.2	11	42	31	14	9.1	7.0
22	7.8	6.7	5.5	4.3	4.5	4.3	12	40	30	15	9.1	7.0
23	7.8	6.7	5.3	4.4	4.5	4.3	15	38	30	14	9.1	7.0
24	7.7	6.8	5.3	4.4	4.3	4.3	21	38	28	14	9.1	7.0
25	7.6	6.6	5.3	4.3	4.1	4.4	30	40	27	13	11	7.0
26	7.5	6.4	5.1	4.4	4.1	4.3	43	38	26	13	10	7.0
27	7.6	6.7	5.0	4.1	4.3	4.3	58	50	25	13	9.4	6.9
28	7.5	6.6	4.9	4.2	4.4	4.1	71	58	24	13	9.1	6.8
29	7.3	6.4	4.8	4.0	---	3.9	74	61	23	13	8.7	6.8
30	7.7	6.2	4.7	4.1	---	4.1	77	64	22	13	8.7	6.7
31	7.4	---	4.6	4.1	---	4.4	---	81	---	12	8.5	---
TOTAL	252.4	198.7	170.2	127.7	124.6	134.5	557.5	1736	1251	510	308.1	233.5
MEAN	8.14	6.62	5.49	4.12	4.45	4.34	18.6	56.0	41.7	16.5	9.94	7.78
MAX	9.9	7.4	6.2	4.6	4.7	4.7	77	81	69	28	12	11
MIN	7.3	5.2	4.6	3.5	4.1	3.9	4.3	38	22	12	8.5	6.7
AC-FT	501	394	338	253	247	267	1110	3440	2480	1010	611	463

WTR YR 1987 TOTAL 5604.2 MEAN 15.4 MAX 81 MIN 3.5 AC-FT 11120

YELLOWSTONE RIVER BASIN

06291500 LODGE GRASS CREEK ABOVE WILLOW CREEK DIVERSION, NEAR WYOLA, MT

LOCATION.--Lat 45°07'39", long 107°36'01", in SE¼NE¼NE¼ sec.24, T.8 S., R.33 E., Big Horn County, Hydrologic Unit 10080016, on left bank 0.2 mi upstream from Willow Creek diversion canal, 1.1 mi downstream from Spring Creek, 10 mi west of Wyola, 17 mi southwest of Lodge Grass, and at mile 43.0.

DRAINAGE AREA.--80.7 mi^2.

PERIOD OF RECORD.--March 1939 to September 1974, October 1982 to current year.

REVISED RECORDS.--WSP 1559: 1944-47. WSP 1629: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 4,170 ft, from topographic map. March 1939 to September 1974 recording gage 0.1 mi upstream at different datum. Flows are equivalent.

REMARKS.--Estimated daily discharges: Nov. 8-17, Dec. 26 to Jan. 25, Mar. 29. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 400 acres upstream of station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--40 years (1939-74, 1983-87), 49.3 ft^3/s, 35,720 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,130 ft^3/s, June 9, 1964, gage height, 6.14 ft, from rating curve extended above 600 ft^3/s; minimum daily, 3.0 ft^3/s, Jan. 17, 18, 25, 30, 31, 1950, Jan. 15, 16, 1954.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 270 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 31	2330	*185	*3.06	No peaks greater than base discharge this year.			

Minimum daily discharge, 6.0 ft^3/s, Nov. 10.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	18	17	e14	18	18	42	142	166	39	30	21
2	28	18	17	e14	18	19	28	140	145	42	29	21
3	30	17	17	e14	18	19	33	106	129	36	28	20
4	23	17	16	e14	18	21	35	89	117	36	28	24
5	26	17	16	e13	17	20	31	91	107	36	27	29
6	22	20	16	e13	17	19	29	105	102	36	27	24
7	22	20	16	e12	18	17	25	110	96	35	27	25
8	21	e17	16	e11	19	18	24	118	94	34	28	24
9	21	e12	16	e12	18	19	25	125	91	34	26	22
10	22	e6.0	18	e12	17	19	26	124	96	37	25	22
11	23	e9.0	19	e13	17	19	24	118	91	65	24	22
12	20	e7.5	18	e15	17	19	25	114	85	48	25	22
13	20	e8.0	17	e15	17	19	24	114	79	41	25	22
14	20	e9.0	17	e14	17	19	23	106	74	38	25	22
15	20	e11	18	e12	17	19	22	100	72	35	25	20
16	20	e15	18	e12	16	19	23	98	69	34	25	20
17	20	e17	17	e13	16	19	24	108	66	34	25	21
18	19	19	17	e14	17	19	29	96	64	36	23	21
19	19	25	18	e15	17	20	34	92	65	35	23	21
20	19	26	17	e15	17	21	35	92	60	33	22	21
21	19	29	16	e16	16	19	32	82	57	32	21	21
22	19	24	17	e16	17	19	31	75	55	33	21	21
23	19	21	16	e17	18	17	32	68	55	33	21	21
24	19	21	16	e14	17	18	36	66	50	33	22	21
25	19	22	e15	e15	18	19	45	66	47	31	31	19
26	19	20	e16	16	17	19	59	68	45	31	31	19
27	19	20	e16	18	17	20	77	119	43	30	26	19
28	18	19	e15	19	20	18	105	124	42	30	23	20
29	18	17	e15	19	---	e18	121	132	42	30	23	20
30	18	17	e15	18	---	18	131	135	40	30	22	20
31	18	---	e15	18	---	38	---	150	---	30	22	---
TOTAL	642	518.5	513	453	486	605	1230	3273	2344	1107	780	645
MEAN	20.7	17.3	16.5	14.6	17.4	19.5	41.0	106	78.1	35.7	25.2	21.5
MAX	30	29	19	19	20	38	131	150	166	65	31	29
MIN	18	6.0	15	11	16	17	22	66	40	30	21	19
AC-FT	1270	1030	1020	899	964	1200	2440	6490	4650	2200	1550	1280

CAL YR 1986 TOTAL 16195.4 MEAN 44.4 MAX 519 MIN 6.0 AC-FT 32120
WTR YR 1987 TOTAL 12596.5 MEAN 34.5 MAX 166 MIN 6.0 AC-FT 24990

e Estimated

06294000 LITTLE BIGHORN RIVER NEAR HARDIN, MT

LOCATION.--Lat 45°44'09", long 107°33'24", in SE¼NE¼NE¼ sec.19, T.1 S., R.34 E., Big Horn County, Hydrologic Unit 10080016, on left bank 50 ft downstream from bridge on Sarpy Road, 0.2 mi upstream of terminal wasteway of Agency Canal, 0.6 mi upstream from mouth, and 2.3 mi east of Hardin.

WATER-DISCHARGE RECORDS

DRAINAGE AREA.--1,294 mi^2.

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

REVISED RECORDS.--WDR MT-86-1: 1978.

GAGE.--Water-stage recorder. Datum of gage is 2,882.29 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 7, 1953, nonrecording gage at site 0.4 mi downstream. Oct. 7, 1953, to May 6, 1963, water-stage recorder at site 0.3 mi downstream. May 6, 1963, to Nov. 6, 1963, nonrecording gage at site 0.4 mi downstream. All at different datums. Nov. 7, 1963, to Aug. 15, 1976, water-stage recorder at site 35 ft downstream at present datum. Aug. 15, 1976, to Sept. 30, 1979, water-stage recorders were located on each bank downstream of Sarpy Road bridge and were used depending on control conditions.

REMARKS.--Estimated daily discharges: Nov. 5 to Mar. 5. Water-discharge records good except those for estimated daily discharges, which are poor. Flow partly regulated by Willow Creek Reservoir (capacity 23,000 acre-ft). Diversions for irrigation of 20,980 acres upstream from station. Figures of discharge given herein include flow of terminal wasteway of Agency Canal. 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.--34 years, 306 ft^3/s, 221,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,600 ft^3/s, May 19, 1978, gage height, 11.20 ft, used gage height obtained at bridge on Sarpy Road; maximum gage height, 11.78 ft, Mar. 20, 1960, site and datum then in use (backwater from ice); minimum discharge observed, 0.20 ft^3/s, Aug. 7, 1961, result of discharge measurement.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 29	1600	*747	*3.56	No peak greater than base discharge this year.			

Minimum daily discharge, 40 ft^3/s, Nov. 10.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	169	151	e140	e125	e470	e80	168	490	491	89	122	123
2	167	150	e145	e130	e460	e90	274	532	461	82	122	119
3	176	152	e140	e125	e450	e105	317	565	445	86	107	122
4	198	150	e135	e150	e450	e125	246	502	416	86	109	118
5	200	e135	e130	e140	e480	e145	240	394	383	93	109	142
6	178	e123	e130	e140	e470	187	269	350	356	110	104	157
7	189	e107	e135	e120	e450	200	254	364	321	92	101	168
8	168	e87	e135	e100	e420	197	235	360	313	80	96	152
9	158	e60	e110	e85	e430	186	226	354	314	71	105	159
10	158	e40	e90	e85	e410	173	220	367	283	63	115	151
11	158	e80	e130	e100	e250	165	218	352	313	111	103	140
12	164	e70	e120	e130	e200	158	213	311	295	201	94	133
13	170	e110	e130	e160	e170	151	208	266	256	332	70	129
14	165	e180	e120	e180	e150	157	202	243	235	256	81	125
15	159	e175	e140	e170	e140	156	190	217	217	177	81	123
16	157	e160	e130	e150	e140	155	183	189	209	141	88	124
17	155	e180	e120	e130	e130	157	179	210	203	147	108	117
18	52	e170	e115	e120	e125	156	180	247	190	218	120	117
19	150	e190	e115	e110	e120	160	191	302	189	251	92	120
20	148	e170	e115	e130	e115	165	215	281	198	239	75	121
21	147	e180	e120	e170	e115	178	236	309	215	219	71	121
22	148	e200	e130	e150	e115	187	231	330	197	211	65	128
23	148	e190	e140	e170	e100	183	216	311	164	191	67	121
24	148	e170	e130	e160	e75	164	212	290	151	181	67	116
25	152	e180	e120	e190	e80	169	217	270	161	157	91	110
26	149	e170	e115	e220	e72	166	246	280	138	150	154	106
27	150	e170	e110	e260	e76	174	300	326	125	141	214	110
28	152	e160	e105	e300	e74	182	351	485	119	134	216	109
29	151	e150	e110	e360	---	177	432	723	117	127	195	105
30	151	e135	e130	e420	---	157	474	679	118	129	176	102
31	151	---	e120	e470	---	143	---	539	---	117	135	---
TOTAL	4886	4345	3855	5450	6737	4948	7343	11438	7593	4682	3453	3788
MEAN	158	145	124	176	241	160	245	369	253	151	111	126
MAX	200	200	145	470	480	200	474	723	491	332	216	168
MIN	52	40	90	85	72	80	168	189	117	63	65	102
AC-FT	9690	8620	7650	10810	13360	9810	14560	22690	15060	9290	6850	7510

CAL YR 1986 TOTAL 102007 MEAN 279 MAX 2420 MIN 40 AC-FT 202300
WTR YR 1987 TOTAL 68518 MEAN 188 MAX 723 MIN 40 AC-FT 135900

e Estimated

YELLOWSTONE RIVER BASIN

06294000 LITTLE BIGHORN RIVER NEAR HARDIN, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1970-79, October 1986 to September 1987.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1969 to September 1979.
WATER TEMPERATURE: October 1969 to September 1979.
SUSPENDED-SEDIMENT DISCHARGE: October 1969 to September 1977.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1970-79): Maximum daily, 1,870 microsiemens, Apr. 7, 1979; minimum daily, 377 microsiemens, June 18, 1974.
WATER TEMPERATURE (water years 1970-79): Maximum, 30.0°C, Aug. 9, 12, 1971; minimum, 0.0°C, on many days during winter periods.
SEDIMENT CONCENTRATION (water years 1970-77): Maximum daily mean, 6,660 mg/L, Mar. 20, 1975; minimum daily mean, 7 mg/L, Oct. 29, 30, 1973, SEP. 4, 1976.
SEDIMENT LOAD (water years 1970-77): Maximum daily, 58,000 tons, May 9, 1975; minimum daily, 1.9 tons, Sep. 4, 1976.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT							
01...	0937	149	--	--	722	7.5	12.0
15...	1454	160	--	--	740	16.5	12.0
DEC							
05...	1045	136	--	--	825	-1.0	0.5
JAN							
09...	0840	89	--	--	775	-15.0	0.0
FEB							
27...	1517	75	--	--	535	--	0.5
APR							
10...	1005	215	--	--	970	10.0	12.0
MAY							
12...	1017	292	--	--	425	25.0	19.0
JUN							
02...	1115	455	0	0	646	17.0	14.5
04...	0945	419	--	--	575	19.5	16.0
JUL							
07...	0954	90	--	--	760	--	--
29...	0910	118	70	1	712	28.0	26.0
AUG							
07...	1208	81	--	--	655	16.5	19.5
19...	1020	80	0	0	709	23.0	18.5
SEP							
09...	0945	157	0	0	642	15.0	16.0

DATE	TIME	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
JUN									
02...	1115	8.30	290	75	67	29	38	1	2.5
JUL									
29...	0910	8.20	280	92	58	34	49	1	2.7
AUG									
19...	1020	8.20	280	88	56	34	45	1	3.7
SEP									
09...	0945	8.20	270	120	56	31	37	1	2.3

06294000 LITTLE BIGHORN RIVER NEAR HARDIN, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)
JUN 02...	212	140	4.1	0.20	8.0	420	0.57	511	<0.100
JUL 29...	193	200	3.9	0.30	6.5	470	0.64	150	<0.100
AUG 19...	192	180	4.4	0.30	5.0	440	0.60	96	<0.100
SEP 09...	151	150	4.8	0.20	6.3	380	0.51	160	<0.100

DATE	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BORON, DISSOLVED (UG/L AS B) (01020)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)
JUN 02...	--	70	--	--	<3	--	--	--	--
JUL 29...	1	140	1	20	7	<5	5	<0.1	<1
AUG 19...	--	130	--	--	8	--	570	--	--
SEP 09...	--	100	--	--	5	--	--	--	--

YELLOWSTONE RIVER BASIN

06294500 BIGHORN RIVER ABOVE TULLOCK CREEK, NEAR BIGHORN, MT

LOCATION.--Lat 46°07'29", long 107°28'06", in SE¼SE¼NE¼ sec.3, T.4 N., R.34 E., Treasure County, Hydrologic Unit 10080015, on right bank, 1.9 mi upstream from Tullock Creek, 3.0 mi upstream from mouth, 3.6 mi southwest of Bighorn, and 4.5 mi southeast of Custer.

DRAINAGE AREA.--22,414 mi^2. Area at site used Oct. 7, 1955, to Sept. 30, 1981, 22,885 mi^2.

PERIOD OF RECORD.--October 1981 to current year. Previously published as "06294700 Bighorn River at Bighorn, MT" 1956-81, and as "near Custer" 1945-55. Flows are equivalent at all sites.

GAGE.--Water-stage recorder. Elevation of gage is 2,700 ft above National Geodetic Vertical Datum of 1929, from topographic map. May 11 to Dec. 6, 1945, nonrecording gage, and Dec. 7, 1945, to Oct. 6, 1955, water-stage recorder 1.7 mi upstream at different datum. Oct. 7, 1955, to Sept. 30, 1981, at site 2.3 mi downstream at different datum.

REMARKS.--No estimated daily discharges this year. Records good. Flow regulated by Bighorn Lake beginning November 1965 (usable capacity, 1,356,000 acre-ft). Major regulation prior to November 1965 by 14 reservoirs in Wyoming and 1 in Montana with combined usable capacity of about 1,400,000 acre-ft. Diversion for irrigation of about 445,200 acres upstream from station. 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.--42 years (water years 1945-81, 1982-87), 3,914 ft^3/s, 2,836,000 acre-ft/yr, unadjusted.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 59,200 ft^3/s, May 20, 1978, gage height, 14.15 ft; maximum gage height recorded, 14.21 ft, Apr. 2, 1965 (ice jam); minimum discharge, about 275 ft^3/s, Nov. 15, 1959, result of freezeup; minimum daily, 400 ft^3/s, Apr. 4, 1967.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,700 ft^3/s, July 4, 1983, gage height, 5.66 ft, maximum gage height, 8.65 ft, Jan. 13, 1985 (ice jam); minimum daily discharge, 1,220 ft^3/s, Oct. 18, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,800 ft^3/s, Apr. 3, gage height, 3.26 ft; minimum daily, 1,620 ft^3/s, Oct. 17.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4270	4040	4020	3600	2990	3010	4560	3390	2990	3010	2500	2750
2	4340	4060	4070	3320	3000	3040	4700	3460	2900	2990	2520	2710
3	4340	4090	4030	3320	2990	3040	4770	3550	2870	3000	2490	2690
4	4360	4080	4010	3320	3010	3080	4690	3450	2910	3030	2420	2670
5	4370	4110	3990	3350	3000	3060	4620	3310	3160	3070	2450	2760
6	4320	4170	4060	3360	3000	3060	4640	3160	3150	3100	2450	2710
7	4340	4210	4020	3330	3010	3060	4690	3070	3110	3050	2530	2710
8	4310	4220	4050	3300	3010	3090	4660	3040	3030	3030	2570	2670
9	4310	4230	4020	3320	3010	3090	4650	2950	2990	3040	2620	2640
10	4300	4080	3940	3270	3020	3060	4520	2920	2950	3050	2680	2550
11	4290	4080	3960	3290	3040	3110	3550	2910	2910	3240	2640	2470
12	4280	4080	4000	3320	3040	3150	3530	2810	2890	3440	2630	2450
13	4310	4040	3990	3340	3050	3160	3500	2690	2840	3580	2590	2370
14	4320	4080	3970	3340	3060	3200	3500	2560	3060	3420	2610	2340
15	4340	4140	4000	3360	3060	3170	3470	2500	3060	2870	2640	2250
16	3250	4150	3970	3420	3040	3150	3420	2320	3040	2750	2690	2240
17	1620	4200	3980	3210	3030	3180	3350	2490	2970	2730	2690	2310
18	4210	4180	3940	2990	3040	3170	3410	2650	3000	2840	2620	2270
19	4310	4240	3900	2960	3030	3210	3420	2680	2980	2680	2550	2230
20	4340	4250	3630	2980	3010	3250	3480	2800	3050	2620	2520	2210
21	4360	4350	3600	2990	3030	3250	3460	2980	3060	2580	2510	2180
22	4380	4460	3620	3040	3010	3250	3400	2850	3090	2680	2600	2170
23	4410	4440	3650	3000	3030	3250	3350	2820	3140	2650	2630	2150
24	4420	4490	3640	2990	3030	3240	3330	2680	3120	2650	2710	2120
25	4390	4400	3650	3000	3000	3220	3180	2640	3100	2620	2860	2100
26	4030	4130	3640	3000	3030	3240	3210	2700	3110	2600	3170	2080
27	4030	4180	3630	3010	2970	3300	3280	2850	3110	2570	3240	2070
28	4040	4140	3620	2980	2980	4420	3290	3500	3080	2540	3080	2070
29	4030	4100	3600	2990	---	4450	3360	3630	3090	2490	2910	2030
30	4050	4100	3640	2980	---	4450	3420	3430	3060	2550	2830	2000
31	4060	---	3640	2990	---	4460	---	3100	---	2490	2790	---
TOTAL	128730	125520	119480	98670	84520	102870	114410	91890	90820	88960	82740	70970
MEAN	4153	4184	3854	3183	3019	3318	3814	2964	3027	2870	2669	2366
MAX	4420	4490	4070	3600	3060	4460	4770	3630	3160	3580	3240	2760
MIN	1620	4040	3600	2960	2970	3010	3180	2320	2840	2490	2420	2000
AC-FT	255300	249000	237000	195700	167600	204000	226900	182300	180100	176500	164100	140800

CAL YR 1986 TOTAL 1609150 MEAN 4409 MAX 9050 MIN 1620 AC-FT 3192000
WTR YR 1987 TOTAL 1199580 MEAN 3287 MAX 4770 MIN 1620 AC-FT 2379000

YELLOWSTONE RIVER BASIN

06294700 BIGHORN RIVER AT BIGHORN, MT

(National stream quality accounting network station)

LOCATION.--Lat 46°08'50", long 107°28'00", in NE¼NE¼NE¼ sec.33, T.5 N., R.34 E., Treasure County, Hydrologic Unit 10080015, on right bank 150 ft downstream from bridge on old U.S. Highway 10, 0.3 mi downstream from bridge on Interstate Highway 94, 0.7 mi upstream from mouth, 1.3 mi southwest of Bighorn, and 4.4 mi east of Custer.

DRAINAGE AREA.--22,885 mi^2. Area at site used prior to Oct. 7, 1955, 22,410 mi2.

PERIOD OF RECORD.--Water years 1946 to current year. Prior to October 1948, published as near Custer.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1964 to September 1981.
WATER TEMPERATURE: April 1949 to September 1951, October 1953 to September 1981
SUSPENDED-SEDIMENT DISCHARGE: July 1947 to September 1954, October 1955 to September 1958, October 1959 to June 1972.

REMARKS.--Water-discharge records for Bighorn River above Tullock Creek near Bighorn (station 06294500) are used, flows are equivalent at these two sites.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1965-81): Maximum daily, 1,460 microsiemens, May 24, 1978; minimum daily, 460 microsiemens, Mar. 13, 1966.
WATER TEMPERATURE (water years 1949-51, 1954-81): Maximum observed, 30.0°C, July 17, 18, 1953; minimum observed, 0.0°C, on many days during winters.
SEDIMENT CONCENTRATION (water years 1947-54, 1955-58, 1959-72): Maximum daily mean, 23,200 mg/L, May 24, 1952; minimum daily mean, 8 mg/L, Oct. 31, 1967.
SEDIMENT LOAD (water years 1947-54, 1955-58, 1959-72): Maximum daily, 727,000 tons, May 24, 1952; minimum daily, 46 tons, Oct. 31, 1967.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
OCT											
20...	1145	4310	0	0	772	17.0	11.5	696	10.0	101	K47
DEC											
23...	1125	3660	0	0	790	6.0	3.0	690	12.0	99	K19
MAR											
04...	1055	3080	60	1	852	9.0	4.5	696	11.8	100	K2
MAY											
27...	1045	2730	100	64	858	13.5	13.0	679	8.4	90	280
JUL											
28...	1210	2560	0	0	860	30.0	24.0	691	7.4	98	100
AUG											
18...	1030	2630	0	0	872	25.0	16.0	697	9.0	100	37

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	PH (STAND-ARD UNITS) (00400)	BICAR-BONATE WATER WHOLE IT-FLD (MG/L) (00450)	CAR-BONATE WATER WHOLE IT-FLD (MG/L) (00447)	ALKA-LINITY WH WAT TOTAL FIELD MG/L AS CACO3 (00410)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
OCT											
20...	K50	8.10	213	0	171	4.2	270	98	68	24	72
DEC											
23...	44	8.90	171	17	171	1.4	270	100	69	24	64
MAR											
04...	410	8.40	169	16	166	1.2	300	130	75	26	70
MAY											
27...	220	8.50	166	12	155	33	290	140	72	27	75
JUL											
28...	100	8.70	155	13	148	17	290	140	70	28	79
AUG											
18...	360	8.50	163	16	156	9.2	300	140	76	26	75

YELLOWSTONE RIVER BASIN

06294700 BIGHORN RIVER AT BIGHORN, MT--Continued
(National stream quality accounting network station)

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, 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)
OCT											
20...	2	3.4	158	230	10	0.40	9.4	530	520	0.72	6170
DEC											
23...	2	3.2	163	250	9.9	0.40	8.6	526	530	0.72	5200
MAR											
04...	2	3.3	176	270	11	0.40	7.8	564	560	0.77	4690
MAY											
27...	2	3.7	165	270	15	0.40	4.1	586	560	0.80	4320
JUL											
28...	2	3.8	162	280	9.4	0.50	4.6	587	560	0.80	4060
AUG											
18...	2	3.6	169	280	11	0.20	6.4	593	570	0.81	4210

DATE	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, 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)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT											
20...	<0.010	0.310	0.030	0.020	0.40	0.020	<0.010	<0.010	31	361	87
DEC											
23...	<0.010	0.250	0.020	0.030	0.40	0.020	<0.010	<0.010	29	287	69
MAR											
04...	<0.010	0.170	0.020	0.020	0.20	0.020	0.010	<0.010	17	141	72
MAY											
27...	<0.010	0.120	0.050	0.050	0.80	0.080	0.030	<0.010	112	826	71
JUL											
28...	<0.010	<0.100	<0.010	0.040	0.50	0.080	0.010	<0.010	81	560	90
AUG											
18...	<0.010	0.200	0.040	0.040	0.80	0.040	0.010	<0.010	47	334	88

DATE	TIME	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)
OCT											
20...	1145	20	2	53	<0.5	1	<1	<3	30	8	5
MAR											
04...	1055	10	1	60	<0.5	<1	<1	<3	3	3	<5
JUL											
28...	1210	<10	2	57	<0.5	<1	<1	<3	2	6	<5
AUG											
18...	1030	10	2	62	<0.5	<1	<1	<3	39	7	21

DATE	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
OCT										
20...	30	44	1.2	<10	5	2	<1	700	<6	36
MAR										
04...	36	4	<0.1	<10	5	2	<1	760	<6	5
JUL										
28...	41	5	<0.1	<10	2	<1	<1	780	<6	8
AUG										
18...	31	9	0.1	<10	7	2	<1	740	<6	31

06295000 YELLOWSTONE RIVER AT FORSYTH, MT

LOCATION.--Lat 46°15'58", long 106°41'24", in NE¼NW¼NW¼ sec.23, T.6 N., R.40 E., Rosebud County, Hydrologic Unit 10100001, on right bank 0.3 mi downstream from U.S. Highway 12 bridge, at intake for Forsyth water supply, at Forsyth, and at mile 238.2.

DRAINAGE AREA.--40,339 mi^2.

PERIOD OF RECORD.--July 16, 1921, to September 30, 1923 (no winter records), October 1977 to current year. Miscellaneous discharge measurements were made in 1974 to 1976 and are available in files of Helena district office.

GAGE.--Water-stage recorder. Datum of gage is 2,504.62 ft above National Geodetic Vertical Datum of 1929, from nearby elevation determined by City of Forsyth. July 1921 to March 1922, nonrecording gage on discontinued highway bridge 10 ft downstream from gage at different datum. March 1922 to September 1923, nonrecording gage on discontinued highway bridge 10 ft downstream from gage at datum 2 ft higher.

REMARKS.--Estimated daily discharges: Nov. 7-16, Dec. 8-11, Jan. 19-27, Feb. 24-28. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 838,000 acres upstream from station. Flow regulated to some extent by Bighorn Lake, usable capacity, 1,356,000 acre-ft, on Bighorn River. Small diversion dam about 4,200 ft downstream from station. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--10 years (1978-87), 11,130 ft^3/s, 8,064,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 106,000 ft^3/s, May 21, 1978, gage height, 14.53 ft; minimum daily, 1,400 ft^3/s, Nov. 23, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of 1918 reached a stage of about 20 ft, datum used in 1921, information from local residents.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 23,800 ft^3/s, May 29, gage height, 5.17 ft; minimum daily, 4,500 ft^3/s, Jan. 19.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9880	8840	7930	6360	5970	4920	6470	12800	21700	8210	7730	7890
2	9860	8900	7770	6090	5880	5200	6780	13700	21000	7870	7750	7540
3	9860	8930	7740	5880	5960	5620	7060	15000	20300	7760	7490	7140
4	10200	8890	7640	6240	6000	5620	6990	14800	18600	7940	6870	6780
5	10100	8770	7520	6250	5940	5600	6800	12600	17100	8400	6200	6770
6	9780	8770	7320	6410	5900	5600	6760	10200	16100	8530	5680	6960
7	9650	e8700	7290	6450	5860	5840	6810	9020	15500	8160	5350	6840
8	9560	e8500	e7000	6110	5860	5870	6820	9110	15400	7500	5280	6830
9	9480	e8600	e6700	6080	5830	6000	6930	10100	16100	7190	5370	6660
10	9590	e8400	e6600	5390	5820	6050	7090	11100	19700	7090	5510	6320
11	9450	e8000	e6700	5600	5740	5860	6790	11600	19700	7540	5530	6130
12	9320	e7100	7060	5650	5740	5760	6150	12000	19000	9650	5310	6080
13	9320	e5700	7200	5970	5720	5760	6050	11600	17900	15400	5250	6000
14	9180	e6200	7150	6240	5710	5880	5970	11000	16600	15000	5430	5890
15	9140	e6800	7300	6370	5690	5830	5940	11600	15700	12600	5440	5800
16	9290	e7400	7330	6030	5620	5940	5860	12000	14500	10700	5990	5700
17	7660	9210	7100	5430	5580	5910	5710	12500	13500	9780	6270	5630
18	7490	8930	7120	4920	5560	5870	5740	14200	13000	9910	6230	5640
19	9430	8770	7070	e4500	5520	5760	6020	17200	13000	10500	6110	5650
20	9410	8720	6910	e4700	5490	5790	6530	16700	12600	11400	6110	5690
21	9390	8870	6470	e5000	5430	5760	7500	16700	12300	12200	5990	5570
22	9290	9010	6460	e5200	5350	5760	7600	16200	11700	11100	5790	5470
23	9280	9090	6460	e5400	5280	5660	7020	14700	11400	10800	5930	5410
24	9250	9070	6630	e5600	e5200	5560	6620	13300	11100	11300	6340	5320
25	9210	8820	6700	e5800	e5100	5540	6680	12200	10800	11100	6560	5230
26	9080	8450	6610	e6000	e4900	5590	7490	11600	10500	10100	7830	5010
27	8830	8240	6690	e6000	e4900	5680	8510	12000	9920	9440	9940	5020
28	8800	8120	6540	6100	e4900	5920	9330	14900	9010	9030	10400	5030
29	8820	7970	6420	6160	---	6520	10400	22900	8560	7880	9610	5050
30	8800	7960	6470	6160	---	6500	11700	22500	8310	7420	8890	5170
31	8820	---	6410	6100	---	6300	---	22500	---	7430	8250	---
TOTAL	287220	249730	216310	180190	156450	179470	212120	428330	440600	298930	206430	180220
MEAN	9265	8324	6978	5813	5587	5789	7071	13820	14690	9643	6659	6007
MAX	10200	9210	7930	6450	6000	6520	11700	22900	21700	15400	10400	7890
MIN	7490	5700	6410	4500	4900	4920	5710	9020	8310	7090	5250	5010
AC-FT	569700	495300	429100	357400	310300	356000	420700	849600	873900	592900	409500	357500

CAL YR 1986 TOTAL 4371130 MEAN 11980 MAX 52300 MIN 3500 AC-FT 8670000
WTR YR 1987 TOTAL 3036000 MEAN 8318 MAX 22900 MIN 4500 AC-FT 6022000

e Estimated

YELLOWSTONE RIVER BASIN

06295113 ROSEBUD CREEK AT RESERVATION BOUNDARY, NEAR KIRBY, MT

LOCATION.--Lat 45°21'40", long 106°59'23", in NE¼NE¼SW¼ sec.36, T.5 S., R.38 E., Bighorn County, Hydrologic Unit 10100003, on right bank, 0.2 mi upstream from Dry Creek, 0.5 mi north of reservation boundary, 1.9 mi downstream from Cache Creek, 2.0 mi north of Kirby, and at mile 179.6.

DRAINAGE AREA.-- 123 mi^2.

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

GAGE.--Water-stage recorder. Elevation of gage is 3,780 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 6 to Mar. 5, 17, 18, 28-30. Records poor. Numerous small diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--8 years (1980-87), 7.06 ft^3/s, 5,110 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 127 ft^3/s, Apr. 16, 1985, gage height, 5.71 ft; maximum gage height observed, 6.30 ft, Feb. 21, 1980 (backwater from ice); minimum daily discharge, 0.10 ft^3/s, Dec. 24, 1983.

EXTREMES OUTSIDE PERIOD OF RECORD.--A discharge of 231 ft^3/s was measured May 9, 1978, at site 1.9 mi upstream from present site. Flow was known to be higher during flood of May 19-21, 1978, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 25 ft^3/s, May 30, gage height, 3.28 ft; maximum gage height, 6.04 ft Jan 26 (backwater from ice); minimum discharge, 0.36 ft^3/s, Aug. 19, gage height, 1.68 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.0	4.4	e4.0	e3.5	e7.0	e11	10	6.8	15	2.3	2.8	1.3
2	6.6	4.5	e4.2	e4.0	e8.0	e13	10	6.7	12	2.3	2.5	1.2
3	6.5	4.6	e4.0	e3.8	e9.0	e16	11	6.6	11	2.5	2.3	1.2
4	6.2	4.7	e3.8	e4.0	e10	e20	11	6.8	10	2.5	1.7	1.7
5	5.8	4.7	e4.0	e3.8	e12	e16	12	6.1	8.9	2.3	1.7	2.9
6	5.4	e4.5	e4.0	e4.0	e14	13	13	6.0	7.6	2.2	1.5	2.8
7	5.2	e4.0	e4.0	e3.8	e16	12	15	5.8	7.1	2.0	1.3	2.6
8	4.9	e3.5	e4.0	e3.0	e15	12	17	5.5	7.3	2.1	1.5	2.5
9	4.6	e2.5	e3.0	e3.0	e15	11	17	5.5	7.2	1.8	1.4	2.1
10	4.8	e2.0	e2.5	e3.0	e14	9.8	15	5.3	7.0	2.4	1.3	2.3
11	4.9	e1.5	e3.5	e3.5	e13	9.1	14	4.8	6.9	5.1	1.0	2.2
12	5.0	e1.0	e4.0	e4.0	e12	8.7	14	4.6	5.8	5.8	.97	2.2
13	5.0	e2.0	e4.0	e4.2	e11	8.1	14	4.4	5.3	5.2	1.0	2.1
14	5.2	e3.0	e4.0	e4.0	e12	8.6	13	4.0	4.9	4.4	1.3	2.0
15	5.2	e4.0	e4.0	e3.5	e11	8.9	11	3.9	4.4	3.7	1.1	1.9
16	5.1	e4.5	e4.0	e3.0	e10	8.7	11	3.6	4.2	3.0	1.4	2.2
17	5.0	e4.3	e3.8	e3.2	e9.5	e8.6	11	4.6	4.1	2.8	1.4	2.8
18	4.9	e3.0	e3.7	e3.5	e9.0	e8.6	10	5.7	3.9	4.7	1.2	3.1
19	4.9	e2.0	e3.5	e3.5	e9.5	8.3	10	6.5	3.6	5.6	.87	3.4
20	4.9	e3.0	e3.7	e3.3	e9.0	8.3	9.7	8.0	3.5	4.6	.86	3.3
21	4.8	e4.0	e3.9	e4.0	e8.5	8.3	9.5	7.8	3.4	4.5	.77	3.2
22	4.7	e4.5	e4.1	e3.7	e8.5	9.0	9.3	7.6	3.3	4.4	.84	3.4
23	4.6	e4.0	e4.5	e3.7	e8.5	8.4	8.7	7.3	3.4	4.0	.86	2.6
24	4.6	e6.0	e4.5	e4.0	e8.0	7.4	8.6	7.0	3.5	4.2	.81	3.1
25	4.6	e5.5	e4.5	e4.5	e7.0	7.2	8.7	6.6	3.7	3.5	4.2	3.2
26	4.5	e5.5	e4.3	e5.0	e6.0	7.5	8.2	6.6	3.5	3.1	5.3	3.3
27	4.4	e6.0	e4.1	e6.0	e7.0	8.4	8.0	11	3.1	3.0	3.5	4.7
28	4.5	e5.5	e3.9	e6.5	e9.0	e8.5	7.5	16	2.9	3.0	2.3	5.3
29	4.5	e5.0	e3.7	e6.0	---	e8.0	7.3	16	2.5	2.4	1.9	5.0
30	4.5	e4.5	e4.2	e5.5	---	e9.0	7.1	21	2.5	2.6	1.5	4.8
31	4.5	---	e4.0	e6.0	---	9.5	---	20	---	2.7	1.3	---
TOTAL	156.3	118.2	121.4	126.5	288.5	310.9	331.6	238.1	171.5	104.7	52.38	84.4
MEAN	5.04	3.94	3.92	4.08	10.3	10.0	11.1	7.68	5.72	3.38	1.69	2.81
MAX	6.6	6.0	4.5	6.5	16	20	17	21	15	5.8	5.3	5.3
MIN	4.4	1.0	2.5	3.0	6.0	7.2	7.1	3.6	2.5	1.8	.77	1.2
AC-FT	310	234	241	251	572	617	658	472	340	208	104	167

CAL YR 1986 TOTAL 3381.77 MEAN 9.27 MAX 80 MIN 1.0 AC-FT 6710
WTR YR 1987 TOTAL 2104.46 MEAN 5.77 MAX 21 MIN .77 AC-FT 4170

e Estimated

YELLOWSTONE RIVER BASIN

06295250 ROSEBUD CREEK NEAR COLSTRIP, MT

LOCATION.--Lat 45°46'03", long 106°34'10", in SE¼SW¼NE¼ sec.8, T.1 S., R.42 E., Rosebud County, Hydrologic Unit 10100003, on left bank 10 ft downstream from bridge on FAS Route 315, 1.5 mi downstream from Lee Coulee, 8.4 mi southeast of Colstrip, and at mile 85.6.

DRAINAGE AREA.--799 mi^2.

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

GAGE.--Water-stage recorder. Elevation of gage is 3,000 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 8 to Mar. 12 and Mar. 28-31. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 800 acres upstream from station. Several observations of water temperatures and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

AVERAGE DISCHARGE.--13 years, 35.6 ft^3/s, 25,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 605 ft^3/s, May 21, 1978, gage height, 9.03 ft; no flow many days most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 38 ft^3/s, May 30, gage height, 1.74 ft; maximum gage height, 2.20 ft, Mar. 10 (backwater from ice); minimum daily discharge, 1.5 ft^3/s, Sept. 28.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	11	e12	e13	e13	e12	27	19	27	7.4	7.6	6.0
2	11	11	e12	e13	e12	e14	23	19	26	7.3	7.7	6.4
3	12	11	e11	e13	e12	e15	22	19	24	7.1	6.9	5.5
4	12	12	e11	e13	e12	e16	22	19	26	6.9	6.2	5.0
5	11	12	e11	e13	e13	e18	22	19	26	6.5	5.4	5.3
6	11	12	e12	e12	e14	e19	22	18	23	6.5	4.8	5.4
7	12	12	e12	e12	e13	e21	22	18	20	6.1	5.5	5.4
8	12	e11	e11	e13	e12	e25	22	17	19	6.0	5.2	5.5
9	11	e8.5	e9.0	e14	e12	e33	22	17	18	5.8	5.0	4.9
10	11	e6.0	e11	e14	e12	e30	22	17	17	5.6	4.8	4.5
11	10	e6.0	e13	e13	e13	e20	23	15	16	6.6	3.9	4.6
12	11	e6.0	e14	e11	e13	e17	26	15	15	7.0	4.2	4.4
13	11	e7.0	e14	e10	e12	20	27	14	15	7.4	4.2	5.1
14	11	e9.0	e14	e9.0	e12	27	26	13	14	8.2	5.2	5.6
15	11	e10	e14	e8.0	e12	29	25	13	12	8.1	4.3	5.2
16	10	e11	e14	e8.5	e12	24	24	13	12	7.5	4.4	3.9
17	10	e11	e14	e8.5	e12	21	23	12	12	6.9	4.3	3.3
18	10	e11	e14	e9.0	e12	18	22	12	11	8.8	4.9	4.2
19	10	e11	e14	e9.0	e11	18	22	13	11	11	4.4	4.2
20	9.9	e11	e13	e9.0	e11	17	22	13	11	11	3.8	3.6
21	10	e12	e14	e8.0	e11	17	23	14	11	11	3.1	3.9
22	10	e12	e15	e8.0	e11	17	23	18	10	9.5	2.7	4.1
23	12	e13	e15	e8.0	e11	17	23	16	10	9.2	2.8	4.0
24	12	e13	e14	e8.5	e10	17	22	16	9.9	9.5	3.4	3.6
25	11	e13	e13	e8.5	e9.0	17	22	17	9.3	9.2	4.6	3.9
26	11	e12	e13	e9.0	e9.0	17	21	17	9.3	9.6	4.7	3.8
27	11	e12	e13	e9.0	e10	17	21	16	9.3	10	8.7	2.5
28	11	e12	e13	e10	e11	e15	21	20	8.7	9.7	7.1	1.5
29	11	e11	e13	e11	---	e11	20	24	8.3	9.0	5.3	2.4
30	11	e11	e12	e12	---	e16	19	29	7.6	8.3	3.9	3.0
31	11	---	e12	e13	---	e21	---	27	---	8.1	4.8	---
TOTAL	337.9	320.5	397.0	330.0	327.0	596	681	529	448.4	250.8	153.8	130.7
MEAN	10.9	10.7	12.8	10.6	11.7	19.2	22.7	17.1	14.9	8.09	4.96	4.36
MAX	12	13	15	14	14	33	27	29	27	11	8.7	6.4
MIN	9.9	6.0	9.0	8.0	9.0	11	19	12	7.6	5.6	2.7	1.5
AC-FT	670	636	787	655	649	1180	1350	1050	889	497	305	259

CAL YR 1986 TOTAL 7946.7 MEAN 21.8 MAX 300 MIN 3.5 AC-FT 15760
WTR YR 1987 TOTAL 4502.1 MEAN 12.3 MAX 33 MIN 1.5 AC-FT 8930

e Estimated

YELLOWSTONE RIVER BASIN

06296003 ROSEBUD CREEK AT MOUTH, NEAR ROSEBUD, MT

LOCATION.--Lat 46°15'53", long 106°28'30", in SW¼NW¼NE¼ sec.21, T.6 N., R.42 E., Rosebud County, Hydrologic Unit 10100003, on left bank 0.4 mi upstream from bridge on Interstate Highway 94, 0.8 mi upstream from mouth, and 1.6 mi southwest of Rosebud.

DRAINAGE AREA.--1,302 mi^2.

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

GAGE.--Water-stage recorder. Elevation of gage is 2,480 ft, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 08 to Mar. 13, Mar. 29, 30. Water-discharge records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 2,000 acres upstream from station.

AVERAGE DISCHARGE.--13 years, 39.6 ft^3/s, 28,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,620 ft^3/s, May 19, 1978, gage height, 6.78 ft, from rating curve extended above 1,500 ft^3/s; no flow several days in August and September 1984.

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

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 28	1600	*302	*2.82	No other peak greater than base discharge this year.			

Minimum discharge, 0.82 ft^3/s, May 14.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19	10	e10	e11	e11	e9.0	67	11	24	4.7	7.7	3.5
2	22	11	e10	e12	e11	e10	30	12	24	2.3	3.6	4.3
3	38	11	e9.0	e13	e11	e11	23	8.7	26	2.2	2.5	4.6
4	30	11	e9.0	e12	e12	e12	23	6.8	24	3.7	2.4	4.0
5	21	11	e10	e12	e12	e13	22	2.2	23	6.3	2.4	4.0
6	17	11	e10	e11	e12	e14	19	3.7	19	5.3	5.1	14
7	15	11	e10	e11	e12	e14	18	1.4	20	6.1	5.3	9.0
8	14	e10	e9.0	e10	e13	e14	18	2.3	20	6.1	4.9	6.8
9	12	e8.0	e9.0	e10	e13	e14	18	2.5	20	5.6	5.3	5.6
10	13	e7.0	e8.0	e11	e13	e13	18	2.5	18	2.1	4.3	5.0
11	12	e6.0	e14	e13	e13	e15	18	3.1	15	2.1	3.1	4.5
12	12	e7.0	e13	e12	e13	e20	18	3.8	11	2.5	2.4	6.7
13	12	e8.0	e12	e10	e12	e28	18	1.4	6.1	2.9	1.7	5.7
14	12	e7.5	e12	e9.0	e12	33	18	1.1	5.7	2.3	3.2	5.5
15	12	e7.0	e11	e8.0	e12	46	19	1.1	6.0	1.9	30	5.4
16	11	e7.0	e11	e7.5	e11	32	20	1.1	4.1	1.8	52	5.1
17	12	e8.0	e11	e8.0	e11	31	21	1.3	3.5	6.1	17	4.7
18	12	e8.0	e11	e9.0	e11	34	20	7.4	1.6	8.5	9.1	4.4
19	11	e9.0	e11	e9.0	e11	31	20	2.7	1.7	12	5.7	4.7
20	11	e10	e12	e8.5	e11	30	19	14	3.4	9.6	4.3	4.9
21	11	e10	e12	e9.0	e11	29	18	55	1.6	7.6	2.7	5.7
22	11	e9.0	e12	e9.0	e11	26	18	34	6.6	31	3.8	5.4
23	10	e10	e12	e9.0	e11	27	18	16	2.5	16	3.3	4.9
24	10	e12	e12	e8.5	e10	26	18	11	4.0	5.1	3.8	4.3
25	10	e13	e11	e9.0	e9.0	24	18	10	5.8	4.6	4.0	3.7
26	10	e12	e12	e9.0	e8.0	39	20	29	6.0	3.1	14	3.4
27	10	e12	e12	e9.0	e8.0	55	20	164	7.7	2.3	34	4.2
28	10	e11	e11	e9.5	e8.0	42	18	231	8.0	2.4	8.6	4.1
29	10	e11	e11	e9.5	---	e17	7.3	176	3.9	1.1	6.1	2.5
30	10	e11	e11	e9.5	---	e21	14	51	3.9	5.3	4.8	1.9
31	10	---	e12	e10	---	33	---	32	---	9.9	3.1	---
TOTAL	430	289.5	340.0	308.0	313.0	763.0	616.3	899.1	326.1	182.5	260.2	152.5
MEAN	13.9	9.65	11.0	9.94	11.2	24.6	20.5	29.0	10.9	5.89	8.39	5.08
MAX	38	13	14	13	13	55	67	231	26	31	52	14
MIN	10	6.0	8.0	7.5	8.0	9.0	7.3	1.1	1.6	1.1	1.7	1.9
AC-FT	853	574	674	611	621	1510	1220	1780	647	362	516	302

CAL YR 1986 TOTAL 10787.5 MEAN 29.6 MAX 604 MIN .63 AC-FT 21400
WTR YR 1987 TOTAL 4880.2 MEAN 13.4 MAX 231 MIN 1.1 AC-FT 9680

e Estimated

06306300 TONGUE RIVER AT STATE LINE, NEAR DECKER, MT

LOCATION.--Lat 45°00'32", long 106°50'08", in NW¼NW¼NE¼ sec.33, T.9 S., R.40 E., Big Horn County, Hydrologic Unit 10090101, on left bank 1 mi north of Wyoming-Montana State line, 1.4 mi southeast of Decker, 1.6 mi upstream from Badger Creek, and at mile 200.9.

DRAINAGE AREA.--1,477 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1960 to current year. Records published as "near Decker" May 1928 to September 1938, not equivalent owing to intervening drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,429.14 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--Estimated daily discharges: Nov. 9 to Mar. 7, Mar. 28-30. Water-discharge records good except those for estimated daily discharges, which are poor. Flow regulated by many small reservoirs in Wyoming, combined capacity, about 15,000 acre-ft. Diversions for irrigation of about 64,300 acres upstream from station.

AVERAGE DISCHARGE.--27 years, 480 ft^3/s, 347,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,500 ft^3/s, May 19, 1978, gage height, 14.25 ft; minimum, 3.0 ft^3/s, Aug. 23, 1961.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 28	1430	*1,190	*4.84	No peak greater than base discharge this year.			

Minimum daily discharge, 80 ft^3/s, Nov. 10.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	309	265	e180	e170	e270	e170	285	1000	712	219	234	279
2	319	255	e170	e180	e290	e200	306	989	707	194	231	260
3	407	242	e160	e200	e270	e250	255	1010	644	234	217	253
4	406	272	e170	e220	e260	e300	254	793	590	224	207	251
5	360	260	e180	e190	e260	e350	269	706	541	207	197	295
6	356	290	e170	e170	e270	e300	282	656	501	206	188	350
7	344	335	e180	e150	e290	e260	291	628	484	187	175	365
8	331	284	e170	e140	e320	256	291	613	629	170	208	442
9	320	e200	e140	e160	e300	249	300	586	935	155	251	381
10	312	e80	e150	e180	e290	229	300	558	1010	153	237	343
11	321	e100	e180	e200	e310	220	284	550	1040	242	215	324
12	301	e90	e200	e230	e300	216	292	509	824	651	199	319
13	273	e120	e210	e240	e290	211	274	454	738	520	211	320
14	285	e150	e200	e200	e280	212	255	437	628	372	212	315
15	289	e170	e200	e120	e270	214	254	413	585	303	211	307
16	285	e200	e190	e150	e270	209	261	406	545	275	226	305
17	281	e240	e190	e170	e260	216	299	579	494	251	228	325
18	278	e230	e190	e190	e260	218	378	967	454	348	224	345
19	276	e250	e180	e180	e250	215	488	685	453	369	214	335
20	275	e270	e190	e190	e230	221	511	586	520	316	204	324
21	278	e300	e190	e190	e240	226	431	610	497	279	197	323
22	279	e290	e200	e210	e240	208	404	600	435	281	186	319
23	280	e320	e210	e230	e240	191	455	564	409	302	182	317
24	284	e350	e200	e250	e240	203	597	510	433	283	196	308
25	279	e300	e200	e270	e220	219	739	480	385	274	241	293
26	273	e240	e210	e290	e190	215	836	510	354	265	308	289
27	269	e250	e210	e310	e170	227	882	549	317	252	384	277
28	268	e230	e220	e290	e160	228	1010	896	273	246	370	266
29	267	e210	e230	e270	---	e190	985	796	242	296	326	265
30	266	e190	e210	e250	---	e185	967	806	247	267	304	260
31	268	---	e190	e260	---	e215	---	743	---	246	293	---
TOTAL	9339	6983	5870	6450	7240	7023	13435	20189	16626	8587	7276	9355
MEAN	301	233	189	208	259	227	448	651	554	277	235	312
MAX	407	350	230	310	320	350	1010	1010	1040	651	384	442
MIN	266	80	140	120	160	170	254	406	242	153	175	251
AC-FT	18520	13850	11640	12790	14360	13930	26650	40040	32980	17030	14430	18560

CAL YR 1986 TOTAL 152483 MEAN 418 MAX 3400 MIN 80 AC-FT 302400
WTR YR 1987 TOTAL 118373 MEAN 324 MAX 1040 MIN 80 AC-FT 234800

e Estimated

YELLOWSTONE RIVER BASIN

06306300 TONGUE RIVER AT STATE LINE, NEAR DECKER, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1966 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE:. October 1965 to September 1976, November 1980 to December 1986.
WATER TEMPERATURE:. October 1965 to September 1976.

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

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE:. Maximum daily, 1,490 microsiemens, Aug. 12, 1966, Jan. 11, 1972; minimum daily, 192 microsiemens, June 7, 1976.
WATER TEMPERATURE (water years 1966-76):. Maximum, 30.5°C, July 16, 1966; minimum, 0.0°C on many days during winter.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE (Oct.-Dec):. Maximum daily observed, 956 microsiemens, Nov. 12; minimum daily observed, 682 microsiemens, Oct. 4.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
NOV											
18...	1345	246	5	1	718	2.0	2.5	668	14.0	117	K5
JAN											
05...	1545	191	--	--	766	-0.5	0.0	--	--	--	--
FEB											
09...	1450	305	--	--	720	10.5	0.0	--	--	--	--
APR											
01...	0815	258	--	--	850	2.5	5.5	--	--	--	--
MAY											
12...	0830	541	0	0	293	15.5	15.5	671	7.8	89	--
JUN											
22...	1300	437	100	2	488	14.5	19.0	676	8.3	101	--
AUG											
03...	1440	219	30	1	690	23.5	25.0	679	9.3	127	290
SEP											
14...	1500	307	0	0	632	25.0	19.5	672	9.9	123	77

DATE	TIME	PH (STAND-ARD UNITS) (00400)	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)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)
NOV								
18...	1345	8.30	0.200	<0.010	--	0.60	0.060	1
MAY								
12...	0830	8.00	<0.100	0.010	0.59	0.60	0.090	1
JUN								
22...	1300	8.30	<0.100	0.020	0.58	0.60	0.080	--
AUG								
03...	1440	8.00	<0.100	0.080	--	<0.20	0.120	1
SEP								
14...	1500	8.30	<0.100	0.010	0.79	0.80	0.070	<1

DATE	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)
NOV								
18...	51	<1	<1	9	<5	<0.1	<1	<1
MAY								
12...	<100	<1	<1	--	<5	<0.1	<1	<1
JUN								
22...	--	--	--	--	--	--	--	--
AUG								
03...	59	<1	<1	16	<5	0.1	<1	<1
SEP								
14...	51	<1	<1	--	<5	0.1	<1	<1

YELLOWSTONE RIVER BASIN

06306300 TONGUE RIVER AT STATE LINE, NEAR DECKER, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	DICAMBA (MED-IBEN) (BAN-VEL D) TOTAL (UG/L) (82052)	PICLO-RAM (TOR-DON) (AMDON) TOTAL (UG/L) (39720)	2,4-D, TOTAL (UG/L) (39730)	2, 4-DP TOTAL (UG/L) (82183)	2,4,5-T TOTAL (UG/L) (39740)	SILVEX, TOTAL (UG/L) (39760)
JUN							
22...	1300	0.01	0.03	0.03	<0.01	<0.01	<0.01
AUG							
03...	1440	<0.01	0.03	<0.01	<0.01	<0.01	<0.01
SEP							
14...	1500	<0.01	0.02	0.01	<0.01	<0.01	<0.01
30...	1150	<0.01	0.03	<0.01	<0.01	<0.01	<0.01

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	702	719	777	---	---	---	---	---	---	---	---	---
2	703	732	770	---	---	---	---	---	---	---	---	---
3	684	741	800	---	---	---	---	---	---	---	---	---
4	682	737	793	---	---	---	---	---	---	---	---	---
5	735	740	847	---	---	---	---	---	---	---	---	---
6	725	730	816	---	---	---	---	---	---	---	---	---
7	697	695	837	---	---	---	---	---	---	---	---	---
8	699	728	837	---	---	---	---	---	---	---	---	---
9	696	752	789	---	---	---	---	---	---	---	---	---
10	707	837	888	---	---	---	---	---	---	---	---	---
11	717	915	827	---	---	---	---	---	---	---	---	---
12	763	956	825	---	---	---	---	---	---	---	---	---
13	768	944	855	---	---	---	---	---	---	---	---	---
14	771	920	805	---	---	---	---	---	---	---	---	---
15	773	862	795	---	---	---	---	---	---	---	---	---
16	751	737	811	---	---	---	---	---	---	---	---	---
17	744	715	793	---	---	---	---	---	---	---	---	---
18	740	730	802	---	---	---	---	---	---	---	---	---
19	741	698	830	---	---	---	---	---	---	---	---	---
20	741	719	812	---	---	---	---	---	---	---	---	---
21	744	720	807	---	---	---	---	---	---	---	---	---
22	732	716	778	---	---	---	---	---	---	---	---	---
23	731	726	776	---	---	---	---	---	---	---	---	---
24	735	766	755	---	---	---	---	---	---	---	---	---
25	730	785	774	---	---	---	---	---	---	---	---	---
26	722	786	777	---	---	---	---	---	---	---	---	---
27	724	805	783	---	---	---	---	---	---	---	---	---
28	731	832	783	---	---	---	---	---	---	---	---	---
29	725	797	803	---	---	---	---	---	---	---	---	---
30	743	743	801	---	---	---	---	---	---	---	---	---
31	734	---	803	---	---	---	---	---	---	---	---	---
MEAN	729	776	805	---	---	---	---	---	---	---	---	---

YELLOWSTONE RIVER BASIN

06307500 TONGUE RIVER AT TONGUE RIVER DAM, NEAR DECKER, MT

LOCATION.--Lat 45°08'29", long 106°46'15", in SW¼SE¼SE¼ sec.12, T.8 S., R.40 E., Big Horn County, Hydrologic Unit 10090101, on left bank 0.5 mi downstream from Tongue River Dam, 4 mi upstream from Post Creek, 8 mi northeast of Decker, 16 mi southeast of Kirby, and at mile 188.4.

DRAINAGE AREA.--1,770 mi^2.

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,344.40 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

REMARKS.--Estimated daily discharges: July 12 to Sept. 30. Water-discharge records good except those for estimated daily discharges, which are fair. Flow regulated by Tongue River Reservoir (station number 06307000) and many small reservoirs, combined capacity, about 15,000 acre-ft. Diversion for irrigation of about 64,800 acres upstream from station.

AVERAGE DISCHARGE.--48 years, 453 ft^3/s, 328,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,800 ft^3/s, May 20, 1978, gage height, 10.00 ft, from floodmark in gage well; no flow part of each day Nov. 12, 13, 1969, when gates at dam were closed.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,060 ft^3/s, May 18, gage height, 2.78 ft; minimum daily, 12 ft^3/s, Apr. 9.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	257	372	348	232	220	58	30	127	736	505	e360	e360
2	257	371	299	230	220	58	16	166	736	505	e360	e360
3	256	371	252	230	218	59	17	229	736	498	e360	e360
4	258	370	252	230	218	59	17	255	544	447	e360	e360
5	258	368	252	230	217	59	17	255	421	445	e360	e360
6	256	367	251	232	217	59	17	256	415	446	e360	e360
7	257	367	252	233	217	60	16	258	394	446	e360	e360
8	207	367	252	231	217	60	15	259	393	446	e360	e360
9	105	367	251	230	217	60	12	259	391	447	e360	e360
10	142	364	249	230	218	60	52	259	391	446	e360	e360
11	214	364	249	230	218	61	107	260	391	419	e360	e360
12	214	362	249	229	220	61	107	261	591	e390	e360	e360
13	214	360	246	227	220	61	107	262	690	e385	e360	e360
14	214	360	246	228	155	61	107	262	690	e380	e360	e360
15	214	360	246	227	55	61	107	262	690	e380	e360	e360
16	146	357	246	227	56	62	107	262	690	e380	e360	e360
17	68	356	245	227	57	62	107	293	690	e380	e360	e360
18	98	356	243	226	57	62	107	784	690	e330	e360	e360
19	102	356	243	223	57	62	107	791	690	e360	e360	e360
20	179	356	243	223	57	62	107	698	690	e390	e360	e360
21	254	356	243	223	57	62	107	724	690	e390	e360	e360
22	253	356	241	223	58	62	108	721	690	e390	e360	e360
23	308	353	237	222	58	62	108	736	689	e390	e360	e360
24	380	352	237	220	58	62	109	747	684	e390	e360	e360
25	379	352	237	220	58	63	110	744	618	e370	e360	e360
26	379	352	237	220	58	64	110	745	511	e360	e360	e360
27	378	351	237	220	58	64	110	742	510	e360	e360	e360
28	376	350	237	217	58	64	101	741	509	e360	e360	e360
29	375	348	237	217	---	64	125	740	509	e360	e360	e360
30	375	348	236	218	---	64	127	736	507	e360	e360	e360
31	375	---	235	220	---	66	---	736	---	e360	e360	---
TOTAL	7748	10789	7728	6995	3794	1904	2394	14570	17576	12515	11160	10800
MEAN	250	360	249	226	135	61.4	79.8	470	586	404	360	360
MAX	380	372	348	233	220	66	127	791	736	505	360	360
MIN	68	348	235	217	55	58	12	127	391	330	360	360
AC-FT	15370	21400	15330	13870	7530	3780	4750	28900	34860	24820	22140	21420

CAL YR 1986 TOTAL 157532 MEAN 432 MAX 2610 MIN 68 AC-FT 312500
WTR YR 1987 TOTAL 107973 MEAN 296 MAX 791 MIN 12 AC-FT 214200

e Estimated

06307500 TONGUE RIVER AT TONGUE RIVER DAM, NEAR DECKER, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1976 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: November 1980 to December 1986 (discontinued).

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

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily (water years 1981-82, 1984-87), 932 microsiemens, Mar. 12, 14, 1981; minimum daily, 230 microsiemens, July 1, 1983.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum daily observed, 841 microsiemens, Dec. 30; minimum daily observed, 664 microsiemens, Oct. 9.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
NOV										
18...	0930	355	--	--	759	-6.0	2.5	--	--	--
JAN										
06...	1010	236	100	2	862	-1.0	0.5	681	13.8	108
FEB										
10...	1230	215	0	0	818	14.0	3.0	675	13.2	111
MAR										
26...	0840	64	70	1	834	4.5	4.0	671	12.2	106
APR										
02...	0820	14	--	--	802	--	3.0	--	--	--
07...	1450	18	--	--	806	19.0	13.0	--	--	--
MAY										
12...	1150	258	0	0	812	24.5	12.0	671	9.3	98
JUN										
23...	0930	690	40	2	429	20.0	18.0	681	8.1	96
AUG										
04...	0855	360	0	0	498	21.5	20.5	681	7.5	94
SEP										
15...	0905	360	0	0	598	22.0	18.0	676	8.4	100

DATE	TIME	PH (STAND-ARD UNITS) (00400)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
JAN										
06...	1010	8.30	390	130	77	49	39	0.9	3.6	268
FEB										
10...	1230	8.00	370	120	73	46	37	0.9	3.3	253
MAR										
26...	0840	8.20	370	130	70	47	41	1	3.5	239
MAY										
12...	1150	8.00	370	140	71	47	41	0.9	3.2	232
JUN										
23...	0930	7.90	180	41	39	21	17	0.6	2.0	143
AUG										
04...	0855	7.90	220	55	46	26	21	0.6	2.8	167
SEP										
15...	0905	8.40	260	79	45	35	30	0.8	3.5	177

YELLOWSTONE RIVER BASIN

06307500 TONGUE RIVER AT TONGUE RIVER DAM, NEAR DECKER, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, 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)
JAN 06...	220	4.7	0.30	7.3	560	0.76	358	<0.100	0.050	0.25
FEB 10...	190	4.9	0.30	8.6	510	0.70	299	0.200	0.070	0.33
MAR 26...	210	4.2	0.30	6.9	530	0.72	91	<0.100	0.030	0.77
MAY 12...	220	5.0	0.30	6.9	530	0.73	372	<0.100	0.040	0.66
JUN 23...	91	2.4	0.20	6.6	270	0.36	494	<0.100	0.140	0.76
AUG 04...	96	2.5	0.20	6.2	300	0.41	292	<0.100	0.080	0.52
SEP 15...	140	2.3	0.30	7.9	370	0.50	360	<0.100	0.100	0.70

DATE	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS-PHORUS, TOTAL (MG/L AS P) (00665)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
JAN 06...	0.30	<0.010	--	--	80	7	33	21	59
FEB 10...	0.40	0.050	3.6	0.5	90	4	70	41	42
MAR 26...	0.80	0.050	3.9	0.5	70	3	24	4.1	62
MAY 12...	0.70	0.030	--	--	70	7	21	15	65
JUN 23...	0.90	0.050	7.0	0.5	50	5	14	26	52
AUG 04...	0.60	0.100	6.2	4.5	50	13	5	4.9	69
SEP 15...	0.80	0.030	--	--	80	4	4	3.9	86

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)
FEB 10...	1230	--	1	--	<0.5	--	<1	--	<10	--	2	--
MAR 26...	0840	--	<1	--	<0.5	--	<1	--	<10	--	2	--
JUN 23...	0930	2	2	<10	0.5	<1	<1	<10	<10	4	1	290

DATE	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG) (71900)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, TOTAL (UG/L AS SE) (01147)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
FEB 10...	--	<5	--	53	--	<0.1	--	2	--	<1	--	4
MAR 26...	--	<5	--	52	--	<0.1	--	2	--	<1	--	5
JUN 23...	<5	<5	60	34	<0.10	<0.1	1	<1	<1	<1	10	5

06307500 TONGUE RIVER AT TONGUE RIVER DAM, NEAR DECKER, MT--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	711	693	750	---	---	---	---	---	---	---	---	---
2	705	683	763	---	---	---	---	---	---	---	---	---
3	724	700	762	---	---	---	---	---	---	---	---	---
4	691	702	771	---	---	---	---	---	---	---	---	---
5	678	692	773	---	---	---	---	---	---	---	---	---
6	689	697	770	---	---	---	---	---	---	---	---	---
7	722	686	770	---	---	---	---	---	---	---	---	---
8	719	689	772	---	---	---	---	---	---	---	---	---
9	664	697	768	---	---	---	---	---	---	---	---	---
10	730	694	777	---	---	---	---	---	---	---	---	---
11	690	702	783	---	---	---	---	---	---	---	---	---
12	696	693	781	---	---	---	---	---	---	---	---	---
13	689	709	784	---	---	---	---	---	---	---	---	---
14	707	695	792	---	---	---	---	---	---	---	---	---
15	685	695	797	---	---	---	---	---	---	---	---	---
16	690	704	801	---	---	---	---	---	---	---	---	---
17	754	720	799	---	---	---	---	---	---	---	---	---
18	704	741	803	---	---	---	---	---	---	---	---	---
19	700	742	809	---	---	---	---	---	---	---	---	---
20	712	745	811	---	---	---	---	---	---	---	---	---
21	714	744	804	---	---	---	---	---	---	---	---	---
22	704	743	810	---	---	---	---	---	---	---	---	---
23	712	740	820	---	---	---	---	---	---	---	---	---
24	701	747	807	---	---	---	---	---	---	---	---	---
25	712	738	818	---	---	---	---	---	---	---	---	---
26	692	742	819	---	---	---	---	---	---	---	---	---
27	702	736	829	---	---	---	---	---	---	---	---	---
28	693	729	826	---	---	---	---	---	---	---	---	---
29	706	733	826	---	---	---	---	---	---	---	---	---
30	702	741	841	---	---	---	---	---	---	---	---	---
31	705	---	838	---	---	---	---	---	---	---	---	---
MEAN	703	716	796	---	---	---	---	---	---	---	---	---

06307570 HANGING WOMAN CREEK BELOW HORSE CREEK, NEAR BIRNEY, MT

LOCATION.--Lat 45°08'02", long 106°29'00", on section line 17-20, T.8 S., R.43 E., Big Horn County, Hydrologic Unit 10090101, at county road bridge, 0.6 mi downstream from Horse Creek, 0.8 mi upstream from Circle Bar Draw, and 13.2 mi southeast of Birney.

DRAINAGE AREA.--321 mi2.

PERIOD OF RECORD.--Water years 1978-83, 1986 to September 1987 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
NOV 19...	0855	0.41	100	2	4450	0.5	0.0	666	10.0	80
JAN 06...	1350	0.32	100	2	4650	2.0	0.0	679	8.3	65
FEB 10...	1550	0.56	5	0	3640	10.5	2.0	675	13.0	108
APR 01...	1010	0.72	100	73	5300	0.0	6.0	682	10.9	100
MAY 12...	1500	0.28	50	1	4910	21.0	24.0	669	8.6	119
JUN 23...	1245	0.15	60	2	4720	22.5	19.5	677	8.2	102
AUG 04...	1220	0.30	0	1	4500	25.5	24.0	680	4.4	60
SEP 15...	1245	0.13	0	0	4050	26.5	20.5	673	9.0	115

DATE	PH (STAND-ARD UNITS) (00400)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV 19...	7.90	1400	920	170	240	660	8	14	492	2200
JAN 06...	7.90	1400	840	180	240	740	9	14	597	2500
FEB 10...	8.00	780	330	100	130	380	6	13	455	1200
APR 01...	8.40	1700	1300	200	280	900	10	12	386	3000
MAY 12...	8.10	1400	1100	170	230	710	8	15	317	2500
JUN 23...	8.10	1300	740	140	220	740	9	25	518	2500
AUG 04...	8.00	1200	680	120	220	670	9	18	525	2000
SEP 15...	8.10	1100	740	110	190	560	8	17	316	1900

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, 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)
NOV 19...	66	0.70	10	3700	5.0	4.0	<0.100	0.050	0.55
JAN 06...	21	0.90	16	4100	5.5	3.5	0.200	0.080	0.42
FEB 10...	16	0.90	15	2100	2.9	3.2	<0.100	0.020	0.68
APR 01...	25	0.60	5.6	4700	6.3	9.0	<0.100	0.060	0.74
MAY 12...	21	0.80	7.2	3800	5.2	2.9	<0.100	0.050	1.0
JUN 23...	23	0.80	9.2	4000	5.4	1.6	<0.100	0.050	1.2
AUG 04...	17	0.90	9.5	3400	4.6	2.7	<0.100	0.180	1.1
SEP 15...	18	0.80	7.8	3000	4.1	1.1	<0.100	0.030	0.67

06307570 HANGING WOMAN CREEK BELOW HORSE CREEK, NEAR BIRNEY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHORUS, TOTAL (MG/L AS P) (00665)	CARBON, ORGANIC DISSOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUSPENDED TOTAL (MG/L AS C) (00689)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 19...	0.60	0.030	--	--	330	20	101	0.11	71
JAN 06...	0.50	<0.010	--	--	360	30	48	0.04	50
FEB 10...	0.70	0.020	--	--	250	30	100	0.15	55
APR 01...	0.80	0.080	10	--	230	40	69	0.13	93
MAY 12...	1.1	0.100	--	--	350	20	130	0.10	38
JUN 23...	1.2	0.130	--	3.0	370	20	68	0.03	59
AUG 04...	1.3	0.050	--	--	440	20	39	0.03	81
SEP 15...	0.70	0.030	9.0	0.6	400	20	22	0.01	87

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)
JUN 23...	1245	2	2	<10	<10	<1	<1	<10	<10	5	<1	1700
SEP 15...	1245	--	2	--	<10	--	<1	--	<10	--	1	--

DATE	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	MERCURY DISSOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
JUN 23...	<5	<5	240	170	<0.10	0.1	6	<1	<1	<1	20	20
SEP 15...	--	<5	--	70	--	0.1	--	2	--	1	--	<10

YELLOWSTONE RIVER BASIN

06307600 HANGING WOMAN CREEK NEAR BIRNEY, MT

LOCATION.--Lat 45°17'57", long 106°30'28", in N½NW¼SE¼ sec.19, T.6 S., R.43 E., Rosebud County, Hydrologic Unit 10090101, on right bank 0.5 mi downstream from bridge on Birney-Otter road, 1.2 mi south of Birney, 1.2 mi downstream from East Fork, and at mile 3.3.

DRAINAGE AREA.--470 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1973 to September 1984, October 1985 to current year.

REVISED RECORDS.--WDR MT-82-1: 1980 (M).

GAGE.--Water-stage recorder. Elevation of gage is 3,150 ft, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 9-15, Dec. 9, 10, Jan. 7-11, 14-23, and Feb. 25, 26. Water-discharge records fair except those for estimated daily discharges, which are poor. Diversions for irrigation of about 1,240 acres upstream from station.

AVERAGE DISCHARGE.--13 years, 3.89 ft^3/s, 2,820 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,060 ft^3/s, May 19, 1978, gage height, 11.56 ft, from rating curve extended above 360 ft^3/s on basis of slope-area measurement of peak flow; no flow most days August and September 1981 and July, August and September 1983.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 100 ft^3/s and maximums (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Aug. 6	2345	* 7.3	* 2.89	No peaks greater than base discharge this year.			

Minimum discharge, 0.02 ft^3/s, Aug. 6.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.8	1.2	1.5	1.4	1.6	1.2	1.4	.85	1.0	.20	.06	.06
2	2.4	1.1	1.6	1.1	1.5	1.2	1.2	.78	.94	.25	.06	.06
3	2.6	1.2	1.5	1.2	1.5	1.4	1.4	.94	.78	.17	.06	.04
4	2.4	1.2	1.4	1.1	1.6	1.4	1.2	.85	.70	.15	.05	.05
5	2.1	1.2	1.4	1.2	1.6	1.2	1.1	.78	.70	.20	.03	.13
6	1.8	1.4	1.5	1.4	1.6	1.4	1.1	.70	.70	.17	.12	.13
7	1.8	1.6	1.5	e1.3	1.6	1.2	1.0	.70	.70	.11	.36	.08
8	1.9	1.6	1.4	e1.1	1.5	1.5	1.0	.70	.70	.09	.16	.09
9	1.6	e1.4	e1.3	e.90	1.5	1.2	1.0	.63	.70	.13	.08	.09
10	1.6	e1.2	e1.3	e1.0	1.4	1.2	1.0	.57	.70	.13	.06	.09
11	1.5	e1.2	1.4	e1.1	1.4	1.1	.94	.57	.63	.32	.06	.09
12	1.4	e1.0	1.4	1.2	1.4	1.2	1.1	.51	.63	.57	.06	.08
13	1.4	e1.1	1.4	1.4	1.4	1.2	1.0	.46	.63	.41	.06	.07
14	1.4	e1.2	1.4	e1.3	1.5	1.2	1.0	.46	.57	.32	.06	.07
15	1.4	e1.3	1.4	e1.0	1.6	1.1	1.0	.46	.36	.28	.05	.08
16	1.2	1.6	1.4	e.80	1.5	1.1	1.0	.41	.46	.17	.06	.06
17	1.4	1.6	1.4	e.85	1.2	1.2	1.0	1.1	.46	.15	.07	.07
18	1.1	1.6	1.2	e.90	1.2	1.4	.94	1.0	.41	.28	.08	.08
19	1.2	1.5	1.2	e.95	1.4	1.4	.85	.94	.70	.28	.07	.08
20	1.2	1.8	1.2	e1.0	1.2	1.4	.94	1.0	1.2	.22	.05	.08
21	1.1	1.9	1.2	e1.1	1.2	1.6	.94	1.2	.70	.17	.08	.08
22	1.1	2.1	1.2	e1.0	1.2	1.5	.94	1.1	.57	.20	.07	.08
23	1.1	1.8	1.2	e1.1	1.2	1.5	.94	1.1	.57	.22	.06	.11
24	1.2	1.8	1.2	1.2	1.2	1.5	1.0	1.1	.51	.15	.04	.08
25	1.2	1.6	1.2	1.4	e1.1	1.4	.94	1.0	.51	.11	.08	.08
26	1.2	1.6	1.1	1.5	e1.1	1.4	.94	.85	.41	.11	.11	.08
27	1.1	1.6	1.2	1.6	1.2	1.6	.94	1.2	.36	.11	.11	.08
28	1.1	1.6	1.2	1.5	1.2	1.5	.94	1.2	.36	.13	.13	.08
29	1.1	1.6	1.1	1.6	---	1.4	.78	1.2	.28	.09	.08	.08
30	1.1	1.6	1.2	1.6	---	1.4	.85	1.2	.25	.08	.07	.13
31	1.1	---	1.4	1.6	---	1.4	---	.94	---	.06	.06	---
TOTAL	45.6	44.2	41.0	37.40	38.6	41.4	30.38	26.50	18.19	6.03	2.55	2.46
MEAN	1.47	1.47	1.32	1.21	1.38	1.34	1.01	.85	.61	.19	.082	.082
MAX	2.6	2.1	1.6	1.6	1.6	1.6	1.4	1.2	1.2	.57	.36	.13
MIN	1.1	1.0	1.1	.80	1.1	1.1	.78	.41	.25	.06	.03	.04
AC-FT	90	88	81	74	77	82	60	53	36	12	5.1	4.9

CAL YR 1986 TOTAL 1399.25 MEAN 3.83 MAX 340 MIN .32 AC-FT 2780
WTR YR 1987 TOTAL 334.30 MEAN .92 MAX 2.6 MIN .03 AC-FT 663

e Estimated

06307600 HANGING WOMAN CREEK NEAR BIRNEY, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water year 1975 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: November 1980 to July 1983, October 1985 to September 1987 (discontinued).

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

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 3,780 microsiemens, July 3, 1986; minimum daily, 263 microsiemens, Feb. 27, 1986.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum daily, 3,530 microsiemens, July 3; minimum daily, 2,370 microsiemens, Sep. 7.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
NOV 19...	1145	1.5	50	1	3320	4.5	0.0	677	11.7	91
JAN 07...	1310	1.4	100	2	3300	-3.0	0.0	687	12.2	94
FEB 11...	0940	1.4	0	0	2840	5.5	1.0	685	12.0	95
APR 02...	1155	1.4	0	0	2840	6.0	10.0	687	11.5	114
MAY 13...	0915	0.49	50	1	3220	18.0	18.0	680	6.9	83
JUN 24...	0920	0.58	0	0	2170	20.0	18.0	686	7.1	84
AUG 05...	0910	0.03	0	0	3110	25.5	19.0	679	6.0	74
SEP 16...	0915	0.05	100	10	2430	10.5	15.0	684	8.0	89

DATE	PH (STAND-ARD UNITS) (00400)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV 19...	8.00	1000	460	120	170	480	7	16	538	1400
JAN 07...	8.10	1100	570	190	160	410	5	16	564	1300
FEB 11...	8.10	1000	570	130	170	500	7	11	454	1700
APR 02...	8.30	810	340	110	130	390	6	14	469	1200
MAY 13...	8.10	940	540	130	150	450	6	18	404	1300
JUN 24...	8.10	730	220	78	130	430	7	16	515	830
AUG 05...	8.30	700	190	48	140	490	8	17	507	1100
SEP 16...	8.40	570	100	46	110	390	7	17	467	930

YELLOWSTONE RIVER BASIN

06307600 HANGING WOMAN CREEK NEAR BIRNEY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)
NOV 19...	13	1.0	17	--	2500	3.5	10	<0.100	0.010	0.39
JAN 07...	18	0.90	18	--	2500	3.3	9.3	<0.100	0.020	0.18
FEB 11...	15	0.80	12	--	2800	3.8	11	0.100	0.080	0.62
APR 02...	15	0.90	15	2190	2200	3.0	8.3	<0.100	0.040	0.36
MAY 13...	18	1.2	11	--	2300	3.2	3.1	<0.100	0.050	0.95
JUN 24...	18	1.0	5.8	--	1800	2.5	2.8	<0.100	0.020	0.68
AUG 05...	16	1.3	1.9	--	2100	2.9	0.17	<0.100	<0.010	--
SEP 16...	15	1.2	1.3	--	1800	2.4	0.24	<0.100	<0.010	--

DATE	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHORUS, TOTAL (MG/L AS P) (00665)	PHOSPHORUS, DISSOLVED (MG/L AS P) (00666)	CARBON, ORGANIC DISSOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUSPENDED TOTAL (MG/L AS C) (00689)	BORON, DISSOLVED (UG/L AS B) (01020)	IRON, DISSOLVED (UG/L AS FE) (01046)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 19...	0.40	0.020	--	--	--	300	20	72	0.29	73
JAN 07...	0.20	<0.010	--	--	--	300	20	99	0.37	16
FEB 11...	0.70	0.040	--	--	--	300	40	62	0.23	59
APR 02...	0.40	0.030	<0.010	5.0	0.3	270	20	25	0.09	80
MAY 13...	1.0	0.050	--	--	--	340	20	35	0.05	82
JUN 24...	0.70	0.050	--	7.7	0.4	350	30	20	0.03	52
AUG 05...	1.3	0.050	--	--	--	380	20	7	0.00	96
SEP 16...	0.60	0.030	--	8.2	0.4	330	30	33	0.00	70

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)
JUN 24...	0920	2	2	<10	<10	<1	<1	<10	<10	2	<1	220
SEP 16...	0915	--	2	--	<10	--	<1	--	<10	--	2	--

DATE	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DISSOLVED (UG/L AS PB) (01049)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	MERCURY DISSOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
JUN 24...	10	<5	60	40	<0.10	<0.1	1	1	<1	<1	<10	<10
SEP 16...	--	<5	--	20	--	0.1	--	3	--	1	--	<10

06307600 HANGING WOMAN CREEK NEAR BIRNEY, MT--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3080	3040	3070	3300	3010	2800	2900	3080	2890	3070	2850	2680
2	2990	3060	3030	3300	2950	2790	2860	3090	2950	3130	2900	2710
3	3020	3080	3100	3360	2950	2840	2910	3070	2940	3130	2920	2750
4	3170	3060	3190	3290	2890	2740	2900	3020	2990	3110	2960	2780
5	3250	3070	3170	3280	2870	2760	2920	3090	3020	3070	3010	2630
6	3170	3090	3190	3260	2840	2710	2940	3060	3010	3060	3110	2420
7	3050	3090	3250	3190	2830	2700	2960	3090	2960	3100	2520	2370
8	3020	3050	3210	3180	2780	2630	3020	3100	2970	3130	2700	2430
9	2950	3120	3260	3170	2780	2680	3010	3110	2990	3170	2750	2430
10	2970	3160	3300	3230	2790	2740	3000	3100	2960	3140	2770	2450
11	2920	3180	3280	3260	2760	2720	2990	3080	2950	2790	2790	2420
12	2890	3250	3330	3210	2730	2700	3000	3130	2960	2760	2890	2420
13	2950	3350	3260	3160	2690	2720	3020	3150	2990	2710	2940	2460
14	2920	3330	3330	3140	2700	2690	3000	3180	2980	2720	2990	2480
15	2910	3310	3400	3160	2680	2720	3000	3090	3010	2700	---	2470
16	2930	3260	3410	3210	2660	2780	3010	3170	3010	2710	2670	2490
17	2960	3250	3420	3290	2680	2750	2990	2920	2960	2760	3020	2550
18	2990	3250	3410	3300	2670	2790	2980	2890	2980	2680	3060	2580
19	3030	3240	3460	3250	2680	2750	2970	2900	2930	2680	3030	2600
20	3070	3210	3510	3210	2690	2680	3000	2840	2830	2720	3040	2590
21	3130	3110	3530	3240	2710	2700	3020	2890	2820	2780	3030	2590
22	3190	3100	3490	3210	2740	2730	3030	2900	2850	2820	2960	2590
23	3180	3080	3470	3150	2750	2730	3030	2890	2860	2760	2910	2570
24	3180	3100	3440	3200	2730	2740	3010	2870	2910	2780	2940	2570
25	3130	3090	3410	3190	2740	2800	3010	2860	3020	2790	2820	2570
26	3140	3070	3410	3130	2770	2810	3010	2870	3050	2810	2820	2590
27	3140	3090	3370	3110	2790	2800	3020	2850	3070	2770	2560	2640
28	3150	3090	3400	3030	2840	2800	3010	2810	3050	2760	2560	2690
29	3130	3110	3370	3020	---	2870	3080	2820	3050	2760	2560	2710
30	3160	3070	3430	3000	---	2900	3030	2800	3050	2800	2620	2770
31	3150	---	3400	2980	---	2960	---	2870	---	2850	2630	---
MEAN	3062	3145	3332	3194	2775	2759	2988	2987	2967	2872	---	2567

YELLOWSTONE RIVER BASIN

06307616 TONGUE RIVER AT BIRNEY DAY SCHOOL BRIDGE, NEAR BIRNEY, MT

LOCATION.--Lat 45°24'42", long 106°27'26", in SE¼SW¼SW¼ sec.8, T.5 S., R.43 E., Rosebud County, Hydrologic Unit 10090102, on left bank, 60 ft upstream from Bureau of Indian Affairs bridge, 0.2 mi east of Birney Day School, 5.5 mi downstream from Cook Creek, 6.5 mi northeast of Birney, and at mile 144.3.

DRAINAGE AREA.--2,621 mi^2.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Elevation of gage is 3,060 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 6-22, Dec. 5 to Mar. 2, Apr. 3-12. Water-discharge records good except those for Apr. 3-12, which are fair, and those for Nov. 6-22, Dec. 5 to Mar. 2, which are poor. Flow regulated by Tongue River Reservoir (station number 06307000), and many small reservoirs in Wyoming (combined capacity, about 15,000 acre-ft. Numerous diversions for irrigation upstream from station.

AVERAGE DISCARGE.--8 years, 385 ft^3/s, 278,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,520 ft^3/s, June 14, 1984, gage height, 6.43 ft, from rating curve extended above 2,700 ft^3/s; minimum daily, 28 ft^3/s, Apr. 6-11, 1987.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 816 ft^3/s, May 18, gage height, 2.86 ft; maximum gage height, 4.55 ft, Nov. 12 (backwater from ice); minimum daily discharge, 28 ft^3/s, Apr. 6-11.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	262	347	337	e240	e230	e80	71	132	647	499	347	357
2	258	346	346	e250	e230	e110	70	135	647	493	344	352
3	261	347	348	e240	e240	90	e40	163	645	478	346	352
4	256	344	289	e240	e260	80	e30	213	642	468	348	369
5	257	343	e280	e250	e250	80	e29	243	447	431	341	377
6	255	e340	e250	e240	e240	79	e28	246	406	420	341	359
7	255	e330	e250	e235	e230	80	e28	239	398	415	358	366
8	255	e320	e240	e210	e220	80	e28	244	391	420	358	359
9	231	e300	e240	e200	e230	79	e28	248	391	422	348	357
10	131	e220	e200	e220	e240	77	e28	244	391	438	346	358
11	139	e250	e270	e240	e255	76	e28	248	390	455	343	359
12	212	e200	e250	e250	e250	76	e60	248	392	400	339	359
13	215	e250	e250	e270	e240	77	107	246	614	377	340	355
14	215	e300	e250	e260	e230	79	110	237	635	371	341	356
15	215	e350	e250	e240	e220	77	111	235	639	358	352	357
16	215	e450	e260	e190	e60	75	111	241	643	356	361	359
17	195	e420	e250	e210	e56	76	111	262	647	361	355	364
18	80	e400	e250	e240	e54	75	112	290	655	370	355	359
19	103	e470	e240	e230	e54	76	113	761	662	317	361	359
20	106	e450	e250	e210	e52	80	113	595	654	344	355	356
21	143	e500	e250	e220	e56	80	112	603	649	380	356	354
22	231	e400	e250	e210	e58	78	113	603	647	402	356	354
23	235	343	e260	e190	e56	74	113	623	645	385	355	353
24	287	343	e250	e280	e56	74	113	645	644	382	356	353
25	345	342	e250	e240	e54	75	112	643	642	385	378	353
26	347	339	e250	e220	e52	72	112	657	557	386	362	353
27	347	343	e250	e230	e56	74	116	665	512	364	353	352
28	347	338	e250	e220	e60	72	117	655	508	362	361	352
29	347	338	e240	e250	---	63	107	645	507	356	358	348
30	347	344	e250	e210	---	81	129	646	508	353	358	348
31	347	---	e250	e220	---	72	---	646	---	345	359	---
TOTAL	7439	10407	8050	7155	4289	2417	2500	12501	16755	12293	10931	10709
MEAN	240	347	260	231	153	78.0	83.3	403	558	397	353	357
MAX	347	500	348	280	260	110	129	761	662	499	378	377
MIN	80	200	200	190	52	63	28	132	390	317	339	348
AC-FT	14760	20640	15970	14190	8510	4790	4960	24800	33230	24380	21680	21240

CAL YR 1986 TOTAL 156256 MEAN 428 MAX 2520 MIN 80 AC-FT 309900
WTR YR 1987 TOTAL 105446 MEAN 289 MAX 761 MIN 28 AC-FT 209200

e Estimated

06307616 TONGUE RIVER AT BIRNEY DAY SCHOOL BRIDGE, NEAR BIRNEY, MT--Continued

WATER-QUALITY RECORD

PERIOD OF RECORD.--Water years 1980 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
JAN 07...	1100	245	--	--	860	-4.0	0.0
MAR 26...	1315	73	100	2	971	9.0	4.0
APR 03...	1110	50	--	--	933	11.5	8.5
APR 07...	1105	28	--	--	962	15.5	11.5
MAY 13...	1155	249	50	1	850	25.5	19.5
JUN 24...	1315	654	1	0	458	23.0	21.0
AUG 05...	1130	350	0	0	542	24.0	22.5
SEP 16...	1315	369	--	--	618	11.5	18.0

DATE	TIME	PH LAB (STAND-ARD UNITS) (00403)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
MAR 26...	1315	8.40	400	140	72	54	61	1	4.2
MAY 13...	1155	7.90	360	130	67	48	45	1	3.8
JUN 24...	1315	8.80	190	46	39	22	19	0.6	2.4
AUG 05...	1130	8.20	240	61	47	29	25	0.7	3.0

DATE	ALKA-LINITY LAB (MG/L AS CACO3) (90410	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, 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)
MAR 26...	260	260	4.6	0.40	4.6	620	0.84	122	<0.100
MAY 13...	235	230	4.5	0.30	5.0	540	0.74	366	<0.100
JUN 24...	142	97	2.1	--	3.7	270	0.37	478	--
AUG 05...	176	110	3.3	0.30	4.9	330	0.45	310	<0.100

DATE	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)
MAR 26...	--	90	--	--	13	--	--	--	--
MAY 13...	--	80	--	--	10	--	--	--	--
JUN 24...	1	360	<1	<10	6	12	6	<0.1	<1
AUG 05...	--	60	--	--	13	--	--	--	--

06308500 TONGUE RIVER AT MILES CITY, MT
(National stream quality accounting network station)

LOCATION.--Lat 46°20'44", long 105°48'10", in NE¼NE¼SE¼ sec.23, T.7 N., R.47 E., Custer County, Hydrologic Unit 10090102, on right bank 4 mi south of Miles City and at mile 8.1.

DRAINAGE AREA.--5,379 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1938 to April 1942, April 1946 to current year. Published as "near Miles City" April 1938 to April 1942. Not equivalent to records published as "near Miles City" May 1929 to October 1932. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,375.76 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). April 1938 to April 1942, nonrecording gage at site 8 mi upstream at different datum. April 1946 to Sept. 30, 1963, at datum 1.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 8 to Mar. 5, Mar. 21, 22, Mar. 27 to Apr. 1. Water-discharge records good except those for estimated daily discharges, which are poor. Flow regulation by Tongue River Reservoir (station 06307000), and many small reservoirs in Wyoming (combined capacity about 15,000 acre-ft). Diversions for irrigation of about 100,800 acres upstream from station.

AVERAGE DISCHARGE.--44 years (1938-41, 1946-87), 432 ft^3/s, 313,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,300 ft^3/s, June 15, 1962, gage height, 12.33 ft, present datum, from rating curve extended above 8,220 ft^3/s on basis of float measurement; maximum gage height, 13.27 ft Mar. 19, 1960, Feb. 15, 1971 (ice jam), present datum; no flow July 9-19, Aug. 13, 14, Sept. 28, 1940.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,180 ft^3/s, Aug. 14, gage height, 5.04 ft; minimum daily, 40 ft^3/s, Feb. 26.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	294	345	e360	e210	e280	e100	e210	127	585	241	148	260
2	297	388	e350	e220	e290	e130	186	127	583	210	151	260
3	304	384	e310	e240	e280	e210	147	124	570	173	178	253
4	299	380	e270	e260	e290	e220	141	96	572	217	169	253
5	290	380	e240	e230	e300	e200	132	74	587	235	167	285
6	283	380	e220	e210	e320	172	120	73	592	230	133	318
7	274	380	e190	e190	e330	158	109	73	515	193	134	283
8	267	e380	e200	e210	e320	148	97	71	409	165	130	243
9	266	e300	e170	e230	e300	143	93	68	370	143	130	228
10	261	e150	e210	e250	e310	139	88	64	354	152	137	219
11	263	e170	e260	e290	e310	137	89	60	340	197	135	219
12	267	e160	e250	e280	e300	137	89	62	312	255	128	224
13	235	e200	e260	e250	e290	137	86	58	282	296	124	234
14	220	e250	e270	e200	e270	134	86	53	261	274	1270	265
15	229	e280	e280	e170	e280	134	84	53	329	196	764	251
16	235	e330	e270	e190	e200	134	82	55	450	172	386	252
17	237	e380	e260	e210	e160	134	102	70	457	168	359	256
18	229	e360	e240	e240	e130	133	112	95	443	184	216	260
19	127	e380	e220	e230	e100	131	113	76	493	224	183	274
20	152	e400	e200	e240	e88	128	116	136	521	221	196	275
21	131	e420	e220	e220	e76	e130	117	446	507	215	195	274
22	120	e440	e240	e200	e66	e130	118	500	494	222	192	272
23	143	e460	e260	e180	e58	133	118	433	487	237	190	271
24	143	e500	e270	e190	e52	131	119	437	440	245	190	262
25	193	e450	e270	e200	e45	126	124	445	427	241	198	243
26	213	e430	e260	e220	e40	125	127	467	415	232	314	243
27	267	e410	e250	e240	e42	e130	124	750	402	225	387	250
28	318	e400	e240	e260	e50	e120	124	737	367	215	287	251
29	327	e380	e230	e270	---	e100	125	688	286	201	254	251
30	330	e370	e220	e260	---	e110	125	638	264	172	242	251
31	338	---	e210	e270	---	e130	---	596	---	154	256	---
TOTAL	7552	10637	7700	7060	5577	4324	3503	7752	13114	6505	7943	7680
MEAN	244	355	248	228	199	139	117	250	437	210	256	256
MAX	338	500	360	290	330	220	210	750	592	296	1270	318
MIN	120	150	170	170	40	100	82	53	261	143	124	219
AC-FT	14980	21100	15270	14000	11060	8580	6950	15380	26010	12900	15750	15230

CAL YR 1986 TOTAL 160129 MEAN 439 MAX 2670 MIN 120 AC-FT 317600
WTR YR 1987 TOTAL 89347 MEAN 245 MAX 1270 MIN 40 AC-FT 177200

e Estimated

06308500 TONGUE RIVER AT MILES CITY, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1946 to current year. October 1977 to December 1985 samples collected at private ranch bridge 11 mi upstream from gaging station.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1965 to September 1981.
WATER TEMPERATURE: April 1949 to September 1983.
SUSPENDED-SEDIMENT DISCHARGE: April 1946 to September 1951. October 1977 to December 1985.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1965-81): Maximum daily, 1,520 microsiemens, May 24, 1981; minimum daily, 215 microsiemens, Feb. 16, 1971.
WATER TEMPERATURE (water years 1949-83): Maximum recorded, 31.0°C July 14, 1983; minimum 0.0°C on many days during winter periods.
SEDIMENT CONCENTRATION (water years 1946-51, 1977-85): Maximum daily mean, 18,900 mg/L, Aug. 13, 1946; minimum daily mean, 1 mg/L, Aug. 14, 15, 1947.
SEDIMENT LOAD (water years 1946-51m 1977-85): Maximum daily, 122,000 tons, June 5, 1948; minimum daily, <0.1 ton on many days in August and September 1949.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)
OCT								
02...	1420	295	--	--	915	6.0	10.0	--
29...	0830	326	--	--	840	4.5	6.5	--
DEC								
17...	1230	255	0	0	1040	2.0	0.0	706
JAN								
28...	0845	267	--	--	1060	1.0	0.0	--
MAR								
25...	0825	125	100	2	1120	1.0	2.0	703
APR								
30...	0830	125	--	--	1120	17.5	16.5	--
JUN								
03...	0850	571	0	0	668	14.0	14.5	711
JUL								
15...	0800	199	--	--	685	22.0	20.0	--
AUG								
18...	0820	227	30	1	696	12.0	15.0	708

DATE	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BICAR-BONATE WATER WHOLE IT-FLD (MG/L) (00450)	CAR-BONATE WATER WHOLE IT-FLD (MG/L) (00447)	ALKA-LINITY WH WAT TOTAL FIELD MG/L AS CACO3 (00410)
OCT							
02...	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--
DEC							
17...	12.8	95	K2	K13	350	16	314
JAN							
28...	--	--	--	--	--	--	--
MAR							
25...	11.8	93	K10	26	345	2	286
APR							
30...	--	--	--	--	--	--	--
JUN							
03...	8.8	93	K210	470	211	0	170
JUL							
15...	--	--	--	--	--	--	--
AUG							
18...	8.1	87	2300	6500	--	--	--

YELLOWSTONE RIVER BASIN

06308500 TONGUE RIVER AT MILES CITY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	PH (STANDARD UNITS) (00400)	TURBIDITY (NTU) (00076)	HARDNESS (MG/L AS CACO3) (00900)	HARDNESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM ADSORPTION RATIO (00931)
DEC 17...	1230	8.80	5.8	450	130	79	60	74	2
MAR 25...	0825	8.60	6.0	420	130	72	58	110	2
JUN 03...	0850	8.00	70	260	87	50	32	38	1
AUG 18...	0820	8.20	690	250	48	50	29	70	2

DATE	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)
DEC 17...	4.6	--	290	5.8	0.30	5.5	701	710	0.95
MAR 25...	5.6	250	340	7.6	0.30	5.5	762	770	1.0
JUN 03...	3.3	184	160	3.0	0.20	5.8	408	390	0.55
AUG 18...	6.5	197	170	5.1	0.30	9.0	459	460	0.62

DATE	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHORUS, TOTAL (MG/L AS P) (00665)	PHOSPHORUS, DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P) (00671)
DEC 17...	483	<0.010	<0.100	--	0.050	0.30	0.010	<0.010	<0.010
MAR 25...	257	<0.010	<0.100	0.020	0.010	0.40	0.010	<0.010	<0.010
JUN 03...	629	<0.010	<0.100	0.060	0.060	1.1	0.130	0.010	<0.010
AUG 18...	281	<0.010	0.230	0.010	--	2.3	0.180	0.020	<0.010

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)	LITHIUM DISSOLVED (UG/L AS LI) (01130)
DEC 17...	1230	<10	<1	78	<0.5	<1	<1	<3	2	6	<5	37
MAR 25...	0825	40	<1	44	<0.5	<1	<1	<3	2	13	<5	21
JUN 03...	0850	20	<1	56	<0.5	<1	1	<3	2	3	<5	24
AUG 18...	0820	20	2	88	0.9	<1	<1	<3	5	150	<5	19

DATE	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
DEC 17...	5	<0.1	<10	1	<1	<1	740	<6	7	69	48	71
MAR 25...	10	<0.1	<10	2	<1	<1	490	<6	<3	24	8.1	85
JUN 03...	1	<0.1	<10	<1	<1	<1	440	<6	3	227	350	76
AUG 18...	26	0.1	<10	4	<1	<1	680	<6	11	1600	981	99

YELLOWSTONE RIVER BASIN

06309000 YELLOWSTONE RIVER AT MILES CITY, MT

LOCATION.--Lat 46°25'18", long 105°51'38", in NE¼SW¼NW¼ sec.28, T.8 N., R.47 E., Custer County, Hydrologic Unit 10100001, on left bank at upstream side of bridge on State Highway 22 at Miles City, 0.8 mi downstream from Tongue River, and at mile 184.2.

DRAINAGE AREA.--48,253 mi^2.

PERIOD OF RECORD.--September 1922 to September 1923, August 1928 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,333.3 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to May 6, 1929, nonrecording gages at pumping plant 1.2 mi downstream at different datums. May 6, 1929, to Sept. 30, 1931, nonrecording gage, and Oct. 1, 1931, to Nov. 10, 1937, water-stage recorder 300 ft upstream from present site at same datum. Nov. 11, 1937, to Sept. 30, 1946, water-stage recorder at pumping plant 1.2 mi downstream at different datum. Oct. 1, 1946, to Mar. 15, 1979, water-stage recorder at site 300 ft upstream at present datum. Mar. 16, 1979, to Sept. 21, 1979, nonrecording gage at present site and datum. Sept. 22, 1979, recording gage established at same site and datum.

REMARKS.--Estimated dialy discharges: Nov. 07 to Jan. 30, and Feb. 25 to Mar. 1. Water-discharge records good except those for estimated daily discharges, which are poor. Some regulation by reservoirs on tributary streams. Diversions for irrigation of about 1,100,000 acres upstream from station (does not include flood irrigation).

AVERAGE DISCHARGE.--60 years (1922-23, 1928-87), 11,550 ft^3/s, 8,368,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 102,000 ft^3/s, May 22, 1978, gage height, 16.50 ft, result of discharge measurement; maximum gage height, 21.7 ft, Mar. 20, 1944 (ice jam, from floodmark, at site 300 ft upstream at present datum); minimum discharge, 996 ft^3/s, Dec. 14, 1932.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 24,100 ft^3/s, May 29, gage height, 6.95 ft; minimum daily, 4,800 ft^3/s, Jan. 19.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11200	9680	e8800	e7200	6830	e5100	6700	11900	21600	7910	7880	8370
2	11200	9760	e8700	e6800	6680	5410	6970	12700	20700	7640	8100	7970
3	11100	9860	e8500	e6600	6640	5910	7120	13700	20400	7260	8070	7620
4	11200	9850	e8400	e6800	6740	6190	7260	14200	19100	7390	7580	7310
5	11500	9700	e8300	e7000	6760	6100	7090	13000	17300	7690	6950	7180
6	11100	9650	e8200	e7000	6660	6000	6940	10600	16300	8000	6260	7430
7	10800	e9600	e8000	e7000	6640	6110	6950	9000	15400	7950	5850	7550
8	10700	e9400	e7700	e6800	6560	6260	6990	8470	15000	7360	5630	7480
9	10600	e9200	e7300	e6600	6630	6270	7040	9100	15100	6880	5580	7340
10	10600	e8800	e7200	e6200	6540	6360	7240	10100	17600	6730	5640	7140
11	10600	e8400	e7300	e6300	6540	6320	7320	10700	19500	6820	5690	6890
12	10400	e7600	e7400	e6500	6440	6110	6670	11100	18800	7870	5590	6710
13	10400	e6800	e6800	e6700	6450	6060	6330	11200	18100	12200	5350	6640
14	10200	e6500	e7000	e7000	6440	6190	6210	10500	16600	15500	8590	6560
15	10100	e7600	e7000	e6700	6450	6150	6190	10500	15700	13400	6830	6450
16	10200	e8600	e7000	e6200	6370	6190	6130	11200	14800	11200	6340	6340
17	9680	e10000	e7000	e5600	6310	6220	6050	11700	13600	10100	6800	6320
18	7740	e10500	e7000	e5200	6250	6170	5920	12700	12900	10100	6590	6270
19	9450	e10200	e7200	e4800	6170	6090	6040	15500	12800	10600	6460	6250
20	10200	e10500	e7200	e5100	6060	6050	6430	16600	12600	11300	6300	6290
21	10200	e10500	e7300	e5400	6030	6140	7120	16600	12100	12400	6140	6250
22	10100	e10600	e7400	e5600	5870	6130	7840	16600	11700	12100	5800	6080
23	10100	e10700	e7500	e5800	5840	6020	7530	15500	11300	11100	5620	5990
24	10100	e10300	e7500	e6200	5760	5860	6880	14200	11000	11100	5760	5900
25	10000	e10000	e7500	e6600	e5400	5800	6700	12900	10600	11500	6130	5770
26	10100	e9800	e7500	e7000	e5000	5810	7040	12000	10200	11000	6720	5620
27	9760	e9700	e7400	e7000	e5000	5950	7960	13900	9650	10100	8860	5530
28	9700	e9500	e7400	e7000	e5000	5950	8870	14900	9130	9560	10200	5580
29	9690	e9300	e7300	e7000	---	6520	9650	21300	8510	8900	9970	5450
30	9670	e9000	e7300	e7000	---	6770	10800	22600	8120	8260	9320	5540
31	9680	---	e7200	6970	---	6690	---	22000	---	7790	8800	---
TOTAL	318070	281600	233300	199670	174060	188900	213980	416970	436210	297710	215400	197820
MEAN	10260	9387	7526	6441	6216	6094	7133	13450	14540	9604	6948	6594
MAX	11500	10700	8800	7200	6830	6770	10800	22600	21600	15500	10200	8370
MIN	7740	6500	6800	4800	5000	5100	5920	8470	8120	6730	5350	5450
AC-FT	630900	558600	462800	396000	345200	374700	424400	827100	865200	590500	427200	392400

CAL YR 1986 TOTAL 4787470 MEAN 13120 MAX 51400 MIN 3300 AC-FT 9496000
WTR YR 1987 TOTAL 3173690 MEAN 8695 MAX 22600 MIN 4800 AC-FT 6295000

e Estimated

06324500 POWDER RIVER AT MOORHEAD, MT

LOCATION.--Lat 45°04'04", long 105°52'10", in NW¼SE¼NW¼ sec.8, T.9 S., R.48 E., Powder River County, Hydrologic Unit 10090207, on left bank 500 ft downstream from discontinued post office at Moorhead, 6.2 mi upstream from Buffalo Creek, and at mile 184.8.
DRAINAGE AREA.--8,088 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1929 to September 1972, October 1974 to current year. Monthly discharge only for some periods, published in WSP 1309.
REVISED RECORDS.--WSP 1309: 1932(M). WSP 1729: Drainage area.
GAGE.--Water-stage recorder. Datum of gage is 3,334.6 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Aug. 28, 1931, nonrecording gage at site 0.3 mi upstream at different datum. Aug. 28, 1931, to Mar. 21, 1956, water-stage recorder at site 1.2 mi upstream at different datum. Mar. 22 to July 24, 1956, nonrecording gage at site 0.3 mi downstream at different datum. July 25 to Sept. 12, 1956, nonrecording gage at present site and datum.
REMARKS.--Estimated daily discharges: Nov. 10 to Feb. 15. Water-discharge records good except those for period of estimated daily discharges, which are poor. Some regulation by three reservoirs in Wyoming with combined usable capacity of 36,800 acre-ft. Diversions for irrigation of about 66,300 acres upstream from station.
AVERAGE DISCHARGE.--56 years, 458 ft^3/s, 331,800 acre-ft/yr.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 33,000 ft^3/s, May 20, 1978, gage height, 15.24 ft; maximum gage height, 17.7 ft, Mar. 21, 1956, site and datum then in use (ice jam); no flow at times.
EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Sept. 30, 1923, reached a stage of 19 ft, site and datum used 1931-56, from information by local residents.
EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 24	1930	3,770	5.22	June 18	2230	4,410	5.58
Nov. 22	----	unknown	ice jam	June 10	0830	4,760	5.77
Feb. 15	----	unknown	ice jam	July 18	0300	*11,400	*8.69

Minimum daily discharge, 4.0 ft^3/s, Nov. 11.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	327	422	e250	e200	e270	214	398	1130	526	179	313	387
2	312	393	e230	e210	e300	202	416	1080	571	176	372	372
3	319	392	e180	e210	e320	346	838	1110	488	182	373	349
4	345	380	e130	e230	e340	527	806	1120	415	188	344	347
5	578	375	e150	e220	e360	757	692	1030	363	289	270	386
6	625	389	e150	e230	e380	1110	920	948	319	241	212	381
7	558	449	e140	e220	e400	1870	1030	757	291	272	189	420
8	455	465	e120	e210	e380	2390	992	653	282	251	171	370
9	391	419	e100	e190	e400	2260	899	513	1030	205	151	396
10	361	e10	e80	e170	e430	2230	737	437	3780	219	140	404
11	340	e4.0	e140	e180	e420	1490	664	417	2070	196	131	365
12	332	e50	e120	e210	e410	1110	633	405	1900	275	219	373
13	321	e30	e130	e250	e500	832	572	333	1400	418	159	364
14	313	e100	e150	e200	e800	734	507	307	1080	441	142	370
15	308	e200	e160	e150	e1200	663	468	326	851	379	165	351
16	308	e300	e180	e100	1080	742	440	268	745	359	159	332
17	305	e280	e190	e120	920	1050	409	290	925	324	232	342
18	301	e260	e210	e140	844	1010	402	349	1050	5340	237	352
19	299	e310	e200	e130	683	831	435	696	1250	1100	179	353
20	294	e300	e210	e120	552	755	645	838	1780	559	143	345
21	291	e350	e220	e130	475	699	786	657	1050	361	128	346
22	296	e320	e230	e120	403	673	795	517	694	337	117	395
23	639	e320	e240	e110	426	623	641	464	560	313	107	374
24	1990	e350	e260	e120	370	518	563	410	478	253	107	356
25	2410	e320	e240	e130	351	468	506	453	423	226	187	336
26	1190	e330	e230	e140	322	480	536	682	372	224	234	318
27	846	e330	e220	e160	284	476	708	765	305	242	373	307
28	657	e290	e230	e180	264	459	789	652	261	568	436	290
29	548	e280	e220	e200	---	519	927	526	235	970	418	279
30	479	e270	e210	e230	---	533	1240	398	207	485	417	268
31	439	---	e200	e250	---	467	---	665	---	350	431	---
TOTAL	17177	8688.0	5720	5460	13884	27038	20394	19196	25701	15922	7256	10628
MEAN	554	290	185	176	496	872	680	619	857	514	234	354
MAX	2410	465	260	250	1200	2390	1240	1130	3780	5340	436	420
MIN	291	4.0	80	100	264	202	398	268	207	176	107	268
AC-FT	34070	17230	11350	10830	27540	53630	40450	38080	50980	31580	14390	21080

CAL YR 1986 TOTAL 156256.0 MEAN 428 MAX 3600 MIN 4.0 AC-FT 309900
WTR YR 1987 TOTAL 177064.0 MEAN 485 MAX 5340 MIN 4.0 AC-FT 351200

e Estimated

06324500 POWDER RIVER AT MOORHEAD, MT--Continued

WATER-QUALITY RECORDS

LOCATION.--Samples collected at bridge on county road, 1.2 mi upstream from gaging station.

PERIOD OF RECORD.--Water years 1951-53, 1956-57, 1969-72, 1975 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: July 1986 to current year.
WATER TEMPERATURE: February 1951 to September 1953, October 1955 to September 1957, October 1974 to September 1977, March 1978 to September 1981 (seasonal records only).
SUSPENDED-SEDIMENT DISCHARGE: October 1974 to September 1977, March 1978 to current year (seasonal records only).

REMARKS.--Flow regulated by reservoirs and diversions for irrigation upstream from station. Unpublished records of once-daily water temperature are available in files of Montana District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 3,340 microsiemens, Aug. 18, 1987; minimum daily, 949 microsiemens, May 4, 1987.
WATER TEMPERATURE (water years 1951-53, 1955-57, 1975-81): Maximum daily, 33.0°C, July 13, 1981; minimum daily, 0.0°C on many days during winter.
SEDIMENT CONCENTRATION: Maximum daily mean, 53,500 mg/L, May 27, 1980; minimum daily mean, 5 mg/L, Sept. 15, 1975.
SEDIMENT LOAD: Maximum daily, 2,230,000 tons, May 20, 1978; minimum daily, 0.24 ton, Sept. 15, 1975.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum daily, 3,340 microsiemens, Aug. 18; minimum daily, 949 microsiemens, May 4.
SEDIMENT CONCENTRATION: Maximum daily mean, 31,200 mg/L, June 10; minimum daily mean, 574 mg/L, Mar. 3.
SEDIMENT LOAD: Maximum daily, 404,000 tons, July 18; minimum daily, 237 tons, Aug. 24.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
NOV										
20...	1040	304	30	1	2150	5.5	0.0	677	11.9	92
JAN										
08...	1105	216	0	0	2230	-5.0	0.0	682	10.6	82
FEB										
12...	0955	424	0	0	--	5.5	0.0	681	12.3	94
MAR										
24...	1205	502	20	1	2450	0.0	3.0	680	11.6	98
MAY										
14...	1310	323	20	1	1680	29.5	22.5	679	7.2	94
JUN										
25...	1005	423	0	0	1490	19.0	18.0	685	8.1	96
JUL										
21...	0930	363	90	2	1970	27.0	21.0	677	6.9	88
AUG										
06...	1125	210	0	0	2440	23.0	21.5	679	6.8	87
SEP										
17...	0955	343	50	1	1770	11.0	12.0	684	8.9	93

DATE	PH (STAND-ARD UNITS) (00400)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV									
20...	8.20	600	530	140	60	260	5	5.2	67
JAN									
08...	8.10	560	360	130	57	280	5	5.4	195
FEB									
12...	8.20	420	220	98	43	240	5	5.2	205
MAR									
24...	8.30	460	350	79	63	340	7	6.0	105
MAY									
14...	8.30	380	180	90	38	230	5	4.8	197
JUN									
25...	8.10	460	300	120	39	160	3	5.3	163
JUL									
21...	8.00	710	550	190	57	160	3	9.4	156
AUG									
06...	8.20	580	360	140	55	310	6	8.6	219
SEP									
17...	8.20	470	280	110	47	210	4	5.8	190

06324500 POWDER RIVER AT MOORHEAD, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P) (00666)
NOV 20...	650	170	0.30	11	1300	1.8	1100	0.630	<0.010
JAN 08...	600	200	0.50	11	1400	1.9	817	0.260	<0.010
FEB 12...	600	150	0.50	8.1	1300	1.7	1450	<0.100	0.010
MAR 24...	1000	120	0.60	7.0	1700	2.3	2280	0.410	0.010
MAY 14...	510	150	0.60	9.5	1200	1.6	1000	0.290	0.030
JUN 25...	520	83	0.50	9.7	1000	1.4	1180	0.100	0.030
JUL 21...	820	66	0.40	7.8	1400	1.9	1380	0.680	0.010
AUG 06...	810	140	0.60	8.0	1600	2.2	909	<0.100	0.010
SEP 17...	550	120	0.50	6.8	1200	1.6	1080	0.180	<0.010

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	OIL AND GREASE, TOTAL RECOV. GRAVI-METRIC (MG/L) (00556)
JUN 12...	0715	2160	1

DATE	TIME	DICAMBA (MED-IBEN) (BAN-VEL D) TOTAL (UG/L) (82052)	PICLO-RAM (TOR-DON) (AMDON) TOTAL (UG/L) (39720)	2,4-D, TOTAL (UG/L) (39730)	2, 4-DP TOTAL (UG/L) (82183)	2,4,5-T TOTAL (UG/L) (39740)	SILVEX, TOTAL (UG/L) (39760)
JUN 25...	1005	0.03	0.08	<0.01	<0.01	<0.01	<0.01
SEP 17...	0955	<0.01	0.05	<0.01	<0.01	<0.01	<0.01

DATE	TIME	TEMPER-ATURE WATER (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. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)
MAR 24...	1205	3.0	502	3460	4690	33	41
APR 30...	1750	22.0	1450	10500	41100	17	20
MAY 14...	1310	22.5	323	1260	1100	--	--
JUN 25...	1005	18.0	423	1930	2200	--	--
JUL 21...	0930	21.0	363	2380	2330	46	70
AUG 06...	1125	21.5	210	5910	3350	--	--
SEP 17...	0955	12.0	343	1700	1570	--	--

06324500 POWDER RIVER AT MOORHEAD, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	SED. SUSP. FALL DIAM. % FINER THAN .008 MM (70339)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAR 24...	49	56	64	74	96	100	--
APR 30...	26	35	76	96	99	100	--
MAY 14...	--	--	--	--	--	--	87
JUN 25...	--	--	--	--	--	--	77
JUL 21...	81	87	92	98	100	--	--
AUG 06...	--	--	--	--	--	--	99
SEP 17...	--	--	--	--	--	--	92

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2430	1960	2090	2290	2120	2680	2860	1000	2120	2280	1770	1680
2	2080	2050	2210	2330	2070	2540	2690	962	1850	2220	1880	1580
3	1990	2060	2230	2250	2050	2240	3060	997	1690	2220	2680	1660
4	2010	2090	2300	2320	2020	2600	3190	949	1740	2250	2730	1490
5	2080	2100	2080	2310	1970	2390	2880	972	---	2220	2690	1430
6	2370	2010	2420	2240	2020	2230	2900	1050	---	2750	2380	1410
7	2310	1960	2350	2190	1980	2250	3080	1060	1840	2540	2090	1670
8	1920	1880	2270	2160	1830	2060	2730	1570	1950	3190	2040	1700
9	1930	2080	2290	2200	1900	1860	2560	1480	1910	3010	2340	1580
10	1950	2340	2670	2250	1930	1780	2420	1460	2140	3110	2540	1690
11	1920	2520	2610	2350	1860	1830	2380	1450	1650	2570	2620	2160
12	1900	2220	1960	2360	1810	1660	2290	1540	1770	2140	2660	1900
13	1990	2180	2430	2260	1790	1640	2390	1550	1610	2220	1870	1910
14	1990	2300	2320	2210	2110	1680	2420	1690	1580	1530	2570	1820
15	2000	2350	2020	2210	2090	1890	2440	1740	1480	1520	3280	1700
16	2030	2100	2120	2310	1980	2190	2500	1880	1470	1760	3110	1700
17	2030	2030	2080	2400	1840	2530	2520	1870	1450	1680	2820	1740
18	2030	1990	2240	2520	1930	2330	2540	2290	1800	1620	3340	1720
19	2010	2010	2540	2660	2000	1990	2540	2130	1630	1730	2580	1720
20	2010	2060	2740	2590	2140	2040	2420	1860	1650	1720	2310	1660
21	2000	2240	2850	2440	2190	2040	2210	1860	1440	1900	2060	1640
22	2010	2290	3010	2400	2180	2170	1840	2030	1320	2010	2500	1830
23	2000	2210	2610	2380	2330	2430	1640	1890	1300	2490	2760	1900
24	2030	2130	2500	2370	2370	2520	1570	1910	1430	2890	2940	1930
25	2170	2080	2480	2320	2470	2580	1730	2110	1490	2800	2440	1830
26	1910	2060	2480	2290	2530	2500	1880	2190	1670	2520	2080	1840
27	1830	2110	2470	2410	2530	2520	2000	1930	1790	2090	2240	1790
28	1780	2040	2530	2390	2610	2690	1840	1810	1910	1800	2260	1760
29	1790	2100	2430	2290	---	2870	1630	2080	2020	1920	1820	1790
30	1850	2080	2430	2200	---	2960	1230	2010	2170	2000	1960	1770
31	1880	---	2360	2180	---	2950	---	2060	---	1760	1680	---
MEAN	2007	2121	2391	2325	2095	2279	2346	1657	---	2208	2421	1733

YELLOWSTONE RIVER BASIN

06324500 POWDER RIVER AT MOORHEAD, MT--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1											582	336
2											576	314
3											574	536
4											595	847
5											3970	9030
6											5530	16600
7											13900	70200
8											24800	160000
9											26000	159000
10											25900	156000
11											18700	75200
12											12200	36600
13											7600	17100
14											5300	10500
15											4300	7700
16											5650	11300
17											9950	28200
18											11000	30000
19											9400	21100
20											6650	13600
21											4900	9250
22											4660	8470
23											4180	7030
24											3360	4700
25											3260	4120
26											3350	4340
27											3260	4190
28											2870	3560
29											3900	5470
30											3950	5680
31											3190	4020
TOTAL											---	884993
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	3030	3260	8400	25600	7800	11100	720	348	4200	3550	4850	5070
2	2660	2990	7540	22000	6760	10400	590	280	4320	4340	3500	3520
3	7650	18600	6960	20900	4780	6300	978	481	4610	4640	4260	4010
4	8150	17700	5730	17300	3160	3540	2010	1020	8100	7520	3330	3120
5	8400	15700	5810	16200	2380	2330	2550	1990	7260	5290	1900	1980
6	12600	31300	6300	16100	1920	1650	3220	2100	5520	3160	1480	1520
7	12600	35000	3860	7890	1670	1310	3520	2590	4990	2550	2580	2930
8	12200	32700	3490	6150	1490	1130	3600	2440	2620	1210	2480	2480
9	11400	27700	4110	5690	3730	23300	8280	4580	1400	571	2350	2510
10	9150	18200	2780	3280	31200	318000	7220	4270	1490	563	4040	4410
11	7220	12900	2310	2600	25700	144000	5820	3080	1410	499	4110	4050
12	5450	9310	1960	2140	22200	114000	5100	3790	3060	2040	4540	4570
13	4560	7040	1560	1400	13300	50300	4210	4750	3230	1390	5380	5290
14	3330	4560	1390	1150	9780	28500	2650	3160	910	349	4460	4460
15	2810	3550	1890	1660	7300	16800	1700	1740	1340	597	2660	2520
16	2580	3070	1500	1090	6980	14000	1860	1800	1610	691	1760	1580
17	2340	2580	1440	1130	11200	28000	2080	2500	8210	6930	1700	1570
18	2100	2280	3810	3590	14400	56300	26000	404000	5100	9660	1650	1570
19	3780	4440	7170	14600	20800	85200	15800	46900	1300	5460	1420	1350
20	7160	12500	8000	18100	20000	96100	6500	9810	4900	1890	1150	1070
21	7290	15500	8310	14700	14800	42000	2580	2510	2600	899	1120	1050
22	6500	14000	9500	13300	7000	13100	4100	3730	1260	398	2160	2300
23	4890	8460	6400	8020	4600	6960	3360	2840	880	254	2310	2330
24	3710	5640	4600	5090	2860	3690	4890	3340	820	237	1960	1880
25	3270	4470	6600	8070	1940	2220	6950	4240	2060	1040	1830	1660
26	3690	5340	11400	21000	1690	1700	6500	3930	4090	2580	2020	1730
27	7000	13400	12800	26400	1340	1100	7400	4840	6300	6340	1380	1140
28	7500	16000	10400	18300	1090	768	13900	23100	0300	12100	1100	861
29	9200	23000	10200	14500	1000	634	17200	45700	5750	6490	950	716
30	10500	35200	7800	8380	845	472	18100	23700	6050	6810	840	608
31	---	---	12100	21700	---	---	9100	8600	6690	7790	---	---
TOTAL	---	406390	---	348030	---	1084904	---	628159	---	107838	---	73855

TOTAL LOAD FOR PERIOD: 3534169 TONS.

YELLOWSTONE RIVER BASIN

06324710 POWDER RIVER AT BROADUS, MT

LOCATION.--Lat 45°25'37", long 105°24'05", in NE¼NE¼SE¼ sec.3, T.5 S., R.51 E., Powder River County, Hydrologic Unit 10090207, on the right bank on the bridge approach on U.S. Highway 212, 0.4 mi downstream from Doyle Creek, 1.0 mi south of Broadus, 7.0 mi upstream from Little Powder River, and at mile 162.0.

DRAINAGE AREA.--8,748 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1975 to current year. Station operated seasonally March 1982 to current year.

REVISED RECORDS.--WDR MT-78-1: 1976(M), 1977(M).

GAGE.--Nonrecording gage. Datum of gage is 3,016.30 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Mar. 1-3, 21. Water-discharge records fair. Some regulation by three reservoirs in Wyoming with combined usable capacity of 36,800 acre-feet. Diversions for irrigation of about 70,000 acres upstream from station.

AVERAGE DISCHARGE.--6 years (1976-1981), 488 ft^3/s, 353,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,000 ft^3/s, May 21, 1978, gage height, 12.96 ft; minimum daily, 6.6 ft^3/s, July 19, 1977, July 10, 1985.

EXTREMES FOR CURRENT SEASON.--Peak discharges greater than base discharge of 4,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 10	2315	*4,590	*5.05	July 18	1730	*7,800	*6.13

Minimum discharge, 121 ft^3/s, Aug. 24, 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	e270	505	1260	560	245	336	437
2	---	---	---	---	---	e280	481	1070	465	212	279	400
3	---	---	---	---	---	e290	505	995	519	210	346	389
4	---	---	---	---	---	472	903	945	469	238	354	371
5	---	---	---	---	---	675	767	938	407	221	345	392
6	---	---	---	---	---	966	748	830	371	309	270	419
7	---	---	---	---	---	1560	896	754	347	263	262	415
8	---	---	---	---	---	2490	1030	635	322	282	214	450
9	---	---	---	---	---	2470	890	554	314	327	184	398
10	---	---	---	---	---	2290	736	449	2630	260	156	418
11	---	---	---	---	---	1700	711	381	2600	266	134	436
12	---	---	---	---	---	1150	675	397	2050	247	128	384
13	---	---	---	---	---	870	669	410	1550	323	152	395
14	---	---	---	---	---	693	664	309	1130	453	215	378
15	---	---	---	---	---	652	575	256	865	480	152	390
16	---	---	---	---	---	635	544	247	719	425	181	363
17	---	---	---	---	---	870	529	238	650	407	179	344
18	---	---	---	---	---	870	481	229	929	3420	182	341
19	---	---	---	---	---	748	481	347	1490	2930	293	354
20	---	---	---	---	---	711	524	701	1250	808	217	347
21	---	---	---	---	---	e681	729	704	1370	584	176	339
22	---	---	---	---	---	664	870	524	789	471	151	334
23	---	---	---	---	---	664	837	426	604	457	140	391
24	---	---	---	---	---	602	693	434	536	428	127	370
25	---	---	---	---	---	554	635	397	476	372	129	346
26	---	---	---	---	---	559	635	462	443	335	184	335
27	---	---	---	---	---	529	687	701	405	331	249	316
28	---	---	---	---	---	524	748	719	356	357	363	306
29	---	---	---	---	---	539	883	558	312	676	449	290
30	---	---	---	---	---	618	1270	431	275	866	425	276
31	---	---	---	---	---	575	---	393	---	464	419	---
TOTAL	---	---	---	---	---	27171	21301	17694	25203	17667	7391	11124
MEAN	---	---	---	---	---	876	710	571	840	570	238	371
MAX	---	---	---	---	---	2490	1270	1260	2630	3420	449	450
MIN	---	---	---	---	---	270	481	229	275	210	127	276
AC-FT	---	---	---	---	---	53890	42250	35100	49990	35040	14660	22060

e Estimated

YELLOWSTONE RIVER BASIN

06324710 POWDER RIVER AT BROADUS, MT--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1976 to current year.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: March 1976 to September 1979.
SUSPENDED-SEDIMENT DISCHARGE: October 1975 to September 1978, March 1979 to current year (seasonal record only).

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

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE (water years 1976-79): Maximum daily observed, 34.0°C, July 12, 1976; minimum daily, 0.0°C, on many days during winter.
SEDIMENT CONCENTRATION: Maximum daily mean, 44,100 mg/L July 29, 1977; minimum daily mean, 16 mg/L Sept. 27, 1981.
SEDIMENT LOAD: Maximum daily, 1,570,000 tons May 21, 1978; minimum daily, 1.1 tons Sept. 27, 1981.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATION: Maximum daily mean, 34,800 mg/L, June 11; minimum daily mean, 620 mg/L Mar. 2.
SEDIMENT LOAD: Maximum daily, 244,000 tons, June 11; minimum daily, 352 tons Aug. 25.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)
MAR									
10...	1730	2270	--	--	--	--	2.5	26000	159000
25...	0835	537	5	0	2650	-0.5	2.0	2840	4120
MAY									
01...	0840	1420	50	1	1340	16.0	18.0	12500	47900
14...	0755	323	1	0	1650	18.0	17.0	1690	1470
JUN									
11...	1300	2540	0	0	1910	26.5	20.5	34200	235000
JUL									
19...	1400	1910	--	--	1840	27.5	20.5	--	--
AUG									
06...	0755	284	50	1	2920	14.5	19.5	6570	5040
SEP									
17...	1430	339	80	1	1740	14.0	14.5	2710	2480

DATE	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .008 MM (70339)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAR									
10...	34	44	54	64	84	94	99	100	--
25...	40	51	62	70	78	89	100	--	--
MAY									
01...	18	22	29	42	86	98	100	--	--
14...	--	--	--	--	--	--	--	--	68
JUN									
11...	41	51	61	70	87	96	100	--	--
JUL									
19...	--	--	--	--	--	--	--	--	--
AUG									
06...	--	--	--	--	--	--	--	--	97
SEP									
17...	--	--	--	--	--	--	--	--	89

06324710 POWDER RIVER AT BROADUS, MT--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1											750	547
2											620	469
3											660	517
4											1420	1810
5											1900	3460
6											4590	12000
7											11100	46800
8											25800	173000
9											30400	203000
10											27000	167000
11											22500	103000
12											18400	57100
13											14200	33400
14											9300	17400
15											6950	12200
16											5650	9690
17											7210	16900
18											10000	23500
19											12100	24400
20											11000	21100
21											7590	14000
22											4980	8930
23											3960	7100
24											3240	5270
25											2770	4140
26											2610	3940
27											2560	3660
28											2560	3620
29											3010	4380
30											3350	5590
31											2750	4270
TOTAL											---	992193
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	2370	3230	10400	35400	12200	18400	1110	734	12800	11600	7650	9030
2	2390	3100	7250	20900	10200	12800	990	567	7200	5420	8420	9090
3	2310	3150	6740	18100	8400	11800	810	459	5380	5030	8650	9090
4	6520	15900	5830	14900	5770	7310	895	575	4500	4300	4490	4500
5	6860	14200	5740	14500	3880	4260	695	415	5040	4690	5240	5550
6	8230	16600	5880	13200	3200	3210	1420	1180	6300	4590	3760	4250
7	11100	26900	5480	11200	2500	2340	1650	1170	7100	5020	2650	2970
8	10700	29800	4840	8300	1990	1730	2100	1600	4800	2770	2770	3370
9	11000	26400	3840	5740	1710	1450	2990	2640	4100	2040	2890	3110
10	9490	18900	3170	3840	14400	154000	2520	1770	2720	1150	2900	3270
11	8230	15800	2810	2890	34800	244000	4560	3270	1520	550	3180	3740
12	6130	11200	2280	2440	27800	154000	6540	4360	1020	353	4220	4380
13	4870	8800	2420	2680	21800	91200	6480	5650	1360	558	5110	5450
14	3860	6920	1610	1340	13300	40600	7460	9120	2690	1560	6720	6860
15	3150	4890	1430	988	10800	25200	5690	7370	1590	653	6400	6740
16	2420	3550	1330	887	7900	15300	3130	3590	1490	728	5260	5160
17	2150	3070	1300	835	7400	13000	3010	3310	1110	536	3260	3030
18	2040	2650	1320	816	10200	25600	16300	239000	1300	683	2530	2330
19	2090	2710	2760	2590	26000	105000	25600	203000	3520	2780	2360	2260
20	2860	4050	10400	21400	23300	78600	17500	38200	11500	6740	2380	2230
21	4810	9470	8480	16100	23000	85100	11600	18300	10000	4750	2040	1870
22	6370	15000	8200	11600	23400	49800	4600	5850	4500	1830	1790	1610
23	5710	12900	9600	11000	10200	16600	2480	3060	2600	983	2060	2170
24	4220	7900	10400	12200	11100	16100	2320	2680	1640	562	2630	2630
25	3980	6820	9300	9970	4090	5260	2420	2430	1010	352	2450	2290
26	3300	5660	7650	9540	3260	3900	3310	2990	1420	705	2380	2150
27	3400	6310	12300	23300	2470	2700	5160	4610	2820	1900	2130	1820
28	5160	10400	14500	28100	2200	2110	5900	5690	5510	5970	2110	1740
29	8450	20100	11600	17500	1850	1560	8700	15900	9200	11200	1830	1430
30	10600	36300	10000	11600	1360	1010	24200	56600	8100	9290	1450	1080
31	---	---	10000	10600	---	---	21300	26700	6400	7240	---	---
TOTAL	---	352680	---	344456	---	1193940	---	672790	---	106533	---	115200

TOTAL LOAD FOR PERIOD: 3777792 TONS.

06324970 LITTLE POWDER RIVER ABOVE DRY CREEK, NEAR WESTON, WY

LOCATION.--Lat 44°55'37", long 105°21'10", in NW¼SW¼SW¼ sec.13, T.57 N., R.71 W., Campbell County, Hydrologic Unit 10090208, on left bank 3.1 mi upstream from Dry Creek, 5.0 mi south of the Wyoming-Montana State line, and 20 mi north of Weston.

DRAINAGE AREA.--1,235 mi^2.

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WDR WY-77-1: Drainage area. WDR WY-78-1: 1976(M).

GAGE.--Water-stage recorder. Elevation of gage is 3,410 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 8-11, Dec. 1-7, July 3-23. Records fair except those for estimated daily discharges, which are poor. Diversion upstream from station for irrigation of about 80 acres downstream from station. Flow occasionally affected by contributions from mine dewatering.

AVERAGE DISCHARGE.--15 years, 22.1 ft^3/s, 16,010 acre-ft/yr.

EXTREMES FOR PERIOD OR RECORD.--Maximum discharge, 5,300 ft^3/s, May 19, 1978, gage height, 11.62 ft; maximum gage height, 11.63 ft, Mar. 20, 1978 (backwater from ice); no flow at times some years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 130 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 4	1700	189	4.71	May 12	1230	229	4.96
Oct. 24	0600	*389	*5.69	May 17	1830	274	5.17
Nov. 23	1600	140	4.42	May 18	1000	172	4.63
Mar. 7	1200	149	4.47	aJuly 19	unknown	134	4.38
Apr. 2	0330	145	4.45				

a Most probable date.

Minimum daily discharge, 0.87 ft^3/s, Sept. 29.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	8.8	11	3.2	3.6	3.7	34	7.1	32	1.2	2.5	1.4
2	14	8.0	9.2	3.3	4.2	4.4	99	7.2	17	1.2	33	1.4
3	17	7.6	9.0	3.3	4.1	5.0	81	7.8	13	3.4	15	1.3
4	158	7.1	8.7	3.2	4.1	7.8	65	7.4	11	10	8.2	1.7
5	120	6.5	8.5	3.5	3.9	20	54	6.8	9.5	55	4.7	3.5
6	71	6.2	8.4	3.7	4.8	68	58	4.4	9.1	21	3.1	6.6
7	58	7.2	8.2	3.8	6.1	126	49	2.9	8.4	8.0	7.0	15
8	31	6.2	7.8	3.9	7.1	102	39	4.2	7.7	10	11	11
9	19	5.7	7.1	4.4	6.5	71	28	4.9	6.7	6.7	2.7	6.6
10	14	5.4	6.7	4.7	7.8	48	23	4.6	6.6	4.4	1.8	7.0
11	11	5.0	6.2	4.1	7.9	32	21	4.8	6.7	5.2	2.4	5.5
12	9.1	4.7	6.2	4.1	13	28	20	70	7.4	7.5	3.0	3.8
13	8.0	4.2	6.0	4.1	25	23	18	18	5.9	4.8	4.1	2.2
14	7.3	4.5	5.6	4.2	27	20	17	8.7	5.1	3.3	4.2	2.0
15	6.1	4.8	5.3	3.8	17	18	16	5.6	4.6	2.5	2.9	1.7
16	5.1	5.1	5.1	3.5	13	16	15	4.9	4.2	2.2	2.5	1.3
17	4.6	5.6	4.9	3.1	13	16	14	81	4.1	4.7	1.8	1.4
18	4.1	5.9	4.5	3.0	13	17	13	137	3.9	15	4.4	1.7
19	3.8	6.2	4.0	3.0	15	16	12	87	4.7	100	3.8	1.7
20	3.8	7.0	3.8	3.0	13	17	10	64	8.4	70	2.7	1.7
21	3.7	7.8	3.6	3.3	11	18	10	54	11	44	1.9	1.4
22	3.8	39	3.5	3.2	9.3	18	10	69	5.5	29	1.8	1.1
23	80	105	3.5	2.8	6.6	16	9.7	50	3.8	20	1.8	1.1
24	246	95	3.5	2.7	7.4	16	9.4	48	3.0	15	1.8	1.0
25	80	83	3.5	2.5	5.8	18	9.3	40	2.5	11	3.8	.95
26	48	76	3.5	2.5	4.8	21	9.4	21	2.0	7.8	6.0	.95
27	29	28	3.5	2.6	4.2	24	7.1	20	2.0	6.0	3.8	1.1
28	19	23	3.5	2.8	3.5	54	6.3	62	1.7	5.9	3.2	1.1
29	14	19	3.3	3.3	---	32	6.6	43	1.7	4.2	2.6	.87
30	12	15	3.4	3.5	---	27	5.6	81	1.5	3.4	1.9	.95
31	9.3	---	3.5	3.5	---	25	---	50	---	2.9	1.7	---
TOTAL	1129.7	612.5	174.5	105.6	261.7	927.9	769.4	1076.3	210.7	485.3	151.1	89.02
MEAN	36.4	20.4	5.63	3.41	9.35	29.9	25.6	34.7	7.02	15.7	4.87	2.97
MAX	246	105	11	4.7	27	126	99	137	32	100	33	15
MIN	3.7	4.2	3.3	2.5	3.5	3.7	5.6	2.9	1.5	1.2	1.7	.87
AC-FT	2240	1210	346	209	519	1840	1530	2130	418	963	300	177

CAL YR 1986	TOTAL	8794.97	MEAN	24.1	MAX	651	MIN	.12	AC-FT	17440
WTR YR 1987	TOTAL	5993.72	MEAN	16.4	MAX	246	MIN	.87	AC-FT	11890

06324970 LITTLE POWDER RIVER ABOVE DRY CREEK, NEAR WESTON, WY--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1975-82, 1985 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM)	TEMPER-ATURE WATER (DEG C)	HARD-NESS (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
OCT 01...	1530	18	887	11.5	220	49	23	110	3	8.8
NOV 19...	1345	6.0	3230	1.0	900	180	110	440	7	16
MAR 06...	1510	80	2690	6.0	830	150	110	380	6	14
JUN 30...	0900	1.7	2450	18.0	630	120	81	410	7	17

DATE	ALKA-LINITY LAB (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)
OCT 01...	130	300	8.2	0.3	9.1	616	590	0.84	30	<0.1
NOV 19...	440	1300	47	0.5	14	2530	2400	3.4	41	0.1
MAR 06...	350	1200	30	0.5	8.3	2190	2100	3.0	473	<0.1
JUN 30...	250	1200	18	0.5	6.3	2000	2000	2.7	9.2	<0.1

06326500 POWDER RIVER NEAR LOCATE, MT
(National stream quality accounting network station)

LOCATION.--Lat 46°26'56", long 105°18'44", in NW¼SW¼ sec.14, T.8 N., R.51 E., Custer County, Hydrologic Unit 10090209, on left bank 1.5 mi downstream from bridge on old U.S. Highway 12 at present site of Locate, 1.5 mi upstream from Locate Creek, 5 mi west of former site of Locate, 25 mi east of Miles City, and at mile 27.9.

DRAINAGE AREA.--13,194 mi^2. Drainage area of site 1.5 mi upstream, 13,189 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1938 to current year.

REVISED RECORDS.--WSP 926: 1939. WSP 1309: 1938-39 (M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,384.79 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to July 11, 1947, nonrecording gage at bridge 1.5 mi upstream, and July 11 1947, to Sept. 30, 1965, water-stage recorder at site near upstream bridge at different datum. Oct. 1, 1965, to Oct. 4, 1966, nonrecording gage, and Oct. 5, 1966, to Mar. 21, 1978, water-stage recorder at present site and datum. Mar. 22, 1978, to Apr. 23, 1981, water-stage recorder 1.5 mi upstream at different datum, Apr. 24 to Aug. 20, 1981, water-stage recorder at present site and datum, and Aug. 21, 1981, to Sept. 30, 1981, water-stage recorder 1.5 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Nov. 8 to Mar. 8. Water-discharge records fair except those for estimated daily discharges, which are poor. Some regulation by three reservoirs in Wyoming with combined usable capacity of 36,800 acre-ft. Diversions for irrigation of about 101,800 acres upstream from station.

AVERAGE DISCHARGE.--49 years, 603 ft^3/s, 436,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 31,000 ft^3/s, Feb. 19, 1943; maximum gage height, 12.27 ft, Mar. 16, 1978 (backwater from ice); no flow Jan. 16 to Feb. 12, Feb. 22-24, 1950, July 27, Sept. 21-27, Oct. 1, 1960, Sept. 4-8, 1961.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
unknown	unknown	unknown	(a)*10.07	July 20	1745	*3,780	5.68

(a) backwater from ice, from highwater mark.

Minimum daily discharge, 70 ft^3/s, Nov. 11.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	622	704	e350	e150	e260	e300	968	856	566	263	1150	458
2	533	659	e300	e170	e300	e400	814	1040	566	246	580	440
3	546	637	e250	e200	e320	e600	758	1030	637	202	390	458
4	506	630	e200	e220	e320	e1000	774	986	601	192	315	464
5	470	573	e230	e200	e350	e1500	898	977	546	149	324	476
6	446	601	e230	e170	e400	e2000	1150	986	513	109	324	458
7	506	580	e220	e150	e450	e2500	1090	941	458	123	333	476
8	839	e580	e200	e140	e500	e3000	1140	872	412	106	288	446
9	734	e500	e150	e150	e500	2190	1170	734	412	143	258	446
10	688	e200	e120	e160	e550	2260	1200	594	358	131	263	494
11	566	e70	e200	e220	e600	2060	1040	482	889	168	220	488
12	513	e100	e180	e180	e650	1790	907	380	2380	271	213	500
13	470	e150	e160	e150	e700	1370	831	324	1950	209	506	464
14	470	e200	e170	e120	e800	1150	774	320	1610	227	941	435
15	470	e250	e200	e80	e900	986	758	297	1230	181	435	429
16	464	e300	e190	e80	e850	872	688	263	977	224	358	429
17	452	e350	e180	e110	e900	814	644	271	831	338	348	418
18	440	e300	e170	e130	e850	847	587	258	774	380	263	401
19	407	e330	e160	e110	e800	1100	553	254	941	1080	199	385
20	418	e350	e140	e120	e750	977	500	263	1550	2690	192	385
21	423	e450	e150	e120	e700	941	506	401	1360	1210	209	390
22	401	e400	e170	e110	e650	924	553	750	1540	1180	231	380
23	407	e450	e200	e100	e600	806	774	719	1090	719	213	385
24	407	e600	e210	e90	e550	806	822	587	766	539	188	380
25	407	e550	e200	e100	e500	766	742	553	608	464	192	435
26	1840	e500	e200	e110	e400	774	615	630	566	435	220	423
27	2050	e500	e190	e120	e300	766	601	986	494	385	246	407
28	1360	e450	e190	e140	e250	734	533	1150	435	353	209	390
29	1120	e450	e180	e170	---	666	696	915	429	412	209	358
30	907	e400	e180	e180	---	688	766	822	329	364	284	353
31	774	---	e170	e220	---	750	---	651	---	782	458	---
TOTAL	20656	12814	6040	4470	15700	36337	23852	20292	25818	14275	10559	12851
MEAN	666	427	195	144	561	1172	795	655	861	460	341	428
MAX	2050	704	350	220	900	3000	1200	1150	2380	2690	1150	500
MIN	401	70	120	80	250	300	500	254	329	106	188	353
AC-FT	40970	25420	11980	8870	31140	72070	47310	40250	51210	28310	20940	25490

CAL YR 1986 TOTAL 203713 MEAN 558 MAX 4510 MIN 30 AC-FT 404100
WTR YR 1987 TOTAL 203664 MEAN 558 MAX 3000 MIN 70 AC-FT 404000

e Estimated

06326500 POWDER RIVER NEAR LOCATE, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1946, 1948-63, 1975 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1974 to September 1981.
WATER TEMPERATURE: March 1951 to July 1963, October 1974 to September 1979.
SUSPENDED-SEDIMENT DISCHARGE: March 1950 to September 1953, October 1974 to September 1984.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1975-81): Maximum daily, 4,000 microsiemens, Aug. 1, 1977; minimum daily, 615 microsiemens, July 8, 1975.
WATER TEMPERATURE (water years 1951-63, 1975-79): Maximum, 30.0°C, July 26, 1959; minimum, 0.0°C, on many days during winter periods.
SEDIMENT CONCENTRATION (water years 1950-53, 1975-84): Maximum daily mean, 60,000 mg/L, Aug. 6, 1953; minimum daily mean, 17 mg/L, Dec, 3, 1974.
SEDIMENT LOAD (water years 1950-53, 1975-84): Maximum daily, 1,020,000 tons, May 26, 1952; minimum daily, less than 1 ton on several days during September 1950.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	DISCHARGE, IN CUBIC FEET PER SECOND (00060)	STREAMFLOW, INSTANTANEOUS (CFS) (00061)	CLOUD COVER (PERCENT) (00032)	WEATHER (WMO CODE NUMBER) (00041)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)
OCT								
02...	1215	--	574	--	--	1600	7.0	10.0
28...	1030	--	1340	0	0	2220	12.0	9.0
DEC								
16...	1050	E190	--	0	0	2980	4.0	0.0
JAN								
27...	1240	--	116	--	--	2890	2.0	0.0
MAR								
24...	1145	--	790	100	71	2100	-1.0	2.0
APR								
09...	1300	--	1240	--	--	2730	--	10.0
28...	0920	--	562	0	0	2010	22.5	16.0
JUN								
02...	0930	--	477	0	0	2110	13.5	12.5
JUL								
14...	0820	--	229	--	--	2600	17.0	18.0
20...	0830	--	3120	--	--	1460	19.5	22.5
AUG								
19...	0900	--	229	30	1	2120	17.5	17.0

DATE	BAROMETRIC PRESSURE (MM OF HG) (00025)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BICARBONATE WATER WHOLE IT-FLD (MG/L) (00450)	CARBONATE WATER WHOLE IT-FLD (MG/L) (00447)	ALKALINITY WH WAT TOTAL FIELD MG/L AS CACO3 (00410)
OCT								
02...	--	--	--	--	--	--	--	--
28...	--	6.4	--	<1	<1	169	0	138
DEC								
16...	702	12.6	95	K160	K260	441	21	394
JAN								
27...	--	--	--	--	--	--	--	--
MAR								
24...	701	11.8	94	K40	100	230	0	189
APR								
09...	--	--	--	--	--	--	--	--
28...	703	8.4	93	K33	K270	260	0	210
JUN								
02...	704	8.5	87	1200	2300	254	0	204
JUL								
14...	--	--	--	--	--	--	--	--
20...	--	--	--	--	--	--	--	--
AUG								
19...	703	8.1	92	3000	12000	--	--	--

06326500 POWDER RIVER NEAR LOCATE, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
OCT 28...	1030	8.00	16000	520	380	120	53	300	6	7.4
DEC 16...	1050	8.50	26	720	330	160	78	410	7	7.4
MAR 24...	1145	8.70	2000	510	320	120	50	270	5	6.2
APR 28...	0920	8.20	850	430	220	94	47	280	6	6.6
JUN 02...	0930	8.20	3100	370	170	65	50	300	7	6.6
AUG 19...	0900	8.30	780	420	230	97	43	290	6	8.5

DATE	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
OCT 28...	169	870	100	0.60	5.2	1570	1500	2.1	5680	0.010
DEC 16...	338	1100	110	0.50	11	2160	2100	2.9	E1110	<0.010
MAR 24...	195	790	95	0.50	6.7	1540	1500	2.1	3280	--
APR 28...	216	690	100	0.60	9.2	1390	1400	1.9	2110	<0.010
JUN 02...	151	740	130	0.50	8.5	1520	1400	2.1	1960	0.010
AUG 19...	193	730	110	0.50	17	1520	1400	2.1	940	<0.010

DATE	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN,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)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 28...	0.990	0.210	0.450	0.70	0.040	0.010	0.020	--	--	--
DEC 16...	0.370	0.080	0.100	1.0	0.010	0.010	0.010	224	E115	74
MAR 24...	--	0.040	--	9.9	5.50	0.020	--	3880	8280	98
APR 28...	0.450	0.040	0.060	6.0	1.50	0.020	0.010	2930	4450	81
JUN 02...	0.470	0.090	0.540	13	1.90	0.030	--	6380	8220	93
AUG 19...	0.240	0.030	0.680	2.7	0.180	0.030	<0.010	2230	1380	93

DATE	TIME	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)
OCT 28...	1030	180	3	<100	<10	<1	<1	<1	6	270	<5
MAR 24...	1145	320	<1	<100	<10	<1	<1	<1	3	170	<5
JUN 02...	0930	30	3	100	<10	<1	2	2	4	30	<5
AUG 19...	0900	30	1	<100	<10	<1	<1	<1	5	20	<5

06326500 POWDER RIVER NEAR LOCATE, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)
OCT										
28...	70	20	0.2	6	8	6	<1	1300	1	30
MAR										
24...	60	10	<0.1	<1	2	3	<1	1500	<35	<10
JUN										
02...	60	<10	<0.1	6	2	3	<1	1500	<5	<10
AUG										
19...	70	20	0.1	2	5	2	<1	1300	5	<10

YELLOWSTONE RIVER BASIN

06326600 O'FALLON CREEK NEAR ISMAY, MT

LOCATION.--Lat 46°25'17", long 104°45'40", in NE¼SE¼ sec. 30, T.8 N., R.56 E., Fallon County, Hydrologic Unit 10100005, on left bank, about 350 ft upstream of U.S. Highway 12, 1 mi east of road to Ismay, 6.5 mi southeast of Ismay, 11.5 mi west of Plevna, and at mile 58.3.

DRAINAGE AREA.--669 mi^2.

PERIOD OF RECORD.--October 1977 to current year. Crest-stage partial-record data collected July 1962 to September 1977.

GAGE.--Water-stage recorder. Elevation of gage is 2,590 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges: Nov. 7 to Mar. 1. Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in back of this report.

AVERAGE DISCHARGE.--10 years, 19.3 ft^3/s, 14,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,100 ft^3/s, Mar. 22, 1978, gage height, 9.35 ft; maximum gage height, 9.60 ft, Feb. 26, 1986, backwater from ice; no flow on many days most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge 1963-77, 4,700 ft^3/s, July 3, 1976, extension of crest-stage gage rating above 3,860 ft^3/s.

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

Date	Time	Discharge (ft^3/s)	Gage Height (ft)	Date	Time	Discharge (ft^3/s)	Gage Height (ft)
July 22	2000	281	4.05	July 31	1630	*518	*4.96

Minimum discharge, 0.01 ft^3/s, part or all of each day, July 6-9.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.9	1.1	e1.5	e1.5	e1.0	e4.5	13	2.1	2.9	.20	56	.97
2	7.7	1.3	e1.4	e1.6	e1.1	5.6	13	2.2	2.3	.17	6.0	.61
3	6.3	1.1	e1.3	e1.6	e1.2	6.5	24	2.9	1.8	.14	2.9	.40
4	4.4	1.2	e1.1	e1.7	e1.3	6.8	63	2.5	1.7	.10	1.8	.37
5	5.0	1.3	e1.0	e1.7	e1.5	6.4	94	2.4	1.6	.09	1.0	.41
6	4.5	1.3	e1.0	e1.5	e2.0	5.8	73	2.7	1.2	.02	.84	.36
7	3.6	e1.0	e1.1	e1.5	e3.5	6.5	84	2.4	.94	.01	.72	.36
8	2.8	e.80	e1.2	e1.5	e8.0	7.5	53	1.9	.89	.01	.79	.32
9	2.7	e.60	e1.0	e1.3	e7.0	6.9	40	1.7	.89	.03	.72	.30
10	2.1	e.30	e.90	e1.4	e6.0	7.0	28	1.4	.89	.11	.64	.28
11	2.0	e.35	e1.2	e1.3	e5.0	7.4	22	1.3	.96	.16	.48	.24
12	1.8	e.30	e1.4	e1.3	e4.5	7.5	17	1.4	1.0	.17	.40	.25
13	1.8	e.30	e1.5	e1.2	e4.5	7.0	13	1.4	.92	.23	.49	.27
14	1.8	e.45	e1.5	e1.2	e4.0	6.6	11	1.1	.75	.47	20	.34
15	1.6	e.60	e1.5	e.80	e5.0	6.2	9.4	.95	.66	.68	23	.33
16	1.5	e.70	e1.4	e.50	e4.5	5.9	8.3	.71	.59	.51	25	.20
17	1.5	e.90	e1.4	e.55	e4.5	6.2	7.5	.85	.45	.25	15	.10
18	1.5	e.70	e1.4	e.60	e4.0	6.2	7.0	1.8	.49	.18	11	.08
19	1.3	e.90	e1.4	e.65	e4.2	5.8	5.5	1.9	.67	.23	7.3	.08
20	1.4	e1.2	e1.4	e.65	e4.5	5.5	5.1	2.0	1.8	.26	4.7	.08
21	1.3	e1.5	e1.3	e.60	e4.3	8.9	4.9	2.4	12	.24	3.5	.09
22	1.1	e1.6	e1.3	e.55	e4.0	8.3	4.6	2.2	3.4	72	2.6	.09
23	1.1	e1.7	e1.2	e.55	e4.0	9.0	4.1	2.0	1.8	216	1.7	.11
24	1.2	e1.8	e1.3	e.60	e4.0	7.6	4.0	1.8	1.3	94	1.2	.12
25	1.2	e2.0	e1.3	e.65	e3.5	6.7	3.7	1.8	.93	45	1.7	.10
26	1.3	e1.9	e1.3	e.70	e3.0	6.7	3.3	1.7	.65	26	11	.10
27	1.3	e1.7	e1.3	e.75	e3.5	7.7	3.2	1.9	.46	13	26	.07
28	1.8	e1.6	e1.2	e.80	e3.0	9.2	2.8	2.5	.43	5.5	11	.20
29	2.0	e1.6	e1.3	e.90	---	9.1	2.7	3.2	.31	4.5	3.8	.20
30	1.1	e1.5	e1.4	e1.0	---	9.0	2.4	2.3	.25	8.1	2.2	.11
31	.89	---	e1.5	e1.0	---	10	---	2.9	---	123	1.7	---
TOTAL	74.49	33.30	40.00	32.15	106.6	220.0	626.5	60.31	44.93	611.36	245.18	7.54
MEAN	2.40	1.11	1.29	1.04	3.81	7.10	20.9	1.95	1.50	19.7	7.91	.25
MAX	7.7	2.0	1.5	1.7	8.0	10	94	3.2	12	216	56	.97
MIN	.89	.30	.90	.50	1.0	4.5	2.4	.71	.25	.01	.40	.07
AC-FT	148	66	79	64	211	436	1240	120	89	1210	486	15

CAL YR 1986 TOTAL 11482.68 MEAN 31.5 MAX 1600 MIN .00 AC-FT 22780
WTR YR 1987 TOTAL 2102.34 MEAN 5.76 MAX 216 MIN .01 AC-FT 4170

e Estimated

06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT

LOCATION.--Lat 47°40'42", long 104°09'22", in SW¼NE¼SW¼ sec.9, T.22 N., R.59 E., Richland County, Hydrologic Unit 10100004, on left bank at Montana-Dakota Utilities Company powerplant, 0.2 mi downstream from bridge on State Highway 23, 2.5 mi south of Sidney, 3.0 mi downstream from Fox Creek, and at mile 29.2.
DRAINAGE AREA.--69,103 mi^2. Area at site 4.5 mi upstream, 68,812 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1910 to September 1931 (published as "at Intake"), October 1933 to current year. If monthly figures of diversions to Lower Yellowstone Canal at Intake are added to records at this site, records equivalent to those published as Yellowstone River at Glendive (1898-1910, 1931-34) can be obtained. Monthly discharge only for some periods, published in WSP 1309. Monthly figures of diversions into Lower Yellowstone Canal prior to 1951 published in WSP 1309, 1951-60 published in WSP 1729, 1961-65 published in WSP 1916, 1966-70 published in WSP 2116, and 1971 to current year are published in annual reports.
GAGE.--Water-stage recorder. Datum of gage is 1,881.3 ft National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Jan. 1, 1911, to Sept. 30, 1931, nonrecording gage at site 32 miles upstream at different datum. Apr. 9, 1934, water-stage recorder at two sites within 500 ft of highway bridge 0.2 mi upstream and May 17, 1945, to Apr. 3, 1952, nonrecording gage on same bridge at datum 1.36 ft higher. Apr. 4, 1952, to Nov. 19, 1967, water-stage recorder at site 4.5 mi upstream at different datum.
REMARKS.--Estimated daily discharges: Nov. 11 to Mar. 12. Water-discharge records good except those for estimated daily discharges, which are poor. Some regulation on tributary streams. Diversion for irrigation of about 1,250,000 acres upstream from station. Lower Yellowstone Project Main Canal diverts from left bank in NW¼ sec.36, T.18 N., R.56 E., at Lower Yellowstone diversion dam at Intake about 36.6 mi upstream for irrigation of about 52,000 acres of which about one-third lies upstream from station (see table below).
AVERAGE DISCHARGE.--75 years, 12,960 ft^3/s, 9,390,000 acre-ft/yr.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 159,000 ft^3/s, June 2, 1921, gage height, 12.6 ft, site and datum then in use; maximum gage height observed, 21.85 ft, Mar. 22, 1947, site and datum then in use (backwater from ice); minimum discharge, 470 ft^3/s, May 17, 1961, gage height, 2.73 ft, site and datum then in use.
EXTREMES FOR CURRENT YEAR.--Maximum discharge, 23,000 ft^3/s, May 31, gage height, 9.33 ft; maximum gage height, 10.32 ft, Nov. 11, result of ice jam; minimum discharge, 4,150 ft^3/s, Aug. 13.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13900	9950	e9500	e7500	e7000	e7000	9270	11000	20800	6880	7040	8060
2	12600	9920	e9000	e7500	e7500	e7000	9370	12400	20500	6390	7260	7680
3	11900	9910	e9000	e7000	e7000	e8000	9160	14300	19600	6120	7320	7270
4	11600	9910	e8500	e7500	e6500	e8500	9170	14500	19500	5840	7050	6860
5	11500	9970	e9000	e8000	e7000	e9000	9300	14900	18700	5670	6750	6600
6	11700	10000	e8500	e7500	e7500	e9000	9220	14500	17100	5960	6080	6430
7	11600	9850	e8500	e7500	e8000	e9000	9010	12700	15700	6150	5480	6320
8	11200	9870	e8500	e7000	e7500	e8500	8880	10700	14600	6270	4940	6570
9	11200	9900	e7500	e7000	e7500	e8000	8700	9510	13700	6110	4600	6550
10	11200	10200	e7500	e6500	e7000	e8500	8670	9210	13400	5650	4370	6510
11	10900	e9000	e8000	e7000	e7500	e9000	8700	9800	14500	5360	4220	6400
12	10900	e8500	e7500	e7500	e7500	e9500	8820	10500	17300	5310	4180	6280
13	10800	e9500	e8000	e8000	e7500	9560	8720	11000	18600	5590	4150	6060
14	10600	e10500	e8500	e7500	e7500	8850	7790	11100	17600	7160	4200	5990
15	10500	e10000	e8500	e7000	e7500	8430	7490	10600	16400	12900	5730	5970
16	10300	e11000	e8000	e7000	e7000	8240	7270	9870	15000	12800	8080	5860
17	10200	e10500	e8000	e7000	e7000	7900	7160	10900	14100	10600	5820	5770
18	10200	e9500	e8000	e7500	e7500	7870	7020	11700	13200	9020	5440	5750
19	9210	e10500	e7500	e7000	e7000	7740	6830	12200	13700	8690	5660	5720
20	8330	e10000	e7500	e7000	e7000	7760	6700	14100	14400	8760	5460	5660
21	10100	e11000	e8000	e7500	e7500	8000	6870	16900	13300	11800	5220	5650
22	10200	e11500	e8500	e6500	e7000	8010	7250	16200	12900	11900	5070	5690
23	10100	e11000	e8500	e5500	e7000	7930	7970	16300	12200	12200	4950	5640
24	9960	e11000	e9000	e6000	e7000	7730	8540	16000	11500	11000	4730	5480
25	9910	e11000	e8000	e6000	e6500	7530	8260	15000	10800	10200	4650	5410
26	9860	e10500	e8500	e6500	e6500	7380	7690	13800	10100	10300	5250	5400
27	10000	e10500	e8500	e6500	e6500	7420	7490	13800	9560	10200	6360	5420
28	11400	e10000	e8500	e6000	e6500	7520	7950	16200	8890	9330	6870	5660
29	10600	e10000	e7500	e6500	---	7410	8910	19000	8210	8430	8540	5660
30	10300	e9500	e8000	e6500	---	7360	9770	19400	7500	8390	9130	5570
31	10100	---	e8000	e7000	---	8060	---	22100	---	7750	8600	---
TOTAL	332870	304480	256000	216000	200000	251700	247950	420190	433360	258730	183200	183890
MEAN	10740	10150	8258	6968	7143	8119	8265	13550	14450	8346	5910	6130
MAX	13900	11500	9500	8000	8000	9560	9770	22100	20800	12900	9130	8060
MIN	8330	8500	7500	5500	6500	7000	6700	9210	7500	5310	4150	5400
AC-FT	660200	603900	507800	428400	396700	499200	491800	833400	859600	513200	363400	364700
(†)	0	0	0	0	0	0	0	57020	69800	79430	70530	61530

CAL YR 1986 TOTAL 5079170 MEAN 13920 MAX 58800 MIN 4000 AC-FT 10070000
WTR YR 1987 TOTAL 3288370 MEAN 9009 MAX 22100 MIN 4150 AC-FT 6522000

e Estimated
† Diversions, in acre-ft, by lower Yellowstone Canal, furnished by the Bureau of Reclamation.

06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT--Continued
(National stream quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1948 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE:. October 1964 to September 1981.
WATER TEMPERATURE:. January 1951 to September 1985.
SUSPENDED-SEDIMENT DISCHARGE:. October 1971 to September 1981, October 1982 to current year.

REMARKS.--Unpublished records of once-daily water temperature are available in files of District office. Prior to July 1972, sediment sampling and record computation under supervision of U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE (water years 1965-81):. Maximum daily, 1,220 microsiemens, Apr. 6, 1979; minimum daily, 261 microsiemens, June 4, 1966.

WATER TEMPERATURE (water years 1951-85):. Maximum, 29.0°C July 23, 1960; minimum, 0.0°C on many days during winter.
SEDIMENT CONCENTRATION:. Maximum daily mean, 26,800 mg/L May 8, 1975; minimum daily mean, 8 mg/L Jan. 9, 1973.
SEDIMENT LOAD:. Maximum daily, 3,030,000 tons May 8, 1975; minimum daily, 67 tons Nov. 25, 1986.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATION:. Maximum daily mean, 7,260 mg/L, May 29; minimum daily mean, 23 mg/L, Jan. 26.
SEDIMENT LOAD:. Maximum daily, 372,000 tons, May 29; minimum daily, 404 tons, Jan. 26.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
NOV								
24...	1415	E9000	--	30	1	718	5.0	0.0
JAN								
27...	1230	--	6580	0	0	890	1.0	0.0
MAR								
18...	1045	--	7740	100	71	890	2.0	5.0
MAY								
14...	1130	--	11100	0	0	500	20.0	22.0
JUN								
23...	1400	--	12400	--	--	940	24.0	25.0
JUL								
22...	0945	--	11700	100	2	893	21.0	19.0
SEP								
15...	1330	--	5980	0	0	723	24.0	19.0

DATE	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BICAR-BONATE WATER WHOLE IT-FLD (MG/L) (00450)	CAR-BONATE WATER WHOLE IT-FLD (MG/L) (00447)	ALKA-LINITY WH WAT TOTAL FIELD MG/L AS CACO3 (00410)
NOV								
24...	706	12.0	89	K11	K42	--	--	--
JAN								
27...	715	11.8	86	K4	K6	216	6	182
MAR								
18...	708	10.9	92	--	--	192	0	154
MAY								
14...	718	7.4	90	160	K60	121	0	99
JUN								
23...	--	--	--	--	--	--	--	--
JUL								
22...	713	7.7	89	K33	K53	173	0	140
SEP								
15...	710	8.2	95	K2	K4	173	3	146

06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	PH (STAND-ARD UNITS) (00400)	TUR-BID-ITY (NTU) (00076)	HARD-NESS (MG/L AS CACO3) (00900)	HARD-NESS NONCARB WH WAT TOT FLD 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)
NOV 24...	1415	8.00	28	240	--	56	23	61	2
JAN 27...	1230	8.50	3.9	290	110	70	28	79	2
MAR 18...	1045	8.20	1400	280	120	68	26	83	2
MAY 14...	1130	8.50	58	160	58	38	15	42	2
JUL 22...	0945	8.00	1200	260	120	64	25	98	3
SEP 15...	1330	8.50	48	240	90	53	25	70	2

DATE	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
NOV 24...	3.2	--	190	10	0.50	11	440	--	0.60
JAN 27...	3.8	--	250	16	0.50	11	572	570	0.78
MAR 18...	3.5	169	280	16	0.40	7.1	563	580	0.77
MAY 14...	3.5	112	130	10	0.30	9.5	318	310	0.43
JUL 22...	4.0	150	270	25	0.40	9.8	608	580	0.83
SEP 15...	4.1	151	200	12	0.40	6.8	463	460	0.63

DATE	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AMMONIA + 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 24...	E10700	--	--	--	--	--	--	--	--
JAN 27...	10200	<0.010	0.410	0.060	0.040	0.50	0.010	0.010	<0.010
MAR 18...	11800	<0.010	0.160	0.080	0.020	1.6	0.600	0.010	<0.010
MAY 14...	9530	0.030	<0.100	0.050	0.050	1.2	0.160	0.010	0.020
JUL 22...	19200	<0.010	0.460	0.041	0.030	4.8	0.930	0.021	0.010
SEP 15...	7480	<0.010	<0.100	0.010	0.020	0.60	0.020	0.010	<0.010

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 24...	1415	20	4	52	<0.5	<1	1	<3	3	14	<5
MAR 18...	1045	50	4	37	<0.5	<1	<1	<3	6	53	<5
JUL 22...	0945	40	2	51	<0.5	<1	<1	<3	4	38	<5
SEP 15...	1330	20	5	47	<0.5	<1	<1	<3	2	7	<5

YELLOWSTONE RIVER BASIN

06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

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 24...	41	10	<0.1	<10	4	1	<1	550	<6	14
MAR 18...	48	4	0.1	<10	2	2	<1	710	<6	9
JUL 22...	53	8	0.1	<10	<1	1	<1	690	<6	5
SEP 15...	35	3	0.1	<10	<1	1	<1	580	<6	<3

DATE	TIME	TEMPER-ATURE WATER (DEG C) (00010)	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)
NOV 24...	1415	0.0	E9000	--	123	E2990	--
JAN 27...	1230	0.0	--	6580	23	409	--
MAR 18...	1045	5.0	--	7740	1200	25100	60
MAY 14...	1130	22.0	--	11100	295	8840	--
JUL 22...	0945	19.0	--	11700	4280	135000	49
SEP 15...	1330	19.0	--	5980	130	2100	--

DATE	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .008 MM (70339)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 24...	--	--	--	--	--	--	79
JAN 27...	--	--	--	--	--	--	92
MAR 18...	74	88	96	99	100	--	--
MAY 14...	--	--	--	--	--	--	62
JUL 22...	64	78	90	99	99	100	--
SEP 15...	--	--	--	--	--	--	98

DATE	TIME	BED MAT. FALL DIAM. % FINER THAN .004 MM (80157)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)
MAY 14...	1130	15	76	95	100	--	--	--	--	--	--
JUL 22...	0945	7	48	93	100	--	--	--	--	--	--
SEP 15...	1330	39	80	90	93	94	95	95	96	97	100

06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DAY	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN-TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	1210	45400	2000	53700	368	9440	61	1240	129	2440	57	1080
2	790	26900	1450	38800	279	6780	57	1150	114	2310	70	1320
3	535	17200	1000	26800	198	4810	54	1020	100	1890	86	1860
4	421	13200	630	16900	138	3170	52	1050	85	1490	109	2500
5	325	10100	472	12700	106	2580	50	1080	72	1360	143	3470
6	259	8180	375	10100	103	2360	51	1030	78	1580	153	3720
7	227	7110	278	7390	173	3970	52	1050	103	2220	197	4790
8	217	6560	240	6400	123	2820	52	983	137	2770	900	20700
9	268	8100	225	6010	90	1820	53	1000	166	3360	1620	35000
10	289	8740	207	5700	87	1760	58	1020	161	3040	1700	39000
11	297	8740	169	4110	84	1810	73	1380	153	3100	1850	45000
12	319	9390	115	2640	81	1640	93	1880	145	2940	2520	64600
13	349	10200	60	1540	79	1710	97	2100	138	2790	3970	102000
14	370	10600	38	1080	76	1740	81	1640	127	2570	4200	100000
15	362	10300	31	837	73	1680	64	1210	117	2370	3100	70600
16	330	9180	50	1490	70	1510	51	964	108	2040	2250	50100
17	283	7790	97	2750	67	1450	43	813	102	1930	1600	34100
18	240	6610	112	2870	63	1360	43	871	96	1940	1180	25100
19	169	4200	84	2380	59	1190	48	907	90	1700	820	17100
20	181	4070	102	2750	57	1150	51	964	84	1590	638	13400
21	193	5260	126	3740	54	1170	53	1070	78	1580	598	12900
22	140	3860	94	2920	52	1190	55	965	72	1360	677	14600
23	138	3760	87	2580	48	1100	57	846	64	1210	676	14500
24	136	3660	98	2910	56	1360	57	923	58	1100	617	12900
25	134	3590	94	2790	65	1400	46	745	52	913	586	11900
26	138	3670	168	4760	74	1700	23	404	52	913	610	12200
27	235	6340	293	8310	82	1880	28	491	53	930	662	13300
28	1450	44600	354	9560	80	1840	115	1860	55	965	679	13800
29	4080	117000	322	8690	75	1520	145	2540	---	---	495	9900
30	3650	102000	319	8180	69	1490	147	2580	---	---	414	8230
31	2750	75000	---	---	66	1430	142	2680	---	---	479	10400
TOTAL	---	601310	---	261387	---	70830	---	38456	---	54401	---	770070
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	635	15900	555	16500	2300	129000	246	4570	250	4750	648	14100
2	690	17500	695	23300	2150	119000	199	3430	810	15900	562	11700
3	1220	30200	1100	42500	1430	75700	160	2640	1080	21300	480	9420
4	1220	30200	998	39100	910	47900	130	2050	990	18800	443	8210
5	1190	29900	1060	42600	680	34300	126	1930	900	16400	469	8360
6	945	23500	930	36400	610	28200	210	3380	800	13100	449	7800
7	770	18700	620	21300	550	23300	258	4280	650	9620	365	6230
8	775	18600	480	13900	480	18900	215	3640	470	6270	388	6880
9	775	18200	398	10200	370	13700	142	2340	360	4470	394	6970
10	810	19000	300	7460	270	9770	131	2000	325	3830	333	5850
11	825	19400	285	7540	600	23500	118	1710	255	2910	272	4700
12	873	20800	270	7650	1890	88300	103	1480	195	2200	221	3750
13	885	20800	290	8610	1230	61800	120	1810	200	2240	210	3440
14	800	16800	240	7190	1370	65100	350	6770	225	2550	168	2720
15	710	14400	223	6380	2650	117000	744	25900	1020	15800	142	2290
16	615	12100	270	7200	2210	89500	722	25000	3340	72900	142	2250
17	520	10100	420	12400	1750	66600	680	19500	2590	40700	148	2310
18	445	8430	695	22000	1890	67400	628	15300	2950	43300	148	2300
19	378	6970	1030	33900	2300	85100	560	13100	2200	33600	149	2300
20	318	5750	2170	82600	3150	122000	518	12300	660	9730	178	2720
21	267	4950	4280	195000	2130	76500	835	26600	235	3310	250	3810
22	210	4110	2720	119000	1700	59200	2930	94100	210	2870	197	3030
23	205	4410	1300	57200	1520	50100	2000	65900	225	3010	150	2280
24	262	6040	1210	52300	1480	46000	1650	49000	175	2230	130	1920
25	235	5240	1310	53100	1400	40800	1170	32200	195	2450	128	1870
26	162	3360	1430	53300	1340	36500	750	20900	160	2270	118	1720
27	270	5460	1500	55900	1180	30500	500	13800	625	10700	111	1620
28	290	6220	4000	175000	808	19400	370	9320	1390	25800	480	7340
29	325	7820	7260	372000	470	10400	290	6600	2060	47500	878	13400
30	417	11000	6460	338000	308	6240	380	8610	1200	29600	629	9460
31	---	---	3380	202000	---	---	225	4710	780	18100	---	---
TOTAL	---	415860	---	2121530	---	1661710	---	484870	---	488210	---	160750

TOTAL LOAD FOR YEAR: 7129384 TONS

Smaller Reservoirs in Missouri River Basin in Montana

06012000 LIMA RESERVOIR.--Lat 44°39'16", long 112°21'54", in SW¼ sec.32, T.13 S., R.6 W., Beaverhead County, Hydrologic Unit 10020001, at Lima Dam on Red Rock River, 7 mi northwest of Monida, and at mile 2,542.2. DRAINAGE AREA, 570 mi^2. PERIOD OF RECORD, April 1940 to current year. Records prior to October 1950, published only in WSP 1309, and those for April 1955, published only in WSP 1729. Records of daily elevation available in files of Helena district office. Nonrecording gage read twice daily. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

Reservoir is formed by earthfill dam with concrete spillway completed in 1902. Usable capacity, 84,050 acre-ft between elevation 6,537.30 ft, bottom of tunnel, and 6,582.7 ft, spillway crest. No dead storage. Figures given herein represent usable contents. Water is used for irrigation, flood control, and recreation. Records furnished by Water Users Irrigation Co.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 85,870 acre-ft, May 27, 28, June 14, 15, 1984, elevation, 6,582.98 ft; no usable storage Sept. 20-26, 1979, Sept. 13-30, 1987.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 63,400 acre-ft, May 12, elevation, 6,579.08 ft; no contents Sept. 13-30.

06020500 RUBY RIVER RESERVOIR.--Lat 45°14'21", long 112°06'35", in NE¼NE¼SE¼ sec.8, T.7 S., R.4 W., Madison County, Hydrologic Unit 10020003, at dam on Ruby River, 6 mi south of Alder, and at mile 47.9. DRAINAGE AREA, 596 mi^2 (1,544 km^2). PERIOD OF RECORD, July 1938 to April 1950, September 1954, May 1955, September to November 1955, and February to September 1960 (total contents), October 1960 to current year (usable contents). Records prior to October 1939, published only in WSP 1309, and those for September 1954, published only in WSP 1729. Elevations are determined by measuring from reference points in the middle and at or near the end of the month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

Reservoir is formed by earthfill dam with concrete spillway, completed in 1938. Usable capacity, 39,740, revised, acre-ft between elevation 5,300.0 ft, bottom of tunnel, and 5,392.0 ft, spillway crest. Dead storage, 100 ft below elevation 5,300.0 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Department of Natural Resources and Conservation. REVISED RECORDS, WSP 1729: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 46,040 acre-ft, Aug. 25, 1975, elevation, 5,399.0 ft; no storage at times in 1938, 1955, 1961.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 40,430 acre-ft, May 1, elevation, 5,393.6 ft; minimum contents, 6,970 acre-ft, Sept. 30, elevation, 5,342.5.ft.

06036000 WILLOW CREEK RESERVOIR.--Lat 45°42'51", long 111°41'57", in NW¼NW¼NW¼ sec.35, T.1 S., R.1 W., Madison County, Hydrologic Unit 10020005, at dam on Willow Creek, 4 mi east of Harrison, and at mile 11.5. DRAINAGE AREA, 153 mi^2. PERIOD OF RECORD, February 1938 to March 1958 (total contents), April 1958 to current year (usable contents). Records prior to October 1939, published only in WSP 1309 and November, December 1951, published only in WSP 1729. Prior to October 1949, published as Harrison Lake near Harrison. Elevations determined by measuring from reference marks in the middle and at or near the end of the month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

Reservoir is formed by earth and rockfill dam with concrete spillway completed in 1938. Usable capacity, 17,730 acre-ft between elevation 4,666.5 ft, tunnel inlet, and 4,736.0 ft, spillway crest. Dead storage, 270 acre-ft below elevation 4,666.5 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Department of Natural Resources and Conservation. REVISED RECORDS, WSP 1629: 1958. WSP 1729: 1948(M), 1951-52, 1956-57.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 19,230 acre-ft, June 30, 1963, elevation, 4,736.7 ft; minimum observed, 2,270 acre-ft, Nov. 15, 1970, elevation, 4,705.0 ft.

EXTREMES FOR CURRENT YEAR: Only one observation made during year.

06038000 HEBGEN LAKE.--Lat 44°51'51", long 111°20'09", in SW¼NW¼ sec.23, T.11 S., R.3 E., Gallatin County, Hydrologic Unit 10020007, at Hebgen Dam on Madison River, 18 mi northwest of West Yellowstone, and at mile 103. DRAINAGE AREA, 904 mi^2. PERIOD OF RECORD, January 1936 to current year. Records prior to October 1939, published only in WSP 1309. Figures of contents published in WSP 1629, 1709, and 1729 have been found to be in error and should not be used. Prior to Oct. 1, 1949, published as Hebgen Reservoir near West Yellowstone. Records of daily elevations since October 1955 on file in Helena district office. Nonrecording gage read about twice daily. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by The Montana Power Co.). Prior to earthquake of Aug. 17, 1959, datum of gage was 9.74 ft higher, also at National Geodetic Vertical Datum of 1929. Reservoir is formed by earthfill dam with concrete core and spillway completed in 1915, repaired in 1960 following severe earthquake of Aug. 17, 1959, which lowered dam 9.74 ft and deformed reservoir area. Subsequent usable capacity, 377,500 acre-ft between elevation 6,473.00 ft, bottom of outlet tower, and 6,534.87 ft, spillway crest. Dead storage, 7,340 acre-ft below elevation 6,473.00 ft. Prior to Aug. 17, 1959, usable capacity, 344,700 acre-ft between 6,483.11 ft, bottom of outlet tower, and 6,544.61 ft, spillway crest. Dead storage, 7,340 acre-ft below elevation 6,473.00 ft. Observations of reservoir level prior and subsequent to earthquake indicate smaller increases in capacity than indicated by new capacity table. Figures given herein represent usable contents. Water is used for power and recreation. Records furnished by The Montana Power Co. REVISED RECORDS, WSP 1916: 1959-60.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 380,500 acre-ft, July 21, 1987, elevation, 6,535.00 ft; minimum monthend, 670 acre-ft Dec. 31, 1936 (by capacity table used prior to August 1959).

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 380,500 acre-ft, July 21, elevation, 6,535.00 ft; minimum observed, 281,300 acre-ft, Mar. 9, elevation, 6,526.66 ft.

Smaller reservoirs in Missouri River basin in Montana--Continued

06040500 ENNIS LAKE.--Lat 45°28'12", long 111°38'15", in NW¼SW¼ sec.20, T.4 S., R.1 E., Madison County, Hydrologic Unit 10020007, at Madison Dam on Madison River, 5 mi northeast of McAllister, and at mile 40.3. DRAINAGE AREA, 2,181 mi^2. PERIOD OF RECORD, January 1936 to September 1975 (total contents), October 1975 to current year (usable contents). Records prior to October 1939, published only in WSP 1309. Prior to 1949, published as Madison Reservoir near McAllister. Records of daily elevations since October 1955 on file in Helena district office. Nonrecording gage read about twice daily. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by The Montana Power Co.).

Reservoir is formed by timber crib dam completed in 1900. Usable capacity, 41,020 acre-ft between elevation 4,826.5 ft, bottom of penstock, and 4,841.5 ft, top of flashboards. Dead storage, 1,040 acre-ft below elevation 4,826.5 ft. Not normally drawn below 4,831.0 ft, 6,810 acre-ft. Figures given herein represent usable contents. Water is used for power and recreation. Records furnished by The Montana Power Co.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 40,830 acre-ft, June 20, 1968, elevation, 4,841.45 ft; minimum observed, 2,600 acre-ft, Mar. 31, 1937, elevation, 4,828.8 ft.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 39,030 acre-ft, July 19, Aug. 24, elevation, 4,841.25 ft; minimum observed, 25,690 acre-ft, May 13, elevation, 4,837.60 ft.

06049500 MIDDLE CREEK RESERVOIR.--Lat 45°29'18", long 110°58'42", in NW¼SW¼ sec.15, T.4 S., R.6 E., Gallatin County, Hydrologic Unit 10020008, at dam on Hyalite Creek, 14 mi south of Bozeman, and at mile 28.9. DRAINAGE AREA, 27.4 mi^2. PERIOD OF RECORD, April 1951 to current year. Nonrecording gage read in the middle and at or near the end of month. Elevation of lake at full pond is about 6,700 ft, from topographic map.

Reservoir is formed by earthfill dam with conduit control works completed in 1951. Storage began in March 1951. Usable capacity, 8,030 acre-ft between gage height 125 ft, bottom of outlet, and 200.75 ft, spillway crest. Dead storage, 209 acre-ft below gage height 125 ft. Figures given herein represent usable contents. Water is used for irrigation and municipal purposes. Records furnished by Montana Department of Natural Resources and Conservation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 8,480 acre-ft, July 10, 1983, gage height, 202.8 ft, from capacity table then in use; minimum observed, 120 acre-ft, Oct. 18, 1965, gage height, 129.0 ft.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 8,270 acre-ft, May 15, 31, June 15, elevation, 6,712.8 ft; minimum observed, 3,940 acre-ft, Oct. 1, gage height, 174.3 ft.

06058600 HELENA VALLEY RESERVOIR.--Lat 46°38'17", long 111°52'56", in NW¼NW¼SE¼ sec.8, T.10 N., R.2 W., Lewis and Clark County, Hydrologic Unit 10030101, at dam 5.8 mi east of Helena. PERIOD OF RECORD, September 1960 to current year. Nonrecording gage read one or more times per month. U.S. Geological Survey began publishing data October 1983. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

This is an offstream reservoir formed by an earthfill dam and dike completed in 1958. Closure and first fill of reservoir in March 1959. Stored water is diverted from Missouri River at Canyon Ferry Dam in W½SE¼SE¼ sec.4, T.10 N., R.1 W., 17 mi east of Helena. Usable capacity, 5,900 acre-ft between elevation 3,805.0 ft, invert of City of Helena municipal outlet, and 3,820.07 ft, top of active conservation pool (maximum normal water-surface elevation). Dead storage, 1,260 acre-ft, below elevation 3,787.75 ft, and inactive storage, 3,290 acre-ft, below elevation 3,805.0 ft. Figures given herin represent usable contents. Water is used for irrigation and municipal use by the City of Helena. Records furnished by U.S. Bureau of Reclamation. Capacity table effective Jan. 1, 1961.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 9,470 acre-ft, June 2, 1975, elevation, 3,820.60 ft; no usable contents observed October and November 1977, result of construction work.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 9,050 acre-ft, July 1, elevation, 3,819.8 ft; minimum observed, 4,130 acre-ft, Mar. 31, elevation, 3,807.1 ft.

06064500 LAKE HELENA.--Lat 46°45'58", long 111°53'10", in SE¼SW¼ sec. 29, T.12 N., R.2 W., Lewis and Clark County, Hydrologic Unit 10030101, at Hauser Dam on Missouri River, 13 mi northeast of Helena, and at mile 2,239.1. DRAINAGE AREA, 610 mi^2 above dam and control works on Prickly Pear Creek. PERIOD OF RECORD, May 1945 to current year. April to July 1953 scattered daily elevation and contents, published in WSP 1320-B. May to June 1964 daily elevations and contents, published in WSP 1840-B. Records of daily elevations since October 1955 on file in Helena district office. Nonrecording gage at Hauser Dam read hourly. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by The Montana Power Co.).

Gage heights collected at Hauser Dam are effective on Lake Helena at control dam. Prior to April 1945, contents of Lake Helena included with records of Hauser Lake. Since that date, a dam and control works has separated the two lakes to allow independent regulation of Lake Helena, if needed. Usable capacity, 10,450 acre-ft between elevation 3,624.00 ft, bottom of control works, and 3,635.00 ft, top of flashboards. No dead storage. Figures given herein represent usable contents. Water is used for recreation, wildlife, and power production through Hauser Dam. Records furnished by The Montana Power Co.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 11,790 acre-ft, Aug. 2, 1960, Dec. 10, 1962, July 19, 20, Sept. 4, 1963, Aug. 15, 1968, Apr. 6, 1973, June 26, 1980, elevation, 3,635.60 ft; no storage Mar. 29 to Apr. 7, 1958, Feb. 12, 20, 1962, May 4-10, 1979.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 11,560 acre-ft, July 17, elevation, 3,635.50 ft; minimum observed, 10,240 acre-ft, July 27-30, elevation, 3,634.90 ft.

Smaller reservoirs in Missouri River basin in Montana--Continued

06065000 HAUSER LAKE.--Lat 46°45'58", long 111°53'10", in SE¼SW¼ sec.29, T.12 N., R.2 W., Lewis and Clark County, Hydrologic Unit 10030101, at Hauser Dam on Missouri River, 1.6 mi downstream from Prickly Pear Creek, 13 mi northeast of Helena, and at mile 2,226.4. DRAINAGE AREA, 16,876 mi^2. PERIOD OF RECORD, January 1936 to current year. Records prior to October 1939, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. May to June 1964 daily elevations and contents, published in WSP 1840-B. Monthend contents prior to May 1945 include contents of Lake Helena, excluded thereafter. Records of daily elevations since October 1955 on file in Helena district office. Nonrecording gage read hourly. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by The Montana Power Co.).

Reservoir is formed by concrete dam completed in 1907; separated from Lake Helena in April 1945. Usable contents, 51,420 acre-ft between elevation 3,617.00 ft, bottom of tunnel, and 3,635.00 ft top of flashboards. Dead storage, 46,810 acre-ft below elevation 3,617.00 ft. Prior to Nov. 28, 1949, usable capacity, 52,090 acre-ft at elevation 3,635.00 ft, decrease caused by construction of Canyon Ferry Dam in backwater of Hauser Dam. Not normally drawn below 3,621.00 ft, 8,870 acre-ft. Figures given herein represent usable contents. Water is used for power and recreation. Records furnished by The Montana Power Co. REVISED RECORDS, WSP 1729: 1949-57.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed since May 1945, 53,630 acre-ft, Aug. 2, 1960, Dec. 10, 1961, July 19, 20, Sept. 4, 1963, Aug. 15, 1968, Apr. 6, 1973, June 26, 1980, elevation, 3,635.60 ft; no storage Jan. 31, Feb. 29, 1936.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 53,260 acre-ft, July 17, elevation, 3,635.50 ft; minimum observed, 51,050 acre-ft, July 27-30, elevation, 3,634.90 ft.

06066000 HOLTER LAKE.--Lat 46°59'28", long 112°00'17", on line between SE¼ sec.5 and NE¼ sec.8, T.14 N., R.3 W., Lewis and Clark County, Hydrologic Unit 10030101, at Holter Dam on Missouri River, 3.3 mi east of Wolf Creek, and at mile 2,211.1. DRAINAGE AREA, 17,149 mi^2. PERIOD OF RECORD, January 1936 to current year. Records prior to October 1939, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. May to June 1964 daily elevations and contents, published in WSP 1840-B. Records of daily elevations since October 1955 on file in Helena district office. Prior to 1950, published as Holter Reservoir near Wolf Creek. Nonrecording gage read three times daily. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by The Montana Power Co.).

Reservoir is formed by concrete dam completed in 1918. Usable capacity, 81,920 acre-ft between elevation 3,543.00 ft, bottom of tunnel, and 3,564.00 ft, top of flashboards. Dead storage, 158,500 acre-ft below elevation 3,543.00 ft. Not normally drawn below 3,548.00 ft, 16,660 acre-ft. Figures given herein represent usable contents. Water is used for power and recreation. Records furnished by The Montana Power Co.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 85,250 acre-ft, June 19, 1970, elevation, 3,564.70 ft; no storage Feb. 29, Dec. 31, 1936.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 81,870 acre-ft, Mar. 10, July 18, elevation, 3,563.99 ft; minimum observed, 65,000 acre-ft, Apr. 7, elevation, 3,560.33 ft.

06075000 SMITH RIVER RESERVOIR.--Lat 46°37'27", long 110°44'48", near center of south line of sec.17, T.10 N., R.8 W., Meagher County, Hydrologic Unit 10030103, at dam on Smith River, 9 mi northeast of White Sulphur Springs, and at mile 22.8. DRAINAGE AREA, 72.3 mi^2. PERIOD OF RECORD, April 1938 to September 1950 (scattered records 1947-50) and April to October 1959 (total contents), November 1959 to current year (usable contents). Records for some periods published only in WSP 1309 and for April 1959, published only in WSP 1729. Elevations determined by measuring from reference marks at or near middle and end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

Reservoir is formed by earthfill dam with concrete spillway completed in 1936. Usable capacity, 10,650 acre-ft between elevation, 5,415.0 ft, bottom of outlet, and 5,486.0 ft, spillway crest. Dead storage, 52 acre-ft below elevation 5,415.0 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Montana Department of Natural Resources and Conservation. REVISED RECORDS, WSP 1729: 1960.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 11,650 acre-ft, June 1, 1978, elevation, 5,489.1 ft; no usable storage Sept. 30, 1987.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 10,390 acre-ft May 15, elevation, 5,485.0 ft; no usable storage Sept. 30.

06079500 GIBSON RESERVOIR.--Lat 47°36'09", long 112°45'39", in NE¼NW¼SE¼ sec.4, T.21 N., R.9 W., Teton County, Hydrologic Unit 10030104, at Gibson Dam on Sun River, 19 mi northwest of Augusta, and at mile 100.8. DRAINAGE AREA, 575 mi^2. PERIOD OF RECORD, January 1930 to current year. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. May to June 1964 daily elevations and contents, published in WSP 1840-B. Nonrecording gage read daily. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

Reservoir is formed by concrete dam with glory-hole spillway completed in 1929. Usable capacity, 99,050 acre-ft, between elevation 4,557.5 ft, bottom of outlet, and 4,724.0 ft, top of glory-hole, by capacity table effective Aug. 1, 1975; see previous reports for superseded figures. Dead storage, 11 acre-ft, below elevation 4,557.5 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by U.S. Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents, 116,300 acre-ft, June 8, 1964, elevation, 4,732.23 ft, from floodmark, of which 11,600 acre-ft was uncontrolled storage, by capacity table used Oct. 1, 1965, to July 30, 1975; minimum observed, 11 acre-ft, Oct. 13, 1936, elevation, 4,560.9 ft, by capacity table used prior to 1939.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 99,180 acre-ft, May 11, elevation, 4,724.1 ft; minimum observed, 21,630 acre-ft, Aug. 28, elevation, 4,642.45 ft.

Smaller reservoirs in Missouri River basin in Montana--Continued

06080500 PISHKUN RESERVOIR.--Lat 47°40'36", long 112°29'48", in W½ sec.10, T.22 N., R.7 W., Teton County, Hydrologic Unit 10030104, at dam 14 mi northwest of Augusta, and at mile 97.3. PERIOD OF RECORD, January 1936 to current year. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. Nonrecording gage read one or more times a month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation). This is an offstream reservoir formed by two earthfill dams completed in 1919. Stored water is diverted from Sun River in sec.36, T.22 N., R.9 W., 18 mi northwest of Augusta. Usable capacity, 30,420 acre-ft, between elevation 4,342.0 ft, bottom of outlet, and 4,370.0 ft, maximum pool. Dead storage, 16,250 acre-ft, below elevation 4,342.0 ft. Prior to 1940, usable capacity varied from 3,600 to 21,750 acre-ft. Figures given herein represent usable contents. Water is used for irrigation, recreation, and wildlife. Records furnished by U.S. Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 32,700 acre-ft, July 4-6, 1953, elevation 4,371.4 ft; no storage October 1939 to March 1940, Oct. 31, 1967.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 32,210 acre-ft, May 28, elevation, 4,371.1 ft; minimum observed, 5,800 acre-ft, Oct. 1, 31, elevation, 4,349.3 ft.

06082000 WILLOW CREEK RESERVOIR.--Lat 47°32'48", long 112°25'45", in SW¼NW¼ sec.30, T.21 N., R.6 W., Lewis and Clark County, Hydrologic Unit 10030104, at dam on Willow Creek, 4 mi northwest of Augusta, and at mile 2.8. PERIOD OF RECORD, January 1936 to September 1960 (total contents), October 1960 to current year (usable contents) Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. Nonrecording gage read one or more times a month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).
Reservoir is formed by earthfill dam completed in 1911. Usable capacity, 32,230 acre-ft between elevation 4,085.28 ft, bottom of outlet, and 4,142.0 ft, maximum pool. Dead storage, 67 acre-ft below elevation 4,085.28 ft. Prior to 1941, total capacity was 16,700 acre-ft. Supplemental water diverted from Sun River in sec.36, T.22 N., R.9 W., 18 mi northwest of Augusta. Figures given herein represent usable contents. Water is used for irrigation, recreation, and wildlife. Records furnished by U.S. Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 35,230 acre-ft, June 22, 1975, elevation, 4,144.0 ft; no storage July 31, Aug. 31, 1940.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 32,850 acre-ft, May 29, elevation, 4,142.41 ft; minimum observed, 17,220 acre-ft, July 20, elevation, 4,130.5 ft.

06083000 NILAN RESERVOIR.--Lat 47°29'06", long 112°32'24", in S½NE¼ sec.18, T.20 N., R.7 W., Lewis and Clark County, Hydrologic Unit 10030104, at north dam, lat 47°28'18", long 112°30'54", in SE¼NE¼ sec. 20, T.20 N., R.7 W., at east dam, 6 mi west of Augusta. PERIOD OF RECORD, December 1951 to current year. April to July 1953 scattered daily contents, published in WSP 1320-B. Records for November 1958 to March 1959, published only in WSP 1729. Nonrecording gage read at middle and end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).
This is an offstream reservoir formed by two earthfill dams completed in 1951. Usable capacity, 10,090 acre-ft between elevation 4,402.0 ft, bottom of outlet, and 4,442.5 ft, spillway crest. Dead storage, 900 acre-ft below elevation 4,402.0 ft, not including contents of old lake. Stored water is diverted from Smith Creek in NE¼ sec.4, T.19 N., R.8 W., and from Ford Creek in SW¼ sec.26, T.20 N., R.8 W., at points 12 mi and 10 mi, respectively, southwest of Augusta. Figures given herein represent total contents. Water is used for irrigation and recreation. Records furnished by Montana Department of Natural Resources and Conservation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 13,520 acre-ft, May 31, 1963, elevation, 4,448.5 ft; no contents observed Sept. 8, 1984.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 9,790 acre-ft, May 28, July 1, Aug. 4, elevation, 4,442.0 ft; minimum observed, 5,290 acre-ft, Oct. 2, elevation, 4,431.8 ft.

06090900 LOWER TWO MEDICINE LAKE.--Lat 48°29'39", long 113°15'49", in NE¼ sec.34, T.32 N., R.13 W., Glacier County, Hydrologic Unit 10030201, at dam on Two Medicine River, 4 mi northwest of East Glacier. DRAINAGE AREA, 50.2 mi^2. PERIOD OF RECORD, September 1938 to June 1964 (dam destroyed), December 1967 to current year. Figures of no storage prior to April 1961 may be in error and should be used with caution. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. May to June 1964 occasional elevations and contents, published in WSP 1840-B. Prior to 1942, published as Two Medicine Lake near East Glacier. Nonrecording gage read at or near end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation) and is 8.22 ft higher than datum for destroyed dam (levels by Bureau of Indian Affairs).
Reservoir is formed by earthfill dam with concrete spillway and control works; construction began in September 1965, completed in November 1967. Storage began Dec. 1, 1967. Former dam 250 ft upstream completed in 1913 and destroyed by flood of June 8, 1964. Usable capacity at new dam, 11,880 acre-ft between elevation 4,861.0 ft, bottom of outlet, and 4,882.0 ft, spillway crest. Dead storage, about 2,000 acre-ft near upper end of reservoir below elevation 4,861.0 ft. Prior to June 8, 1964, at site and datum then in use, usable capacity was 16,620 acre-ft between elevation 4,848.00 ft elevation of natural outlet, and 4,878.0 ft, spillway crest. Dead storage was unknown. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Bureau of Indian Affairs. REVISED RECORDS, WSP 1729: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 20,930 acre-ft, June 8, 1964, elevation, 4,883.8 ft, datum and capacity table then in use, dam overtopped; no storage at times in some years.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 12,490 acre-ft, June 1, elevations, 4,883.0 ft; no contents Oct. 1.

Smaller reservoirs in Missouri River basin in Montana--Continued

06093000 FOUR HORNS LAKE.--Lat 48°20'33", long 112°41'48", in SW¼NW¼SE¼ sec.19, T.30 N., R.8 W., Glacier County, Hydrologic Unit 10030201, at dam 7 mi northeast of Heart Butte. PERIOD OF RECORD, September 1938 to current year. Records prior to October 1940, published only in WSP 1309 and those for December 1958 to August 1959, published only in WSP 1729. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. Prior to 1950, published as Four Horns Reservoir near Heart Butte. Nonrecording gage read at or near end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Bureau of Indian Affairs). This is an offstream reservoir formed by earthfill dam completed in 1932.

Stored water is diverted from Badger Creek in NE¼ sec.24, T.30 N., R.10 W., 5 mi north of Heart Butte. Usable capacity, 19,250 acre-ft between elevation 4,081.0 ft, gage sill, and 4,115.0 ft, maximum design level. No dead storage. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by Bureau of Indian Affairs.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 16,320 acre-ft, Aug. 5, 1958, elevation, 4,111.6 ft, from capacity table then in use; minimum observed, 2,840 acre-ft, July 31, 1949, elevation, 4,090.0 ft.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 13,830 acre-ft, June 1, Sept. 12, elevation, 4,110.8 ft; minimum observed, 7,550 acre-ft, July 10, elevation, 4,100.8 ft.

06094000 SWIFT RESERVOIR.--Lat 48°09'53", long 112°52'20", in NE¼ sec.27, T.28 N., R.10 W., Pondera County, Hydrologic Unit 10030201, at Swift Dam on Birch Creek, 17 mi west of Dupuyer, and at mile 60.5. DRAINAGE AREA, 75.3 mi^2. PERIOD OF RECORD, January 1936 to June 1964 (dam destroyed), June 1967 to current year. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. April to June 1964 scattered daily elevations and contents, published in WSP 1840-B. Prior to 1950, published as Birch Creek Reservoir near Dupuyer. Nonrecording gage read monthly. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation) and is 63.7 ft lower than datum for destroyed dam (levels by Pondera County Canal and Reservoir Co.).

Reservoir is formed by concrete arch dam; construction began in 1965; completed in 1967. Storage began June 22, 1967. Former dam, in same location, was built about 1915 and destroyed by flood of June 8, 1964. Usable capacity at new dam, 29,980 acre-ft between elevation 4,748.0 ft, bottom of outlet, and 4,883.5 ft, spillway crest. Dead storage, 35 acre-ft below elevation 4,808.2 ft, bottom of outlet, and 4,947.0 ft, spillway crest. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Pondera County Canal and Reservoir Co. REVISED RECORDS, WSP 1729: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 34,300 acre-ft, June 8, 1964, elevation, 4,956.3 ft, datum then in use; minimum observed, 20 acre-ft, Sept. 30, 1952, elevation, 4,810.0 ft, datum then in use.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 30,110 acre-ft, May 31, elevation, 4,883.8 ft; minimum, 7,560 acre-ft, Oct. 31, elevation, 4,820.7 ft.

06095500 LAKE FRANCES.--Lat 48°15'48", long 112°12'24", in NE¼NE¼ sec.23, T.29 N., R.5 W., Pondera County, Hydrologic Unit 10030203, at dam 3 mi southeast of Valier. PERIOD OF RECORD, January 1936 to current year. Records prior to October 1940, published only in WSP 1309. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. Nonrecording gage read at or near end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Pondera County Canal and Reservoir Co.).

This is an offstream reservoir formed by earthfill dam completed about 1931. Stored water is diverted from Birch Creek in sec.28, T.29 N., R.8 W., and Dupuyer Creek in sec.28, T.29 N., R.6 W., at points 20 mi and 6 mi, respectively, west of dam. Usable capacity, 111,900 acre-ft between elevation 3,787.40 ft, outlet sill, and 3,816.00 ft, maximum design level. Dead storage is estimated at 5,000 acre-ft below elevation 3,787.40 ft. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Pondera County Canal and Reservoir Co.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 111,400 acre-ft, June 4, 1953, elevation, 3,815.92 ft; minimum observed, 4,560 acre-ft, Jan. 31, 1938, elevation, 3,789.36 ft.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 104,100 acre-ft, May 31, elevation, 3,814.55 ft; minimum, 74,700 acre-ft, Oct. 1, interpolated.

06110500 ACKLEY LAKE.--Lat 46°57'19", long 109°55'55", in SE¼ sec.22, T.14 N., R.14 E., Judith Basin County, Hydrologic Unit 10040103, at dam 4 mi southwest of Hobson. PERIOD OF RECORD, June 1938 to September 1960 (total contents), October 1960 to current year (usable contents). Records prior to October 1939, published only in WSP 1309. Nonrecording gage read usually at or near middle and end of month.

This is an offstream reservoir formed by earthfill dam with concrete conduits completed in 1938. Water is diverted from Judith River near center of east line of sec.14, T.14 N., R.13 E., 7.5 mi west of Hobson. Usable capacity, 5,820 acre-ft between gage height 45.0 ft, bottom of outlet, and 82.67 ft, spillway crest. Dead storage, 325 acre-ft below gage height 45.0 ft. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Department of Natural Resources and Conservation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 6,150 acre-ft, Sept. 1, 1975, elevation, 2,984.0 ft; minimum observed, 784 acre-ft, Aug. 25, 1984, elevation, 2,954.0 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents observed, 5,700 acre-ft, June 2, July 1, elevation, 2,982.2 ft; minimum observed, 4,370 acre-ft, Mar. 27, elevation, 2,976.5 ft.

Smaller reservoirs in Missouri River Basin in Montana--Continued

06116500 BAIR RESERVOIR.--Lat 46°34'47", long 110°33'24", in SE¼SE¼SW¼ sec.35, T.10 N., R.9 E., Meagher County, Hydrologic Unit 10040201, at dam on North Fork Musselshell River, 1 mi northwest of Delpine, 14 mi northwest of Martinsdale, and at mile 24.7. DRAINAGE AREA, 48.6 mi^2. PERIOD OF RECORD, November 1939 to September 1960 (total contents), winter records incomplete some years during 1951-59, October 1960 to current year (usable contents). Records for November 1939, published only WSP 1309. Prior to October 1969, published as "Durand Reservoir." Nonrecording gage read at or near middle and end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

Reservoir is formed by earthfill dam with concrete spillway completed in 1939. Usable capacity, 7,000 acre-ft between elevation 5,253.2 ft, bottom of inlet, and 5,325.0 ft, spillway crest. Dead storage, 24 acre-ft below elevation 5,253.2 ft. Supplemental water can be diverted from Checkerboard Creek in S½ sec.5, T.9 N., R.9 E., but seldom used. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Department of Natural Resources and Conservation. REVISED RECORDS, WSP 1729: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 7,390 acre-ft, July 1, 1979, elevation, 5,326.3 ft; no storage July 31, 1961, September, October 1984, and July to October 1985.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 6,950 acre-ft, May 1, elevation, 5,324.8 ft; minimum, 926 acre-ft, Sept. 30, interpolated.

06119000 MARTINSDALE RESERVOIR.--Lat 46°27'17", long 110°16'02", in NE¼NW¼SE¼ sec.18, T.8 N., R.12 E., Wheatland County, Hydrologic Unit 10040201, at north dam 2 mi east of Martinsdale, lat 46°26'33", long 110°15'30", in NE¼ sec.20, T.8 N., R.12 E., at south dam 3 mi southeast of Martinsdale. PERIOD OF RECORD, November 1939 to September 1960 (total contents), winter records incomplete for some years during 1951-59, October 1960 to current year (usable contents). Records for November 1939, published only in WSP 1309. Nonrecording gage read at or near middle and end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

This is an offstream reservoir formed by two earthfill dams with concrete conduit and spillway completed in 1939. Stored water is diverted from South Fork Musselshell River in N½ sec.15, T.8 N., R.11 E., at a point 1 mi west of Martinsdale. Usable capacity, 23,110 acre-ft between elevation 4,714.67 ft, bottom of outlet, and 4,779.0 ft, spillway crest. Dead storage, 73 acre-ft below elevation 4,714.67 ft. South Fork Musselshell River flow above diversion is supplemented at times with return flow from lands irrigated by water diverted from North Fork Musselshell River. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Department of Natural Resources and Conservation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 23,910 acre-ft, June 15, 1980, elevation, 4,779.84 ft; no storage July 31, Aug. 31, Sept. 30, Oct. 31, 1961.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 15,400 acre-ft, May 5, elevation, 4,770.2 ft; minimum, 2,560 acre-ft, Sept. 30, interpolated.

06122500 DEADMAN'S BASIN RESERVOIR.--Lat 46°20'24", long 109°24'35", in NE¼ sec.25, T.7 N., R.18 E., Wheatland County, Hydrologic Unit 10040201, at dam 6 mi east of Shawmut. PERIOD OF RECORD, June 1941 to June 1955 (some contents may be total), July 1955 to current year (usable contents), incomplete 1942, 1951-59. Nonrecording gage read at or near middle and end of month. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by Montana Department of Natural Resources and Conservation).

This is an offstream reservoir formed by earthfill dam completed in 1941. Stored water is diverted from Musselshell River in NW¼ sec.8, T.7 N., R.17 E., 6 mi northwest of Shawmut. Usable capacity, 72,220 acre-ft between elevation 3,872.0 ft, bottom of outlet, and 3,921.0 ft, maximum design level. Prior to 1958, usable capacity was 52,500 acre-ft at elevation 3,911.0 ft. Dead storage, 4,600 acre-ft below elevation 3,872.0 ft. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Department of Natural Resources and Conservation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 73,240 acre-ft, June 7, 1978, elevation, 3,921.5 ft; minimum observed, 3,290 acre-ft, Oct. 31, 1961, elevation, 3,867.3 ft.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 64,180 acre-ft, Apr. 23, elevation, 3,917.0 ft; minimum observed, 29,810 acre-ft, Sept. 30, elevation, 3,897.9 ft.

06136500 FRESNO RESERVOIR.--Lat 48°36'04", long 109°56'45", in SE¼ sec.19, T.33 N., R.14 E., Hill County, Hydrologic Unit 10050002, at dam on Milk River, 13 mi west of Havre and at mile 437.3. DRAINAGE AREA, 3,766 mi^2 of which 670 mi^2 is probably noncontributing. PERIOD OF RECORD, January 1940 to current year. Records prior to September 1940, published only in WSP 1309. March to May, 1952 daily elevations and contents, published in WSP 1260-B. April to July 1953 scattered daily elevations and contents, published in WSP 1320-B. Records of daily contents in files of Helena district office. Nonrecording gage read daily. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

Reservoir is formed by earthfill dam with concrete spillway completed in 1939. Usable capacity, 103,000 acre-ft, between elevation 2,530.00 ft, invert of tunnel inlet, and 2,575.00 ft, spillway crest, from revised capacity table effective Feb. 1, 1983. Elevation of maximum water surface is 2,592.93 ft, 224,700 acre-ft. Crest of dam is 2,596.10 ft. There are no gates in the spillway. Dead storage, 544 acre-ft, below elevation 2,530.00 ft. Figures given herein represent usable contents. Water is used for irrigation and recreation. Records furnished by U.S. Bureau of Reclamation. REVISED RECORDS, WSP 1729: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 154,000 acre-ft, Apr. 3, 1952, elevation, 2,579.35 ft, of which 26,800 acre-ft was uncontrolled storage, capacity table then in use; no storage Feb. 18 to Mar. 6, 1950.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 105,300 acre-ft, May 1, elevation, 2,575.50 ft; minimum observed, 62,140 acre-ft, Jan. 15, elevation, 2,564.62 ft.

Smaller reservoirs in Missouri River Basin in Montana--Continued

06155000 NELSON RESERVOIR.--Lat 48°31'42", long 107°31'00", in SE¼ sec.14, T.32 N., R.32 E., Phillips County, Hydrologic Unit 10050004, at dam 10 mi northwest of Saco. PERIOD OF RECORD, March 1928 to current year. Records prior to October 1940, published only in WSP 1309. Nonrecording gage read on first and last day of month and more often during high stages. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

This is an offstream reservoir formed by earthfill dam completed in 1922. Stored water is diverted from Milk River at Dodson Dam in SE¼ sec.26, T.31 N., R.26 E., 6 mi west of Dodson. Usable capacity, 60,570 acre-ft, between elevation 2,200 ft, gage sill, and 2,221.6 ft, top of active conservation pool. Dead storage, 18,650 acre-ft below elevation 2,200.0 ft. Reservoir has never been operated to maximum capacity which is 66,800 acre-ft at elevation 2,223.0 ft, maximum design level. Figures given herein represent usable contents. Water is used for irrigation, recreation, and wildlife. Records furnished by U.S. Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 60,570 acre-ft July 12-14, 1965, elevation, 2,221.6 ft; minimum observed, 842 acre-ft Aug. 31, 1984, elevation, 2,200.5 ft.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 57,170 acre-ft, May 31, elevation, 2,220.8 ft; minimum observed, 38,820 acre-ft, July 23, elevation, 2,216.1 ft.

06204000 MYSTIC LAKE.--Lat 45°13'30", long 109°45'36", in sec.9, T.7 S., R.16 E., (unsurveyed), Stillwater County, Hydrologic Unit 10070005, at dam on West Rosebud Creek, 15 mi southwest of Roscoe, 25 mi southwest of Absarokee, and at mile 28.8. DRAINAGE AREA, 46.9 mi^2. PERIOD OF RECORD, January 1936 to current year. Records prior to September 1939, published only in WSP 1309. Record of daily elevations since October 1965 available in files of Helena district office. Water-stage recorder. Prior to October 1965, only monthend figures furnished. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by The Montana Power Co.).

Reservoir is formed by thin-section reinforced concrete arch dam completed in 1925. Usable capacity, 21,000 acre-ft between elevation 7,612.00 ft, minimum operating level, and 7,673.50 ft, top of 3.5 ft stop logs. No dead storage. Figures given herein represent usable contents. Water is used for power development and recreation. Records furnished by The Montana Power Co. REVISED RECORDS, WSP 1916: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 21,130 acre-ft, July 10, 1983, elevation, 7,673.80 ft; no storage most days Mar. 23 to May 5, 1981, Apr. 10 to May 19, 1982, May 4, 5, 1983, May 14, 1984, and Mar. 23, 26, 27, 1986.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 20,580 acre-ft, Aug. 2, elevation, 7,672.55 ft; minimum observed, 1,290 acre-ft, Apr. 17, 18, elevation, 7,616.49 ft.

06212000 COONEY RESERVOIR.--Lat 45°26'47", long 109°11'57", in N½NE¼ sec.36, T.4 S., R.20 E., Carbon County, Hydrologic Unit 10070006, at dam on Red Lodge Creek, 1 mi upstream from Cottonwood Creek, 6.6 mi west of Boyd, and at mile 12.0. DRAINAGE AREA, 206 mi^2. PERIOD OF RECORD, May 1937 to September 1960 (total contents), incomplete 1954-60, October 1960 to current year (usable contents). Records prior to October 1939, published only in WSP 1309. Nonrecording gage read at or near middle and end of month. Datum of gage is at National Geodetic Vertical Datum of 1929.

Reservoir is formed by earthfill dam with concrete spillway completed in 1936. Usable capacity, 27,400 acre-ft between elevation 4,175.0 ft, bottom of tunnel, and 4,250.0 ft, top of 4 ft flashboards. Dead storage, 90 acre-ft below elevation 4,175.0 ft. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Department of Natural Resources and Conservation. REVISED RECORDS, WSP 1729: Drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 28,140 acre-ft, May 31, 1987, elevation, 4,251.0 ft; no contents observed Sept. 30, 1960, Oct. 31, 1981 through Feb. 28, 1982.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 28,140 acre-ft, May 31, elevation, 4,251.0 ft; minimum observed, 15,050 acre-ft, Dec. 31, elevation, 4,233.1 ft.

06307000 TONGUE RIVER RESERVOIR.--Lat 45°07'48", long 106°46'13", in SE¼SE¼NE¼ sec.13, T.8 W., R.40 E., Big Horn County, Hydrologic Unit 10090101, at dam on Tongue River, 4 mi upstream from Post Creek, 7 mi northeast of Decker, and at mile 189.1. DRAINAGE AREA, 1,770 mi^2. PERIOD OF RECORD, December 1938 to current year. Records prior to September 1939, published only in WSP 1309 and those for January, February 1956, published only in WSP 1729. Nonrecording gage read daily but only weekly readings supplied. Datum of gage is at National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

Reservoir is formed by earthfill dam with concrete spillway completed in May 1939. Usable capacity, 68,040 acre-ft between elevation 3,374.4 ft, bottom of outlet, and 3,424.4 ft, spillway crest. Prior to October 1947, usable contents was 73,950 acre-ft at same elevations, due to sedimentation study. Dead storage, 1,400 acre-ft below elevation, 3,374.4 ft. Figures given herein represent usable contents. Water is used for irrigation. Records furnished by Montana Department of Natural Resources and Conservation. REVISED RECORDS, WSP 1309: 1947-50. WSP 1729: 1951, drainage area.

EXTREMES FOR PERIOD OF RECORD: Maximum contents observed, 77,040 acre-ft, May 26, 1978, elevation, 3,426.8 ft, from extension of rating curve; no storage October 1939 to February 1940.

EXTREMES FOR CURRENT YEAR: Maximum contents observed, 64,950 acre-ft, June 13-16, elevation, 3,423.5 ft; minimum, 16,430 acre-ft, Oct. 1, interpolated.

Smaller reservoirs in Missouri River basin in Montana--Continued

Monthend contents, in acre-feet, water year October 1986 to September 1987

Date	Lima Reservoir	Ruby River Reservoir	Willow Creek Reservoir	Hebgen Lake	Ennis Lake	Middle Creek Reservoir	Helena Valley Reservoir
Sept. 30	23,630	11,370		349,600	37,310	b3,940	b6,910
Oct. 31	24,180	a14,820		305,000	36,740	b4,310	a6,300
Nov. 30	26,780	19,270		285,100	30,480	a4,450	b5,840
Dec. 31	27,350	b23,310		282,100	29,930	4,530	a5,410
Jan. 31	28,190	26,730	No	282,700	31,740	4,570	a4,450
Feb. 28	29,150	b31,540	data	282,300	30,480	4,730	a4,450
Mar. 31	34,480	36,020	avail-	289,800	30,220	5,090	4,130
Apr. 30	57,430	b40,430	able	316,300	27,380	6,960	b7,820
May 31	55,670	a32,630		370,700	35,990	8,270	b6,520
June 30	35,970	25,290		378,200	36,630	7,890	b9,050
July 31	33,640	19,960		373,800	36,860	8,160	b8,640
Aug. 31	21,390	13,370		351,800	37,310	7,020	b7,960
Sept. 30	0	6,970		322,900	37,310	5,830	b8,200

Date	Lake Helena	Hauser Lake	Holter Lake	Smith River Reservoir	Gibson Reservoir	Pishkun Reservoir	Willow Creek Reservoir
Sept. 30	10,890	52,150	80,830	b 5,990	30,270	5,800	24,980
Oct. 31	11,110	52,520	80,590	b 6,490	41,230	5,800	25,930
Nov. 30	10,890	52,150	80,400	b 6,880	38,470	19,550	26,340
Dec. 31	10,890	52,150	81,440	b 6,880	46,170	19,420	26,750
Jan. 31	10,890	52,150	81,200	b 6,880	51,850	19,290	27,290
Feb. 28	10,890	52,150	80,590	a 7,640	56,430	18,910	27,290
Mar. 31	10,890	52,150	70,360	b 8,380	63,180	17,230	28,520
Apr. 30	10,890	52,150	80,640	b 9,790	84,910	27,620	29,260
May 31	10,670	51,780	80,970	b 9,460	99,050	31,400	32,680
June 30	10,890	52,150	80,490	b 5,380	66,590	26,430	24,570
July 31	10,450	51,420	80,160	b 3,800	38,870	24,950	17,930
Aug. 31	11,110	52,520	80,260	c 1,000	21,270	20,200	23,620
Sept. 30	10,890	52,150	80,640	0	31,230	20,200	23,620

Date	Nilan Reservoir	Lower Two Medicine Lake	Four Horns Lake	Swift Reservoir	Lake Frances	Ackley Lake	Bair Reservoir
Sept. 30	a5,320	0	10,360	10,020	74,380	a4,430	b5,670
Oct. 31	b5,970	---	---	7,560	84,250	a4,830	b5,960
Nov. 30	a6,640	---	---	12,170	84,010	---	b6,450
Dec. 31	a7,360	c11,880	---	15,870	83,760	---	b6,450
Jan. 31	a8,100	c11,920	a13,430	18,350	83,620	---	b6,420
Feb. 28	8,550	b11,960	b13,390	20,280	83,250	---	b6,700
Mar. 31	9,530	a12,060	a13,680	23,270	83,910	a4,400	b6,550
Apr. 30	a9,660	a12,160	a12,810	24,940	94,080	a4,790	b6,950
May 31	9,790	b12,490	b13,830	30,110	104,100	a5,640	b5,410
June 30	b9,790	a12,150	a 9,160	27,390	95,880	b5,700	b3,160
July 31	a9,790	b10,340	c12,200	23,690	93,730	a5,300	b2,390
Aug. 31	c9,100	b10,480	c13,570	21,190	98,230	a4,950	b1,850
Sept. 30	c8,800	b11,510	c13,570	20,540	96,540	a4,500	a 926

Date	Martinsdale Reservoir	Deadman's Basin Reservoir	Fresno Reservoir	Nelson Reservoir	Mystic Lake	Cooney Reservoir	Tongue River Reservoir
Sept. 30	b11,930	a35,260	68,000	54,280	18,610	a16,390	16,100
Oct. 31	b11,520	b40,830	69,430	51,580	16,010	b17,230	b19,020
Nov. 30	b12,070	a46,010	b65,560	49,850	11,310	b17,230	---
Dec. 31	b12,070	b50,610	b63,200	a48,000	7,830	15,050	---
Jan. 31	b12,070	a56,740	a62,560	a45,480	4,060	15,170	---
Feb. 28	b11,720	a58,930	a64,220	a43,580	2,140	a17,730	---
Mar. 31	b12,790	b63,980	86,800	41,380	1,570	22,040	b24,260
Apr. 30	b15,090	a63,560	105,300	54,680	2,560	24,390	45,650
May 31	b11,400	b51,940	b92,440	57,180	12,370	28,140	59,790
June 30	b 7,120	45,850	84,400	46,710	19,420	24,060	54,600
July 31	b 5,700	b38,110	62,820	41,770	20,530	24,300	44,150
Aug. 31	b 4,600	b32,640	64,600	47,090	19,780	23,500	35,200
Sept. 30	a 2,560	29,810	69,950	49,450	19,240	21,590	31,470

a Interpolated.
b Figure of contents for first day of following month.
c Estimated.

06334500 LITTLE MISSOURI RIVER AT CAMP CROOK, SD

LOCATION.--Lat 45°32'49", long 103°58'23", in SW¼ sec.2, T.18 N., R.1 E., Harding County, Hydrologic Unit 10110201, on left bank 15 ft upstream from bridge on State Highway 20 at east edge of Camp Crook.

DRAINAGE AREA.--1,970 mi^2, approximately.

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

REVISED RECORDS.--WSP 1309: 1904. WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,108.98 ft above National Geodetic Vertical Datum of 1929. Sept. 2, 1903, to Nov. 30, 1906, nonrecording gage at site 0.5 mi upstream at different datum. May 1956 to Oct. 8, 1957, nonrecording gage at site 15 ft downstream, and Oct. 9, 1957, to Sept. 30, 1976, water-stage recorder at present site both at datum 2.00 ft higher.

REMARKS.--Records good except those for period of estimated record, which is poor. Estimated daily discharges during water year: Nov. 9 to Feb. 23, Feb. 26 to Mar. 3, Mar. 26-30. Small diversions upstream from station for irrigation. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--34 years, 133 ft^3/s, 96,360 acre-ft/yr; median of yearly mean discharges, 120 ft^3/s, 86,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,420 ft^3/s, Mar. 24, 1978, gage height, 16.90 ft, present datum; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of 1952 reached a stage of about 18 ft, present datum, from local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 6	0130	*2,240	*10.27	No other peak greater than base discharge.			

Minimum daily discharge, 4.7 ft^3/s, Nov. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	
1	560	47	45	13	19	15	19	25	56	5.8	30	6.1
2	330	44	45	12	20	16	35	24	45	5.8	21	5.6
3	247	41	45	13	22	17	228	36	34	5.5	16	5.3
4	323	38	43	16	22	20	818	31	28	5.6	13	5.6
5	271	37	40	18	21	24	1380	30	24	6.3	11	7.7
6	289	34	39	17	25	28	1980	28	19	5.3	29	19
7	334	33	38	16	30	37	1550	24	21	5.9	34	50
8	258	26	37	16	36	33	1090	21	20	6.7	28	199
9	183	24	36	16	40	24	937	21	19	6.6	126	108
10	126	22	25	15	46	27	695	19	18	7.2	166	78
11	96	20	29	16	55	25	460	17	17	9.0	58	57
12	79	18	28	16	65	25	290	18	18	20	44	44
13	70	16	27	17	55	32	223	17	13	12	57	35
14	64	15	26	16	46	33	191	16	11	9.2	45	30
15	63	16	26	15	37	28	147	15	15	8.3	33	25
16	58	17	25	15	35	24	119	15	12	16	26	21
17	53	17	24	13	33	22	103	15	10	21	23	18
18	49	18	24	16	33	20	91	15	8.4	16	20	16
19	49	18	24	17	28	18	80	15	6.8	14	17	16
20	50	19	23	16	25	18	72	20	20	13	16	15
21	46	19	23	16	25	24	64	35	23	24	14	17
22	42	20	23	16	27	33	56	26	13	153	10	19
23	41	21	22	14	31	28	49	26	8.8	161	9.3	18
24	39	22	19	14	31	26	46	24	8.9	228	7.7	15
25	37	30	18	16	28	21	42	21	10	159	5.9	13
26	103	70	17	16	27	20	38	21	9.2	76	8.0	12
27	161	60	16	17	25	18	33	49	6.6	55	11	9.9
28	114	45	16	17	17	17	31	414	5.4	46	9.6	10
29	75	45	16	17	---	17	29	191	4.9	37	7.7	9.3
30	59	45	15	18	---	16	26	106	4.7	40	7.0	8.3
31	50	---	15	18	---	20	---	69	---	35	6.4	---
TOTAL	4319	897	849	488	904	726	10922	1404	509.7	1213.2	909.6	898.8
MEAN	139	29.9	27.4	15.7	32.3	23.4	364	45.3	17.0	39.1	29.3	28.8
MAX	560	70	45	18	65	37	1980	414	56	228	166	199
MIN	37	15	15	12	17	15	19	15	4.7	5.3	5.9	5.3
AC-FT	8570	1780	1680	968	1790	1440	21660	2780	1010	2410	1800	1770

CAL YR 1986	TOTAL	84227.2	MEAN	231	MAX	4870	MIN	2.2	AC-FT	167100
WTR YR 1987	TOTAL	24034.3	MEAN	65.8	MAX	1980	MIN	4.7	AC-FT	47670

06336600 BEAVER CREEK NEAR TROTTERS, ND

LOCATION.--Lat 47°09'47", long 103°59'32", in SW¼SW¼NE¼ sec.33, T.143 N., R.105 W., Golden Valley County, Hydrologic Unit 10110204, on left bank 100 ft upstream from bridge on county road, 2.4 mi east of Montana-North Dakota State line, 13 mi southwest of Trotters, 17 mi north of Beach, 20 mi upstream from Elk Creek, and at mile 27.

DRAINAGE AREA.--616 mi^2, revised.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1977 to current year (seasonal records only since 1984).

REVISED RECORDS.--1977: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,370 ft, from topographic map.

REMARKS.--Estimated daily discharges: Feb. 1 to Mar. 29, and June 11 to Sept. 30. Records fair.

AVERAGE DISCHARGE.--6 years (water years 1978-83), 33.3 ft^3/s, 24,130 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,720 ft^3/s, Mar. 29, 1978, gage height, 18.61 ft; maximum gage height, 19.27 ft Mar. 22, 1978, ice jam; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 623 ft^3/s, Apr. 7, gage height, 9.50 ft; minimum recorded daily discharge, 0.22 ft^3/s, Sept. 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					.50	18	25	12	7.5	1.8	30	1.3
2					1.0	18	27	12	6.8	1.4	23	1.0
3					2.0	22	30	17	6.2	1.1	14	.80
4					3.0	30	48	20	5.9	.85	9.2	.65
5					5.0	35	221	19	5.6	.90	6.7	.60
6					10	30	239	17	5.0	1.0	5.4	.65
7					18	26	505	15	4.8	.95	4.0	.60
8					25	20	276	14	4.5	.85	3.5	.55
9					32	14	166	13	4.1	.90	2.8	.60
10					45	10	109	12	3.7	.95	2.0	.75
11					100	12	78	11	3.5	1.0	1.4	.85
12					175	15	62	9.9	3.0	1.0	1.2	.78
13					140	16	50	9.2	2.6	1.0	1.2	.70
14					110	18	43	8.4	2.2	1.0	1.5	.65
15					110	20	38	8.3	1.9	1.1	1.4	.80
16					90	18	33	8.2	1.9	1.3	1.2	1.0
17					85	16	30	9.8	1.7	1.5	1.1	.75
18					70	15	29	11	1.8	1.6	1.0	.65
19					65	15	27	10	2.2	1.9	.94	.52
20					70	16	24	9.4	2.8	1.6	.85	.38
21					55	22	22	9.0	2.6	2.0	.75	.32
22					50	26	21	8.6	2.2	2.4	.64	.30
23					40	35	18	8.5	2.2	2.2	.52	.28
24					35	36	17	8.1	1.9	1.9	.50	.25
25					28	25	16	7.5	1.6	1.6	1.0	.22
26					25	20	15	7.2	1.3	1.5	2.2	.28
27					20	18	13	8.0	1.5	1.3	4.5	.36
28					20	16	13	7.9	1.7	1.1	3.5	.75
29						15	13	8.1	2.1	1.0	3.0	.55
30						16	12	7.7	2.2	.85	2.4	.40
31						19		7.4		2.5	1.7	
TOTAL					1429.50	632	2220	334.2	97.0	42.05	133.10	18.29
MEAN					51.1	20.4	74.0	10.8	3.23	1.36	4.29	.61
MAX					175	36	505	20	7.5	2.5	30	1.3
MIN					.50	10	12	7.2	1.3	.85	.50	.22
AC-FT					2840	1250	4400	663	192	83	264	36

06336600 BEAVER CREEK NEAR TROTTERS, ND--Continued

WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	HARD-NESS (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)
FEB											
09...	1130	32	1870	8.23	6.5	0.5	450	160	81	60	250
MAR											
10...	1125	9.3	1580	--	0.0	0.5	--	--	--	--	--
APR											
03...	1345	40	1900	--	6.5	3.0	--	--	--	--	--
MAY											
07...	0930	15	2170	--	22.0	17.0	--	--	--	--	--
JUN											
04...	1355	6.0	2340	--	27.5	21.0	--	--	--	--	--
JUL											
06...	1045	0.99	2610	8.28	20.0	22.0	570	210	72	94	400
AUG											
17...	1105	1.1	2370	--	15.5	17.5	--	--	--	--	--

DATE	PERCENT SODIUM (00932)	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)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
FEB											
09...	54	5	11	290	680	6.2	0.20	8.7	1300	1300	1.8
JUL											
06...	60	7	14	360	1100	11	0.20	1.3	1920	1900	2.6

DATE	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)
FEB										
09...	1	320	70	<1	40	30	0.3	<1	1	1000
JUL										
06...	1	680	20	1	69	10	0.7	2	1	1200

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^2)	Period of record	Date	Annual maximum Gage height (ft)	Annual maximum Discharge (ft^3/s)
Part 6		BIG SHEEP CREEK BASIN					
06013500	Big Sheep Creek below Muddy Creek, near Dell	Lat 44°39'19", long 112°46'41", SW¼NW¼SE¼ sec.35, T.13 S., R.10 W., Beaverhead County, Hydrologic Unit 10020001, on left bank 2.2 mi downstream from Muddy Creek, 6.5 mi southwest of Dell, and at mi 8.5.	278	† 1936 †1946-53 1960-76 †1977-79 1980-87	7-18-87	5.47	351
		CLARK CANYON BASIN					
06015430	Clark Canyon near Dillon	Lat 45°00'56", long 112°50'10", in SE¼SW¼ sec.28, T.9 S., R.10 W., Beaverhead County, Hydrologic Unit 10020002, at culvert in county road, 0.3 mi south of Interstate Highway 15 and junction with access road, 1.6 mi north of Interstate Highway 15 and junction to Clark Canyon Dam, 17.0 mi southwest of Dillon.	18.0	1969 1974-87	5-17-87	2.02	39
		RUBY RIVER BASIN					
06019400	Sweetwater Creek near Alder	Lat 45°04'39", long 112°13'32", in NW¼SW¼ sec.4, T.9 S., R.4 W., Madison County, Hydrologic Unit 10020003, at bridge on county road 0.6 mi upstream from small reservoir, 3.5 mi upstream from Belmont Park Ranch, 6.0 mi southwest of Ruby River bridge, 12.5 mi southwest of Ruby Reservoir dam, 18 mi south of Alder.	81.5	1974-87	5-17-87	a	b 10
		BIG HOLE RIVER BASIN					
06025100	Quartz Hill Gulch near Wise River	Lat 45°46'35", long 112°51'41", in NE¼SE¼ sec.5, T.1 S., R.10 W., Beaverhead County, Hydrologic Unit 10020004, 210 ft upstream from State Highway 43, 0.3 mi west of Dewey, 4.2 mi east of Wise River.	14.3	1974-87	---	---	c

See footnotes at end of table.

Annual maximum discharge at crest-stage partial-record stations--continued

Station No.	Station name	Location	Drainage area (mi^2)	Period of record	Date	Annual maximum Gage height (ft)	Annual maximum Discharge (ft^3/s)
		FISH CREEK BASIN					
06027700	Fish Creek near Silver Star	Lat 45°46'18", long 112°14'56", in NW¼ sec.8, T.1 S., R.5 W., Silver Bow County, Hydrologic Unit 10020005, at bridge in county road, 6 mi north of Silver Star.	38.9	1959-87	5-17-87	1.11	102
		TRIBUTARY BETWEEN FISH CREEK AND BOULDER RIVER					
06030300	Jefferson River tributary No. 2 near Whitehall	Lat 45°52'48", long 111°58'28", SE¼ sec.33, T.2 N., R.3 W., Jefferson County, Hydrologic Unit 10020005, at culvert in State Highway 281, 6 mi east of Whitehall.	4.50	1958-87	---	---	c
		BOULDER RIVER BASIN					
06031950	Cataract Creek near Basin	Lat 46°17'10", long 112°14'33", in NW¼SW¼ sec.9, T.6 N., R.5 W., Jefferson County, Hydrologic Unit 10020006, on bridge on county road 200 ft upstream from Big Limber Gulch, and 2.1 mi northeast of Basin.	30.6	1973-87	5-28-87	2.52	210
		MADISON RIVER BASIN					
06038550	Cabin Creek near West Yellowstone	Lat 44°52'19", long 111°20'29", in NW¼SE¼ sec.15, T.11 W., R.3 E., Gallatin County, Hydrologic Unit 10020007, at U.S. Forest Service Cabin Creek Campground on U.S. Highway 287, 12.8 mi west of U.S Highway 191, 19 mi northwest of West Yellowstone.	30.3	1974-87	4-30-87	2.10	363
		GALLATIN RIVER BASIN					
06043300	Logger Creek near Gallatin Gateway	Lat 45°27'17", long 111°14'38", in SW¼ sec.28, T.4 S., R.4 E., Gallatin County, Hydrologic Unit 10020008, at culvert in U.S. Highway 191, 10 mi south of Gallatin Gateway.	2.48	1959-87	5-28-87	.34	10
06046500	Rocky Creek near Bozeman	Lat 45°39'17", long 110°56'33", in NE¼ sec.23, T.2 S., R.6 E., Gallatin County, Hydrologic Unit 10020008, 5 mi east of Bozeman.	50.5	†1951-53 1956-57 1959-87	5-28-87	1.28	210
		SIXTEENMILE CREEK BASIN					
06053050	Lost Creek near Ringling	Lat 46°15'38", revised, long 110°47'08",, in SE¼SE¼ sec.24, T.6 N., R.7 E., Meagher County, Hydrologic Unit 10030101, on bridge on U.S. Highway 89, 1 mi southeast of Ringling.	9.59	1974-87	5-21-87	a	b 1
		DEEP CREEK BASIN					
06056300	Cabin Creek near Townsend	Lat 46°20'00", long 111°13'05", in NW¼ sec.27, T.7 N., R.4 E., Broadwater County, Hydrologic Unit 10030101, at bridge 100 ft upstream from mouth, 14.5 mi east of Townsend.	11.8	1960-87	5-27-87	2.17	5

See footnotes at end of table.

Annual maximum discharge at crest-stage partial-record stations--continued

Station No.	Station name	Location	Drainage area (mi^2)	Period of record	Date	Annual maximum Gage height (ft)	Annual maximum Discharge (ft^3/s)
		SPOKANE CREEK BASIN					
06058700	Mitchell Gulch near East Helena	Lat 46°34'20", long 111°49'21", in NW¼ sec.2, T.9 N., R.2 W., Lewis and Clark County, Hydrologic Unit 10030101, at culvert in U.S. Highway 12, 4.7 mi east of East Helena.	8.09	1959-87	9-24-87	-2.06	b 1
		WEGNER CREEK BASIN					
06071600	Wegner Creek at Craig	Lat 47°04'35", long 111°57'17", in NW¼ sec.11, T.15 N., R.3 W., Lewis and Clark County, Hydrologic Unit 10030102, at bridge on U.S. Highway 91, 0.9 mi east of Craig.	35.7	1960-87	5-27-87	- .15	40
		DEARBORN RIVER BASIN					
06073600	Black Rock Creek near Augusta	Lat 47°17'28", long 112°09'46", in NE¼NW¼ sec. 30, T.18 N., R.4 W., Lewis and Clark County, Hydrologic Unit 10030102, at culvert 0.1 mi north of Bowmans Corner in U.S. Highway 287, 17.5 mi southeast of Augusta.	5.54	1974-87	7-18-87	3.17	54
		SMITH RIVER BASIN					
06076700	Sheep Creek near Neihart	Lat 46°47'59", long 110°42'10", in SE¼ sec.15, T.12 N., R.8 E., Meagher County, Hydrologic Unit 10030103, at culvert in U.S. Highway 89, 10 mi south of Neihart.	5.23	1960-87	5-02-87	1.08	43
		BELT CREEK BASIN					
06090550	Little Otter Creek near Raynesford	Lat 47°15'05", long 110°43'50", in SW¼NW¼ sec.8, T.17 N., R.8 E., Judith Basin County, Hydrologic Unit 10030105, at culvert in Secondary Highway 427, 1.0 mi south of Raynesford.	39.5	1974-87	5-19-87	a	3
		SHONKIN CREEK BASIN					
06090810	Ninemile Coulee near Fort Benton	Lat 47°42'01", long 110°42'12", in SE¼SE¼ sec.34, T.23 N., R.8 E., Chouteau County, Hydrologic Unit 10030102, at culverts in county road, 8.4 mi south of Missouri River bridge at Fort Benton, and 8.5 mi south of Fort Benton.	16.9	1972-87	3-30-87	2.73	14
		MARIAS RIVER BASIN					
06097100	Blacktail Creek near Heart Butte	Lat 48°14'56", long 112°47'19", in NW¼NW¼ sec.28, T.29 N., R.9 W., Pondera County, Hydrologic Unit 10030201, at bridge on county road, 3.3 mi southeast of Heart Butte, 16.7 mi northwest of Dupuyer.	16.4	1975-87	5-27-87	2.23	155

See footnotes at end of table.

Annual maximum discharge at crest-stage partial-record stations--continued

Station No.	Station name	Location	Drainage area (mi^2)	Period of record	Date	Annual maximum Gage height (ft)	Annual maximum Discharge (ft^3/s)
		MARIAS RIVER BASIN--Continued					
06098700	Powell Coulee near Browning	Lat 48°45'01", long 112°45'21", in SE¼NE¼ sec.34, T.35 N., R.9 W., Glacier County, Hydrologic Unit 10030202, at culvert in Secondary Highway 444, 10.5 mi north of U.S. Highway 2, 18 mi northeast of Browning.	12.7	1974-87	4-03-87	d2.88	b 15
06100300	Lone Man Coulee near Valier	Lat 48°14'10", long 112°13'49", in SE¼ sec.27, T.29 N., R.5 W., Pondera County, Hydrologic Unit 10030203, at culvert in county road, 5 mi south of Valier.	14.1	1960-87	1987	a	b 10
06101520	Favot Coulee tributary near Ledger	Lat 48°15'47", long 111°42'09", in SE¼SW¼ sec.14, T.29 N., R.1 W., Pondera County, Hydrologic Unit 10030203, at culvert in Highway 366, 0.3 mi east of Higgins School, 5.5 mi east of Ledger.	.86	1974-87	4-02-87	1.14	3
06101700	Fey Coulee tributary near Chester	Lat 48°27'31", long 111°04'47", near center of east line of sec.9, T.31 N., R.5 E., Liberty County, Hydrologic Unit 10030203, at culvert in county road, 3.5 mi south of Tiber Siding on Great Northern Railway and U.S. Highway 2, 6.5 mi southwest of Chester.	2.47	1963-87	8-24-87	5.16	b200
06105800	Bruce Coulee tributary near Choteau	Lat 47°44'07", long 112°15'05", near center of sec.21, T.23 N., R.5 W., Teton County, Hydrologic Unit 10030205, at bridge on county road 1.2 mi west of State Highway 287 and 6 mi southwest of Choteau.	1.70	1963-87	7-18-87	2.17	99
		LITTLE SANDY CREEK BASIN					
06109530	Little Sandy Creek tributary near Virgelle	Lat 48°05'15", long 109°56'34", in NW¼NW¼ sec.21, T.27 N., R.14 E., Chouteau County, Hydrologic Unit 10040101, at culvert in county road, 11 mi east of Highway 236, 10 mi southeast of Big Sandy.	.80	1972 1974-87	1-10-87	1.22	2
		ALKALI COULEE BASIN					
06109560	Alkali Coulee tributary near Virgelle	Lat 48°03'19", long 110°05'21", in SW¼NW¼ sec.32, T.27 N., R.13 E., Chouteau County, Hydrologic Unit 10040101, at culvert on county road, 2.1 mi south of Highway 236, 9.1 mi southeast of of Big Sandy.	.96	1972-87	6-20-87	1.26	2
		JUDITH RIVER BASIN					
06111700	Mill Creek near Lewistown	Lat 46°59'44", long 109°26'49", in NE¼ sec.9, T.14 N., R.18 E., Fergus County, Hydrologic Unit 10040103, at culverts in county road, 5 mi south of Lewistown.	3.53	1960-87	4-16-87	d.31	b 2
06112800	Bull Creek tributary near Hilger	Lat 47°15'10", long 109°21'51", in NW¼NE¼ sec.12, T.17 N., R.18 E., Fergus County, Hydrologic Unit 10040103, at culvert in county road, 0.4 mi west of Hilger.	.99	1974-87	5-27-87	1.48	1

See footnotes at end of table.

Annual maximum discharge at crest-stage partial-record stations--continued

Station No.	Station name	Location	Drainage area (mi^2)	Period of record	Date	Annual maximum Gage height (ft)	Annual maximum Discharge (ft^3/s)
		JUDITH RIVER BASIN--Continued					
06114550	Wolf Creek tributary near Coffee Creek	Lat 47°17'56", long 110°07'57", in NE¼NE¼ sec.25, T.18 N., R.12 E., Judith Basin County, Hydrologic Unit 10040103, at culverts in county road, 1.8 mi east of Highway 230, 4 mi southwest of Coffee Creek.	1.73	1974-87	1-10-87	2.37	10
		DOG CREEK BASIN					
06114900	Taffy Creek tributary near Winifred	Lat 47°39'06", long 109°15'33", in SW¼NW¼ sec.26, T.22 N., R.19 E., Fergus County, Hydrologic Unit 10040101, at culvert in county road, 8.5 mi northeast of Winifred.	2.95	1974-87	---	---	c
		DUVAL CREEK BASIN					
06115300	Duval Creek near Landusky	Lat 47°45'17", long 108°42'23", in center of sec.13, T.23 N., R.23 E., Phillips County, Hydrologic Unit 10040104, at culvert in U.S. Highway 191, 10.0 road mi north of Fred Robinson Bridge over the Missouri River, 11 mi southwest of Landusky.	3.31	1963-87	---	---	c
		MUSSELSHELL RIVER BASIN					
06117800	Big Coulee near Martinsdale	Lat 46°33'00", long 110°18'52", in SW¼SW¼ sec.11, T.9 N., R.11 E., Meagher County, Hydrologic Unit 10040201, at culvert in county road, 4.3 mi north of U.S. Highway 12 and turnoff to Martinsdale, 6.5 mi north of Martinsdale.	2.86	1972 1974-87	6-09-87	6.08	260
06120800	Antelope Creek tributary No. 2 near Harlowton	Lat 46°27'47", long 109°49'29", in SE¼ sec.10, T.8 N., R.15 E., Wheatland County, Hydrologic Unit 10040201, at E.S. Bacon ranch, 1.5 mi north of Harlowton.	21.2	1956-87	6-09-87	3.01	480
06123200	Sadie Creek near Harlowton (formerly Spring Creek tributary near Harlowton)	Lat 46°11'35", long 109°54'10", in NW¼NW¼ sec.18, T.5 N., R.15 E., Sweet Grass County, Hydrologic Unit 10040201, at culverts in U.S. Highway 191, 17 mi south of Harlowton.	2.10	1973-87	---	---	c
06124600	East Fork Roberts Creek tributary near Judith Gap	Lat 46°40'51", long 109°40'24", in SE¼SW¼ sec.26, T.11 N., R.16 E., Wheatland County, Hydrologic Unit 10040201, at culvert in Secondary Highway 248, 3.5 mi east of Judith Gap.	.74	1974-87	5-27-87	3.06	46
06125520	Swimming Woman Creek tributary near Living Springs	Lat 46°36'24", long 109°21'33", in SW¼SW¼ sec.20, T.10 N., R.19 E., Golden Valley County, Hydrologic Unit 10040201, at culvert in county road, 2.3 mi east of county line, 12.5 mi northeast of Hedgesville, 19.5 mi east of Judith Gap.	1.73	1974-87	7-17-87	1.87	2

See footnotes at end of table.

Annual maximum discharge at crest-stage partial-record stations--continued

Station No.	Station name	Location	Drainage area (mi^2)	Period of record	Annual maximum Gage height (ft)	Annual maximum Date	Annual maximum Discharge (ft^3/s)
		MUSSELSHELL RIVER BASIN--Continued					
06125680	Big Coulee Creek tributary near Cushman	Lat 46°14'50", long 109°01'58", in SE¼SE¼ sec.24, T.6 N., R.21 E., Golden Valley County, Hydrologic Unit 10040201, at culvert in county road, 3.0 mi south of Cushman, 5.5 mi southwest of Lavina.	1.23	1974-87	---	---	c
06127505	Fishel Creek near Musselshell	Lat 46°27'25", long 108°06'36", in NW¼SW¼ sec.9, T.8 N., R.29 E., Musselshell County, Hydrologic Unit 10040202, at culvert in county road, 2.5 mi southwest of Hawk Creek road, 4.5 mi southwest of Musselshell.	16.5	1974-87	---	---	c
06127520	Home Creek near Sumatra	Lat 46°38'14", long 107°37'12", in SE¼NW¼ sec.7, T.10 N., R.33 E., Rosebud County, Hydrologic Unit 10040202, 100 ft upstream from U.S. Highway 12, 3.7 mi northwest of Sumatra.	1.98	1973-87	5-17-87	a	b 10
06127570	Butts Coulee near Melstone	Lat 46°38'49", long 107°49'15", in center of E½ sec.9, T.10 N., R.31 E., Musselshell County, Hydrologic Unit 10040202, at culvert in county road, 2.8 mi north of U.S. Highway 12, 4 mi northeast of Melstone.	6.71	1963-87	5-27-87	5.63	170
06127585	Little Wall Creek tributary near Flatwillow	Lat 46°45'36", long 108°36'24", in SE¼NW¼ sec.32, T.12 N., R.25 E., Petroleum County, Hydrologic Unit 10040202, at culvert in U.S. Highway 87, 1.7 mi north of junction with Highway 244, 20.5 mi southeast of Grass Range.	3.95	1974-87	---	---	c
06128500	South Fork Bear Creek tributary near Roy	Lat 47°13'44", long 108°47'54", in SW¼ sec.16, T.17 N., R.23 E., Fergus County, Hydrologic Unit 10040204, at culvert in State Highway 19, 1.7 mi north of South Fork Bear Creek, 8.7 road mi south of U.S. Highway 191, 10.5 mi southeast of Roy, and 14 mi north of Grass Range.	5.40	1962-87	5-27-87	2.57	51
06129800	Gorman Coulee tributary near Cat Creek	Lat 47°00'45", long 108°05'33", in SE¼SW¼ sec.31, T.15 N., R.29 E., Petroleum County, Hydrologic Unit 10040204, at culvert in State Highway 20, 6 mi southwest of Cat Creek.	.81	1955-87	---	---	c
06130610	Bair Coulee near Mosby	Lat 47°03'15", long 107°36'43", in NE¼NE¼ sec.23, T.15 N., R.32 E., Garfield County, Hydrologic Unit 10040205, at bridge on U.S. Highway 200, 6.8 mi southwest of Sand Springs, 9.0 mi northeast of Mosby.	1.79	1974-87	---	---	c
06130620	Blood Creek tributary near Valentine	Lat 47°20'12", long 108°27'48", in SW¼NW¼ sec.7, T.18 N., R.26 E., Fergus County, Hydrologic Unit 10040205, at culvert in county road 3.0 mi northeast of Valentine, 16 mi east of State Highway 19, 23 mi east of Roy.	1.97	1974-87	---	---	c

See footnotes at end of table.

Annual maximum discharge at crest-stage partial-record stations--continued

Station No.	Station name	Location	Drainage area (mi^2)	Period of record	Date	Annual maximum Gage height (ft)	Annual maximum Discharge (ft^3/s)
		BIG DRY CREEK					
06130850	Second Creek tributary No. 2 near Jordan	Lat 47°12'23", long 106°48'56", in NE¼ sec.25, T.17 N., R.38 E., Garfield County, Hydrologic Unit 10040105, at culvert in State Highway 22, 9.5 mi southeast of Jordan.	2.08	1958-87	---	---	c
06130915	Russian Coulee near Jordan	Lat 47°19'58", long 106°42'39", in NE¼SW¼ sec.11, T.18 N., R.39 E., Garfield County, Hydrologic Unit 10040105, at bridge on U.S. Highway 200, 9.4 mi east of Jordan.	3.45	1974-87	---	---	c
06130925	Thompson Creek tributary near Cohagen	Lat 46°57'05", long 106°27'38", in NW¼SW¼ sec.19, T.14 N., R.42 E., Garfield County, Hydrologic Unit 10040106, 100 ft downstream from bridge, 1.3 mi northeast of Thompson Creek, 10.5 mi southeast of Cohagen, 11 mi northeast of county line, 14.1 mi northeast Rock Springs.	1.23	1974-87	5-27-87	1.77	15
06130940	Spring Creek tributary near Van Norman	Lat 47°14'58", long 106°18'21", in NW¼NE¼ sec.12, T.17 N., R.42 E., Garfield County, Hydrologic Unit 10040106, at culvert in county road, 7.2 mi south of State Highway 200, 8 mi southeast of Van Norman, 20.6 mi northeast of Cohagen.	1.39	1974-87	---	---	c
		TIMBER CREEK BASIN					
06131100	Terry Coulee near Van Norman	Lat 47°23'32", long 106°10'15", in SE¼NE¼ sec.24, T.19 N., R.43 E., McCone County, Hydrologic Unit 10040104, at culvert in State Highway 24, 4.7 mi north of State Highway 200, 12 mi east of Van Norman.	.48	1974-87	3-22-87	1.21	11
		MCGUIRE CREEK BASIN					
06131300	McGuire Creek tributary near Van Norman	Lat 47°36'22", long 106°09'12", in NE¼SE¼ sec.2, T.21 N., R.43 E., McCone County, Hydrologic Unit 10040104, at culvert in State Highway 24, 0.7 mi south of McGuire Creek, 19 mi north of State Highway 200, 20.5 mi northeast of Van Norman.	.79	1974-87	8-26-87	6.73	250
		MILK RIVER BASIN					
06132400	Dry Fork Milk River near Babb	Lat 48°49'50", long 113°12'02", in SE¼ sec.32, T.36 N., R.12 W., Glacier County, Hydrologic Unit 10050001, at bridge on State Highway 464, 11 mi east of Babb.	17.9	1962-87	4-04-87	2.03	290
06134800	Van Cleeve Coulee tributary near Sunburst	Lat 48°53'05", long 111°49'20", on north line of NE¼ sec.14, T.36 N., R.2 W., Toole County, Hydrologic Unit 10030203, at culvert in county road, 3.7 road mi east of Interchange on Interstate 15 at Sunburst.	10.8	1963-87	4-05-87	1.37	24

See footnotes at end of table.

Annual maximum discharge at crest-stage partial-record stations--continued

Station No.	Station name	Location	Drainage area (mi^2)	Period of record	Annual maximum Gage height (ft)	Annual maximum Discharge (ft^3/s)
		MILK RIVER BASIN--Continued				
06136400	Spring Coulee tributary near Simpson	Lat 48°56'36", long 110°12'51", in SW¼SW¼ sec.24, T.37 N., R.12 E., Hill County, Hydrologic Unit 10050002, at culvert in Highway 232, 1.3 mi northwest of Simpson, 0.7 mi north of mile post 39, 38 mi northwest of Havre.	2.49	1972 1974-87	---	---	c
06137600	Sage Creek tributary No. 2 near Joplin	Lat 48°54'38", long 110°46'20", in NE¼NE¼ sec.2, T.36 N., R.7 E., Liberty County, Hydrologic Unit 10050006, at culvert in Highway 224, 0.7 mi north of Sage Creek, 5.9 mi north of end of pavement, 25.2 mi north of Joplin.	2.21	1974-87	---	---	c
06138700	South Fork Spring Coulee near Havre	Lat 48°24'33", long 109°49'44", in NE¼ sec.31, T.31 N., R.15 E., Hill County, Hydrologic Unit 10050005, at culvert in county road, 12 mi southwest of Havre.	6.47	1960-87	1-10-87	1.39	21
06153400	Fifteenmile Creek tributary near Zurich	Lat 48°38'36", long 109°02'50", in SE¼SE¼ sec.1, T.33 N., R.21 E., Blaine County, Hydrologic Unit 10050004, at culvert in county road, 4.3 mi north of U.S. Highway 2, 4.3 mi north of Zurich.	1.40	1974-87	---	---	c
06154350	Peoples Creek tributary near Lloyd	Lat 48°11'33", long 109°18'25", in SW¼SE¼ sec.8, T.28 N., R.19 E., Blaine County, Hydrologic Unit 10050009, at culvert in county road, 1.6 mi south of Peoples Creek, 8 mi south of of Lloyd, 9 mi southwest of Cleveland.	2.51	1965-66 1974-87	5-21-87	3.22	1
06155300	Disjardin Coulee near Malta	Lat 48°16'33", long 107°57'49", in SE¼NW¼ sec.16, T.29 N., R.29 E., Phillips County, Hydrologic Unit 10050004, at bridge on U.S. Highway 191, 8 mi southwest of Malta.	4.84	1956-87	3-21-87	.93	18
06155600	Murphy Coulee tributary near Hogeland	Lat 48°47'19", revised, long 108°44'50", in SW¼SE¼ sec.17, T.35 N., R.23 E., Blaine County, Hydrologic Unit 10050010, at culverts in county road, 6.5 mi southwest of Hogeland, 13.6 mi north of State Highway 241, 18.4 mi northeast of Harlem.	1.77	1974-87	5-16-87	1.01	5
06156100	Lush Coulee near Whitewater	Lat 48°41'10", long 107°41'25", in SE¼SE¼ sec.20, T.34 N., R.31 E., Phillips County, Hydrologic Unit 10050011, at culverts in county road, 3 mi north of State Highway 242, 6 mi southwest of Whitewater.	9.58	1974-87	---	---	c
06164600	Beaver Creek tributary near Zortman	Lat 47°55'38", long 108°21'07", in NE¼NE¼ sec.15, T.25 N., R.26 E., Phillips County, Hydrologic Unit 10050014, at bridge on State Highway 191, 0.3 mi northeast of turnoff to Zortman, 8 mi east of Zortman.	3.89	1974-87	5-27-87	1.40	12

See footnotes at end of table.

Annual maximum discharge at crest-stage partial-record stations--continued

Station No.	Station name	Location	Drainage area (mi^2)	Period of record	Date	Annual maximum Gage height (ft)	Annual maximum Discharge (ft^3/s)
		MILK RIVER BASIN--Continued					
06165200	Beaver Creek tributary No. 2 near Malta	Revised--Lat 48°14'34", long 107°32'58", in SW¼NE¼ sec.27, T.29 N., R.32 E., Phillips County, Hydrologic Unit 10050014, at culvert in county road, 11 mi south of Bowdoin, 17 mi southeast of Malta, and 18 mi southwest of Saco.	2.06	1974-87	---	---	c
06172300	Unger Coulee near Vandalia	Lat 48°22'11", long 106°47'37", in SW¼ sec.9, T.30 N., R.38 E., Valley County, Hydrologic Unit 10050012, at bridge on U.S. Highway 2, 4.5 mi northeast of Vandalia.	11.1	1958-87	4-01-87	d1.00	b10
06173300	Willow Creek tributary near Fort Peck	Lat 47°53'36", long 106°53'22", in SE¼NE¼ sec.25, T.25 N., R.37 E., Valley County, Hydrologic Unit 10050012, at culvert in county road, 6.8 mi west of Pines Recreation area turnoff, 19.8 mi southwest of State Highway 24, 21.5 mi southwest of Fort Peck.	.86	1972 1974-87	7-29-87	5.12	80
06174300	Milk River tributary No. 3 near Glasgow	Lat 48°12'17", long 106°33'05", in SW¼SW¼ sec.3, T.28 N., R.40 E., Valley County, Hydrologic Unit 10050012, at upstream end of culvert in county road, 1.4 mi east of State Highway 247, 4 mi northwest of Glasgow.	1.82	1974-87	7-29-87	2.63	29
06174600	Snow Coulee at Opheim	Lat 48°50'27", long 106°24'47", in SE¼SE¼ sec.25, T.36 N., R.40 E., Valley County, Hydrologic Unit 10050016, at culvert in FAS Route 247, 1 mi south of Opheim.	3.11	1972 1974-87	3-05-87	1.86	47
		WOLF CREEK BASIN					
06175700	East Fork Wolf Creek near Lustre	Lat 48°24'58", long 105°47'51", in SE¼ sec.30, T.31 N., R.46 E., Valley County, Hydrologic Unit 10060001, at culverts in county road, 4 mi east of Lustre.	9.61	1956-87	2-29-87	5.35	224
		TRIBUTARY BETWEEN WOLF CREEK AND TULE CREEK					
06176950	Missouri River tributary No. 6 near Wolf Point	Lat 48°03'23", long 105°33'22", in NW¼NW¼ sec.32, T.27 N., R.48 E., McCone County, Hydrologic Unit 10060001, on the left bank at upstream end of culvert in county road, 1.2 mi west of State Highway 13, 5 mi southwest of Wolf Point.	.53	1973-87	7-30-87	8.68	30
		TULE CREEK BASIN					
06177020	Tule Creek tributary near Wolf Point	Lat 48°14'40", long 105°29'31", in SE¼SE¼ sec. 21, T.29 N., R.48 E., Roosevelt County, Hydrologic Unit 10060001, on the right bank at upstream end of culvert in county road 0.2 mi east of State Highway 13, 8.6 mi north of U.S. Highway 2, 12 mi northeast of Wolf Point.	1.91	1974-87	7-29-87	8.58	108
		REDWATER RIVER BASIN					
06177050	East Fork Duck Creek near Brockway	Lat 47°11'14", long 105°47'09", in sec.31, T.17 N., R.47 E., McCone County, Hydrologic Unit 10060002, at bridge on county road, 8 mi south of Brockway.	12.4	1955-87	3-22-87	1.59	130

See footnotes at end of table.

Annual maximum discharge at crest-stage partial-record stations--continued

Station No.	Station name	Location	Drainage area (mi^2)	Period of record	Date	Annual maximum Gage height (ft)	Annual maximum Discharge (ft^3/s)
		REDWATER RIVER BASIN--Continued					
06177700	Cow Creek tributary near Vida	Lat 47°42'07", long 105°29'20", in SW¼NW¼SW¼ sec. 31, T.23 N., R.49 E., McCone County Hydrologic Unit 10060002, at bridge on State Highway 13, 8.8 mi south of Vida, and 20 mi northeast of Circle.	1.71	1963-87	7-30-87	2.46	120
06177720	West Fork Sullivan Creek near Richey	Lat 47°31'47", long 105°13'43", in NW¼NW¼ sec.4, T.20 N., R.51 E., Dawson County, Hydrologic Unit 10060002, at culvert in county road, 2.5 mi south of Highway 200, 11 mi southwest of Richey, 19 mi northeast of Circle.	13.8	1974-87	5-03-87	2.05	6
06177800	Wolf Creek tributary near Vida	Lat 47°54'49", long 105°29'53", in SE¼ sec.15, T.25 N., R.48 E., McCone County, Hydrologic Unit 10060002, at bridge on State Highway 13, 5.5 mi north of Vida, and 11.1 mi south of Missouri River bridge near Wolf Point.	.91	1962-87	7-30-87	1.03	19
06177820	Horse Creek tributary near Richey	Lat 47°52'28", long 104°56'10", in SE¼NE¼ sec.36, T.25 N., R.52 E., Richland County, Hydrologic Unit 10060002, at culvert in county road, 14.5 mi northwest of Enid, 15.3 mi north of Highway 200, and 17 mi northeast of Richey.	.63	1974-87	7-30-87	2.63	25
		POPLAR RIVER BASIN					
06179100	Butte Creek tributary near Four Buttes	Lat 48°48'33", long 105°35'08", in SE¼SE¼ sec.5, T.35 N., R.47 E., Daniels County, Hydrologic Unit 10060003, attached to wooden post on left bank at upstream end of culvert in FAS Route 248, 1 mi east of Four Buttes.	1.60	1972 1974-87	---	---	c
		BIG MUDDY CREEK BASIN					
06183300	Spring Creek near Plentywood	Lat 48°48'45", long 104°28'16", in SE¼ sec.1, T.35 N., R.55 E., Sheridan County, Hydrologic Unit 10060006, at culvert in county road, 5 mi northeast of Plentywood.	7.05	1955-87	3-05-87	4.84	175
06184200	Lost Creek tributary near Homestead	Lat 48°24'09", long 104°29'49", in NW¼NW¼ sec.31, T.31 N., R.56 E., Sheridan County, Hydrologic Unit 10060006, at upstream side of culvert in State Highway 16, 2.3 mi southeast of Homestead, 4.6 mi north of Froid.	1.90	1974-87	3-04-87	3.58	18
		TRIBUTARY BETWEEN BIG MUDDY CREEK AND YELLOWSTONE RIVER					
06185400	Missouri River tributary No. 5 at Culbertson	Lat 48°09'31", long 104°30'55", in SE¼ sec.20, T.28 N., R.56 E., Roosevelt County, Hydrologic Unit 10060005, at culvert in State Highway 16, at Culbertson Rodeo grounds, 0.7 mi north of U.S. Highway 2.	3.67	1963-87	3-04-87	1.27	58

See footnotes at end of table.

Station No.	Station name	Location	Drainage area (mi^2)	Period of record	Date	Annual maximum Gage height (ft)	Annual maximum Discharge (ft^3/s)
		YELLOWSTONE RIVER BASIN					
06201700	Hump Creek near Reed Point	Lat 45°42'33", long 109°35'35", in NE¼ sec.35, T.1 S., R.17 E., Sweet Grass County, Hydrologic Unit 10070004, at bridge on Interstate Highway 90 and U.S. Highway 10, 2 mi west of Reed Point.	7.61	1960-87	---	---	c
06205100	Allen Creek near Park City	Lat 45°35'43", long 109°03'22", in NE¼ sec.7, T.3 S., R.22 E., Stillwater County, Hydrologic Unit 10070004, about 200 ft upstream from Cove ditch flume, 7 mi west of Park City.	7.17	1961-87	7-10-87	3.72	462
06207600	Jack Creek tributary near Belfry	Lat 45°09'44", long 108°49'24", in SE¼SE¼ sec.6, T.8 S., R.24 E., Carbon County, Hydrologic Unit 10070006, on railroad bridge 100 ft upstream from U.S. Highway 310, 9 mi east of Belfry, 11.5 mi northwest of Warren.	.85	1975-87	5-27-87	3.50	50
06214150	Mills Creek at Rapelje	Lat 45°58'03", long 109°15'17", in SE¼NE¼ sec.32, T.3 N., R.20 E., Stillwater County, Hydrologic Unit 10070004, at culvert in Secondary Highway 306, 0.4 mi south of Rapelje.	3.32	1974-87	7-17-87	1.79	7
06216200	West Wets Creek near Billings	Lat 45°37'38", long 108°24'14", in SW¼ sec.28,T.2 S.,R.27 E., Yellowstone County, Hydrologic Unit 10070008, at bridge on county road, 19 mi southeast of Billings.	8.80	1955-87	8-25-87	4.85	305
06217300	Twelvemile Creek near Shepherd	Lat 45°55'16", long 108°27'44", in NW¼SW¼ sec.14, T.2 N., R.26 E., Yellowstone County, Hydrologic Unit 10070007, at culverts in U.S. Highway 87, 5.6 mi north of junction with old Highway 10, 6.0 mi west of Shepherd.	9.05	1973-87	---	---	c
06217700	Crooked Creek tributary near Shepherd	Lat 46°04'23", long 108°30'09", in SW¼ sec.21, T.4 N., R.26 E., Yellowstone County, Hydrologic Unit 10070007, at bridge on county road, 1.7 mi west of U.S. Highway 87 between Billings and Roundup, 12 mi northwest of Shepherd, 20 mi north of Billings.	6.85	1962-87	5-21-87	1.16	72
06293300	Long Otter Creek near Lodge Grass	Lat 45°26'15", long 107°23'42", near center of line between NE¼ and NW¼ of SE¼ sec.28, T.4 S., R.35 E., Big Horn County, Hydrologic Unit 10080016, at culvert in U.S. Highway 87, 10 mi north of Lodge Grass.	11.7	1973-87	5-27-87	2.41	7
06294400	Andresen Coulee near Custer	Lat 46°03'53", long 107°32'30", in center of W½ sec.30, T.4 N., R.34 E., Yellowstone County, Hydrologic Unit 10080015, at culvert in State Highway 47, 4.5 mi south of Custer, and 5.3 road mi south of Highways 10 and 312.	2.35	1963-87	7-30-87	.42	4

See footnotes at end of table.

Annual maximum discharge at crest-stage partial-record stations--continued

Station No.	Station name	Location	Drainage area (mi^2)	Period of record	Date	Annual maximum Gage height (ft)	Annual maximum Discharge (ft^3/s)
		YELLOWSTONE RIVER BASIN--Continued					
06294600	East Cabin Creek tributary near Hardin	Lat 45°47'52", long 107°15'40", in SE¼SE¼SE¼ sec.29, T.1 N., R.36 E., Big Horn County, Hydrologic Unit 10080015, just upstream from culvert on State Highway 384, 0.1 mi upstream from East Cabin Creek, 18 mi northeast of Hardin, and at site of former gaging station.	8.63	1973-81 † 1982-85 1986-87	---	---	c
06294930	Sarpy Creek tributary near Colstrip	Lat 45°54'54", long 107°07'57", in in SW¼SW¼ sec.16, T.2 N., R.37 E., Treasure County, Hydrologic Unit 10100001, at culvert in county road, 0.1 mi north of Treasure and Big Horn county line, 25 mi west of Colstrip.	4.44	1972-87	---	---	c
06294985	East Fork Armells Creek tributary near Colstrip	Lat 46°04'01", long 106°42'39", in SE¼SE¼ sec.26, T.4 N., R.40 E., Rosebud County, Hydrologic Unit 10100001, at bridge on State Highway 315, 13 mi north of Colstrip.	1.87	1973-87	---	---	c
06295020	Short Creek near Forsyth	Lat 46°17'44", long 106°40'05", in NW¼ sec.12, T.6 N., R.40 E., Rosebud County, Hydrologic Unit 10100001, at bridge on county road, 2 mi north of Forsyth, 2.4 mi northeast of U.S. Highway 12.	3.23	1962-87	5-27-87	3.30	84
06295100	Rosebud Creek near Kirby	Lat 45°14'45", long 106°58'02", in NW¼NE¼SW¼ sec.9, T.7 S., R.39 E., Big Horn County, Hydrologic Unit 10100003, upstream from culvert on private road to Helvey Ranch, 5.0 mi upstream from Indian Creek, and 7.0 mi south of Kirby Post Office.	35.5	1959-74 † 1982-85 1986-87	5-29-87	.24	5
06296100	Snell Creek near Hathaway	Lat 46°17'29", long 106°08'38", in NE¼SE¼NW¼ sec.7, T.6 N., R.45 E., Custer County, Hydrologic Unit 10100001, at old U.S. Highway 10 bridge 2.5 mi northeast of Hathaway, and at mile 1.4.	10.5	1963-77 † 1982-85 1986-87	5-27-87	1.97	135
06296115	Reservation Creek near Miles City	Lat 46°22'38", long 105°58'21", in SE¼NE¼ sec.9, T.7 N., R.46 E., Custer County, Hydrologic Unit 10100001, at culvert in county road No. 446, 6.5 mi southwest Miles City.	6.29	1973-87	8-14-87	12.29	840
06306950	South Fork Leaf Rock Creek near Kirby	Lat 45°11'16", long 106°54'50", in SW¼NE¼SE¼ sec.35, T.7 S., R.39 E., Bighorn County, Hydrologic Unit 10090101, just upstream of culvert on county road, 10 mi south of Kirby, 12 mi north of Decker, and at mile 4.6.	4.53	1958 1960-81 † 1982-85 1986-87	5-26-87	2.19	14
06307520	Canyon Creek near Birney	Lat 45°14'28", long 106°40'32", in SW¼ sec.11, T.7 S., R.41 E., Rosebud County, Hydrologic Unit 10090101, at county bridge 11 mi southwest of Birney.	50.2	1972-87	---	---	c

See footnotes at end of table.

Annual maximum discharge at crest-stage partial-record stations--continued

Station No.	Station name	Location	Drainage area (mi^2)	Period of record	Date	Annual maximum Gage height (ft)	Annual maximum Discharge (ft^3/s)
		YELLOWSTONE RIVER BASIN--Continued					
06307700	Cow Creek near Fort Howes Ranger Station, near Otter	Lat 45°17'20", long 106°09'14", in in SW¼NW¼ sec.30, T.6 S., R.46 E., Powder River County, Hydrologic Unit 10090102, at bridge on county road, 0.8 mi south of Fort Howes Ranger Station, and 6.6 mi north of Otter Creek Post Office.	8.37	1972-87	8-25-87	2.55	154
06307720	Brian Creek near Ashland	Lat 45°24'37", long 106°09'07", in SW¼SW¼ sec.11, T.5 S., R.45 E., Powder River County, Hydrologic Unit 10090102, at culvert in county road, 8.1 mi north of Fort Howes Ranger Station 13.5 mi south of Ashland.	8.03	1973-87	---	---	c
06307780	Stebbins Creek at mouth, near Ashland	Lat 45°38'27", long 106°17'34", in NW¼ sec.27, T.2 S., R.44 E., Rosebud County, Hydrologic Unit 10090102, at bridge on county road along west side of Tongue River, 3.5 mi northwest of Ashland, and 3.6 mi north of U.S. Highway 212.	19.9	1963-87	---	---	c
06307930	Jack Creek near Volborg	Lat 46°04'55", long 105°51'08", in NE¼NW¼ sec.26, T.4 N., R.47 E., Custer County, Hydrologic Unit 10090102, at bridge on State Highway 332, 19 mi northwest of Volborg.	5.47	1973-87	8-14-87	4.27	267
06308100	Sixmile Creek tributary near Epsie	Lat 45°31'27", long 105°45'10", in SW¼SW¼ sec.36, T.3 S., R.48 E., Powder River County, Hydrologic Unit 10090102, at culvert in U.S. Highway 212, 5.2 mi northwest of Epsie.	.80	1973-87	---	---	c
06308200	Basin Creek tributary near Volborg	Lat 45°53'11", long 105°41'12", in NW¼ sec.31, T.2 N., R.49 E., Custer County, Hydrologic Unit 10090102, at culvert in county road, 3.5 mi north of Volborg.	.14	1955-87	8-14-87	.11	2
06308330	Deer Creek tributary near Volborg	Lat 46°02'04", long 105°31'15", in extreme southwest corner of sec.4, T.3 N., R.50 E., Custer County, Hydrologic Unit 10090102, at culvert in county road, 3 mi east of U.S. Highway 312, 16 mi northeast of Volborg.	1.65	1973-87	8-14-87	5.72	127
06308340	LaGrange Creek near Volborg	Lat 46°06'17", long 105°33'20", in NE¼NW¼ sec.18, T.4 N., R.50 E., Custer County, Hydrologic Unit 10090102, at culvert near mile post 27 in U.S. Highway 312, 19 mi north of Volborg.	3.66	1973-87	8-14-87	3.88	88
06309060	North Sunday Creek tributary No. 2 near Angela	Lat 46°34'00", long 106°03'51", in NE¼ sec.4, T.9 N., R.45 E., Custer County, Hydrologic Unit 10100001, at culvert in State Highway 22, 13 mi southeast of Angela, 14.1 mi northwest of Yellowstone River bridge at Miles City, 15 mi northwest of Miles City.	.22	1962-87	8-14-87	3.53	30

See footnotes at end of table.

Annual maximum discharge at crest-stage partial-record stations--continued

Station No.	Station name	Location	Drainage area (mi^2)	Period of record	Date	Annual maximum Gage height (ft)	Annual maximum Discharge (ft^3/s)
		YELLOWSTONE RIVER BASIN--Continued					
06309078	Tree Creek near Kinsey	Lat 46°33'17", long 105°47'48", in NE¼NW¼ sec.10, T.9 N., R.47 E., Custer County, Hydrologic Unit 10100001, at culvert in county road, 5.3 mi north of road to Kinsey, 6.5 mi west of Kinsey, and 10.9 mi northeast Miles City.	4.13	1972 1974-87	5-27-87	6.07	92
06309080	Deep Creek near Kinsey	Lat 46°33'25", long 105°37'12", in SE¼SE¼ sec.1, T.9 N., R.48 E., Custer County, Hydrologic Unit 10100001, at culvert in Interstate Highway 94 and U.S. Highway 10, 2 mi southeast of Kinsey, 3.1 mi southwest of Shirley railroad station, and 13 mi northeast of Miles City.	11.5	1962-87	8-14-87	5.65	450
06324995	Badger Creek at Biddle	Lat 45°05'46", long 105°20'17", in SW¼NW¼ sec.34, T.8 S., R.52 E., Powder River County, Hydrologic Unit 10090208, at culvert in State Highway 59, 0.2 mi south of Biddle.	6.06	1972-87	---	---	c
06325700	Deep Creek near Powderville	Lat 45°48'46", long 105°03'51", in NE¼NE¼ sec.25, T.1 N., R.53 E., Custer County, Hydrologic Unit 10090209, at culvert in county road, 2 mi north of Custer-Powder River county line, and 4.5 mi north of Powderville.	3.00	1973-87	---	1.73	1
06325950	Cut Coulee near Mizpah	Lat 46°08'38", long 105°10'05", in NE¼SW¼ sec.36, T.5 N., R.52 E., Custer County, Hydrologic Unit 10090209, at culvert in county road, 8.5 mi southeast of Mizpah.	2.23	1973-87	5-27-87	9.37	318
06326510	Locate Creek tributary near Locate	Lat 46°25'52", long 105°10'51", in SW¼SE¼ sec.23, T.8 N., R.52 E., Custer County, Hydrologic Unit 10090209, at culvert in U.S. Highway 12, 5.5 mi east of Locate, 6.4 mi east of Locate, and 6.5 mi east of Powder River bridge.	.91	1973-87	8-14-87	2.07	16
06326550	Cherry Creek tributary near Terry	Lat 46°51'18", long 105°20'26", in NE¼SW¼ sec.25, T.13 N., R.50 E., Prairie County, Hydrologic Unit 10100004, at bridge on abandoned part of State Highway 253, 4.8 mi north of Terry.	2.52	1973-87	5-17-87	2.73	51
06326580	Lame Jones Creek tributary near Willard	Lat 46°11'40", long 104°33'05", in SE¼SE¼ sec.11, T.5 N., R.57 E., Fallon County, Hydrologic Unit 10100005, at culvert in county road, 1.1 mi east of Lame Jones School, 8.8 mi west of Willard.	.51	1974-87	---	---	c
06326800	Pennel Creek near Baker	Lat 46°29'57", long 104°14'17", in center of south edge of sec.36, T.9 N., R.59 E., Fallon County, Hydrologic Unit 10100005, at culvert in State Highway 7, 7.8 mi north of Highway 12 in Baker, and 8 mi north of Baker.	1.00	1962-87	5-03-87	2.49	26

See footnotes at end of table.

Annual maximum discharge at crest-stage partial-record stations--continued

Station No.	Station name	Location	Drainage area (mi^2)	Period of record	Date	Annual maximum Gage height (ft)	Annual maximum Discharge (ft^3/s)
		YELLOWSTONE RIVER BASIN--Continued					
06326940	Spring Creek tributary near Fallon	Lat 46°48'06", long 104°59'25", in NE¼NE¼ sec.13, T.12 N., R.53 E., Prairie County, Hydrologic Unit 10100004, at culvert in county road, 6.8 mi southeast of Fallon.	3.10	1972-87	---	---	c
06326950	Yellowstone River tributary No. 5 near Marsh	Lat 46°57'11", long 104°53'53", in SW¼ sec.21, T.14 N., R.54 E., Dawson County, Hydrologic Unit 10100004, at culvert in Interstate Highway 94 and U.S. Highway 10, 2.4 mi northeast of Cracker Box Creek, 2.5 mi 2.5 mi southwest of Clear Creek, 5 mi northeast of Marsh.	.87	1962-87	---	---	c
06326960	Timber Fork Creek tributary near Lindsay	Lat 47°10'55", long 105°10'16", in SW¼SW¼ sec.36, T.17 N., R.51 E., Dawson County, Hydrologic Unit 10100004, at culvert in county road, 3.3 mi southwest of Lindsay.	1.13	1974-87	5-27-87	1.34	7
06327550	South Fork Horse Creek tributary near Wibaux	Lat 46°48'09", long 104°22'55", in SW¼SE¼ sec.11, T.12 N., R.58 E., Wibaux County, Hydrologic Unit 10100004, at culvert in county road, 7.5 mi west of State Highway 7, 16.0 mi southwest of Wibaux.	1.34	1973-87	5-03-87	2.45	3
06327720	Griffith Creek tributary near Glendive	Lat 47°06'20", long 104°35'48", in NE¼NW¼ sec.35, T.16 N., R.56 E., Dawson County, Hydrologic Unit 10100004, at culvert in Interstate Highway 94, 5 mi east of Glendive.	3.48	1965 1974-87	5-17-87	2.95	22
06327790	Krug Creek tributary No. 2 near Wibaux	Lat 47°00'23", long 104°18'13", in NW¼NW¼ sec.6, T.14 N., R.59 E., Wibaux County, Hydrologic Unit 10100004, at culvert in county road at Interstate Highway 94 interchange, 5.5 mi west of Wibaux.	.44	1974-87	---	---	c
06328100	Yellowstone River tributary No. 6 near Glendive	Lat 47°09'26", long 104°39'14", in NW¼SW¼ sec.8, T.16 N., R.56 E., Dawson County, Hydrologic Unit 10100004, at bridge on county road to Belle Prairie, 3 mi northeast of Glendive.	2.93	1974-87	5-17-87	1.67	34
06328400	Thirteenmile Creek tributary near Bloomfield	Lat 47°24'46", long 104°49'58", in SE¼SE¼ sec.9 T.19 N., R.54 E., Dawson County, Hydrologic Unit 10100004, at culvert in county road, 3.9 mi east of Bloomfield.	.67	1972 1974-87	5-17-87	3.31	70
06329350	Alkali Creek tributary near Sidney	Lat 47°30'34, long 104°07'03", in SW¼NE¼ sec.7, T.20 N., R.60 E., Richland County, Hydrologic Unit 10100004, at culvert in county road, 7.7 mi south of O'Brien Creek, 12.8 mi south of State Highway 23, 14.8 mi southeast of junction to State Highway 23 and State Highway 16, 14.2 mi southeast of Sidney.	.49	1974-87	5-03-87	2.07	22

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^2)	Period of record	Date	Annual maximum Gage height (ft)	Annual maximum Discharge (ft^3/s)
		YELLOWSTONE RIVER BASIN--Continued					
06329510	Fox Creek tributary near Lambert	Lat 47°38'58", long 104°36'52", in NW¼SW¼ sec.24, T.22 N., R.55 E., Richland County, Hydrologic Unit 10100004, at bridge on county road, 2.2 mi south of Lambert.	5.17	1972 1974-87	5-03-87	2.80	2
06329570	First Hay Creek near Sidney	Lat 47°50'08", long 104°16'16", in SE¼ sec.16, T.24 N., R.58 E., Richland County, Hydrologic Unit 10100004, at bridge on State Highway 16, 4.1 road mi north of "Dryland Crop and Soils Research Station" sign, 10 mi northwest of Sidney.	29.1	1963-87	6-19-87	.38	2
		LITTLE MISSOURI RIVER BASIN					
06334100	Wolf Creek near Hammond	Lat 45°09'53", long 104°45'20", in SE¼ sec.5, T.8 S., R.57 E., Carter County, Hydrologic Unit 10110201, at culvert in U.S. Highway 212, 8 mi southeast of Hammond.	9.09	1955-87	5-18-87	2.75	67
06334330	Little Missouri River tributary near Albion	Lat 45°12'42", long 104°15'41", in SW¼NW¼ sec.21, T.7 S., R.61 E., Carter County, Hydrologic Unit 10110201, at culvert in FAS Route 270, 1.8 mi north of Albion.	1.49	1972-87	---	---	c
06334610	Hawks Nest Creek tributary near Albion	Lat 45°23'20", long 104°28'38", in SE¼ sec.19, T.5 S., R.59 E., Carter County, Hydrologic Unit 10110202 at culvert in State Highway 323, 17 mi northwest of Albion.	.92	1973-87	3-21-87	2.35	7
06334625	Coal Creek near Mill Iron	Lat 45°54'15", long 104°21'42", in NW¼SW¼ sec.26, T.2 N., R.59 E., Carter County, Hydrologic Unit 10110202, at culvert in county road, 8 mi northwest of Mill Iron, 8.5 mi east of State Highway 7, 9.0 mi east of Ekalaka.	.64	1974-87	---	---	c
06334720	Soda Creek tributary near Webster	Lat 46°00'34", long 104°05'30", in NE¼ sec.23, T.3 N., R.61 E., Fallon County, Hydrologic Unit 10110202, at culvert in county road, 0.3 mi south of Soda Creek and 8 mi southeast of Webster.	2.22	1962-87	---	---	c

† Operated as a continuous-record station.
a Peak discharge did not reach bottom of gage.
b Estimate.
c No evidence of flow during year.
d Backwater.

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 1987

Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
					Date	Discharge (ft^3/s)
RED ROCK RIVER BASIN						
Hellroaring Creek 4435571113257	Red Rock River	Lat 44°35'57", long 111°32'57", in SE1/4SE1/4NW1/4 sec.24, T.14 S., R.1 E., Beaverhead County, Hydrologic Unit 10020001, at culvert on Red Rock Pass Road, 1.3 mi west of Red Rock Pass, and 36.5 mi west of West Yellowstone, MT.	12.6		04-16-87 05-07-87 05-21-87 06-24-87 08-19-87 09-23-87	11.3 52.8 37.0 16.9 9.45 8.08
Corral Creek 4436111113514	Red Rock River	Lat 44°36'11", long 111°35'44", in SE1/4NE1/4NW1/4 sec.22, T.14 S, R.1 E., Beaverhead County, Hydrologic Unit 10020001, at culvert on Red Rock Pass Road, 3.2 mi west of Red Rock Pass, and 35.5 mi west of West Yellowstone.	1.66		04-16-87 05-07-87 05-21-87 06-24-87 08-19-87 09-23-87	.90 5.18 3.84 2.23 1.36 1.67
Antelope Creek 4436401113654	Red Rock River	Lat 44°36'40", long 111°36'54", in SW1/4NE1/4SW1/4 sec.16, T.14 S., R.1 E., Beaverhead County, Hydrologic Unit 10020001, at culvert on Red Rock Pass Road, 4.7 mi west of Red Rock Pass, and 39.2 mi west of West Yellowstone.	2.87		05-07-87 05-21-87 06-24-87 08-19-87 09-23-87	.60 .31 .35 .38 .30
Red Rock River ab Upper Red Rock Lake 4437011113921	Missouri River	Lat 44°37'01", long 111°39'21", in NE1/4SW1/4NW1/4 sec.18, T.14 S., R.1 E., Beaverhead County, Hydrologic Unit 10020001, at bridge on county road 6.8 mi west of Red Rock Pass, and 44.5 mi west of West Yellowstone.	39.2		04-16-87 05-06-87 05-21-87 06-24-87 08-19-87 09-23-87	41.0 59.2 27.2 25.2 17.2 13.6
Tom Creek 4435181113948	Red Rock River	Lat 44°35'18", long 111°39'48", in NW1/4SE1/4NE1/4 sec.25, T.14 S., R.1 W., Beaverhead County, Hydrologic Unit 10020001, at culvert on Red Rock Pass road, 7 mi west of Red Rock Pass, and 45.5 mi west of West Yellowstone.	6.43		04-16-87 05-06-87 05-21-87 06-24-87 08-19-87 09-23-87	.50 7.65 3.34 .72 .69 .41
Odell Creek 4435331114716	Lower Red Rock Lake	Lat 44°35'33", long 111°47'16", in NW1/4NW1/4NE1/4 sec.25, T.14 S., R.2 W., Beaverhead County, Hydrologic Unit 10020001, at culvert on Red Rock Pass Road, 1.2 mi east of Lakeview, and 38.5 mi east of Lima.	21.4		04-16-87 05-06-87 05-20-87 06-24-87 08-19-87 09-23-87	7.41 31.9 27.3 12.4 7.94 5.91
Long Creek nr Lakeview 06011400	Red Rock River	Lat 44°42'29", long 112°04'34", in NW1/4SE1/4SW1/4 sec.10, T.13 S., R.4 W., Beaverhead County, Hydrologic Unit 10020001, at bridge on county road, 15 mi northwest of Lakeview, and at site of former crest-stage gage.	36.0	1959-67 1984	04-15-87 05-06-87 05-19-87 06-30-87 08-26-87 09-21-87	32.4 11.3 16.0 5.67 4.58 2.66
BEAVERHEAD RIVER BASIN						
Deadman Creek at mouth 4432421124802	Big Sheep Creek	Lat 44°32'42", long 112°48'02", in SE1/2SW1/4NE1/4 sec.10, T.15 S., R.10 W.,Beaverhead County, Hydrologic Unit 10020001, at mouth 12.5 mi southwest of Lima.	26.5		04-15-87 05-06-87 05-20-87 07-01-87 08-20-87 09-22-87	12.8 6.87 8.32 6.49 5.62 5.62
BIG SHEEP CREEK BASIN						
Big Sheep Creek bl Muddy Creek 06013500	Red Rock River	Lat 44°39'19", long 112°46'41", in SW1/4NW1/4SE1/4 sec.35, T.13 S., R.10 W., Beaverhead County, Hydrologic Unit 10020001, on left bank 2.2 mi downstream from Muddy Creek, 6.5 mi southwest from Dell, and at mi 8.5, and at site of former gaging and crest-stage gage station.	278	1936 1946-53 1960-86	07-01-87 08-20-87 09-22-87	59.5 62 47.1

Discharge measurements made at miscellaneous sites during water year 1987

Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements Date	Measurements Discharge (ft^3/s)
		BEAVERHEAD RIVER BASIN				
Black Canyon Creek at Forest Service Boundary 4451521131927	Horse Prairie Creek	Lat 44°51'52", long 113°19'27", in SW1/4SW1/4NW1/4 sec.21, T.11 S., R.14 W., Beaverhead County, Hydrologic Unit 10020001, at U.S. Forest Service boundary, 3.2 mi west of Bannock Pass road, 16 mi southwest of Grant, and 32.5 mi west of Dell.	10.3		04-15-87 05-05-87 07-01-87 08-26-87 09-22-87	3.32 4.54 3.33 2.30 1.58
Frying Pan Creek below Forks 4456491132605	Trail Creek	Lat 44°56'49", long 113°26'05", in SW1/4NW1/4SW1/4 sec.22, T. 10 S., R.15 W., Beaverhead County, Hydrologic Unit 10020001, below North and South Forks, 2 mi south of Lemhi Pass, 18.5 mi southwest of Grant, and 30 mi south of Jackson.	4.91		04-15-87 05-05-87 05-20-87 07-01-87 08-26-87 09-22-87	5.00 4.69 7.74 2.96 1.47 1.24
Bear Creek at mouth 4457281132135	Trail Creek	Lat 44°57'28", long 113°21'35", in SW1/4SE1/4SE1/4 sec.18, T. 10 S., R.14 W., Beaverhead County, Hydrologic Unit 10020001, just upstream from mouth, 15.5 mi southwest of Grant, and 30 mi south of Jackson.	20.0		04-15-87 05-05-87 05-20-87 07-01-87 08-26-87 09-22-87	6.45 13.4 26.4 5.84 3.46 2.52
Bloody Dick Creek ab Magpie Gulch 4459591132111	Horse Prairie Creek	Lat 44°59'59", long 113°21'11", in NW1/4NW1/4NW1/4 sec.5, T.10 S., R.14 W., Beaverhead County, Hydrologic Unit 10020001, 1.7 mi upstream of Magpie Gulch, 14 mi west of Grant, and 26 mi south of Jackson.	93.3		04-14-87 05-05-87 05-20-87 07-01-87 08-26-87 09-22-87	31.9 62.2 83.7 26.0 14.7 8.92
Horse Prairie Creek 06015000	Clark Canyon Reservoir	Lat 45°00'52", long 113°13'28", in NE1/4NW1/4 sec.32, T.9 S., R.13 W., Beaverhead County, Hydrologic Unit 10020001, on left bank 0.25 mi downstream from Bloody Dick Creek, 7.5 mi west of Grant, 17.5 mi west of Armstead, and at site of former gaging station.	321	1946-53 1961 1966 1985	04-14-87 05-06-87 05-20-87 07-01-87 08-26-87 09-22-87	86.9 68.6 177 39.2 52.0 22.3
Medicine Lodge Creek below Schwartz Creek 4452161130025	Clark Canyon Reservoir	Lat 44°52'16", long 113°00'25", in SW1/4SW1/4SE1/4 sec. 13, T.11 S., R.12 W., Beaverhead County, Hydrologin Unit 10020001, at culvert on county road, 10 mi south of Grant, and 18 mi northwest of Dell.	137		04-15-87 05-06-87 05-20-87 07-01-87 08-20-87 08-26-87 09-22-87	11.9 9.37 31.8 12.7 18.5 23.8 14.1
Beaverhead River 06017000	Missouri River	Lat 45°13'06", long 112°39'15", on south line of sec.13, T.7 S., R.9 W., Beaverhead County, Hydrologic Unit 10020002, on right bank at old county bridge site on road to Jackson, at Dillon, and at site of former gaging station.	2895	1907 1950-52 1963-71 1984-86	05-12-87	168
West Fork Blacktail Deer Creek at mouth 445322122048	Blacktail Deer Creek	Lat 44°53'22", long 112°20'48", in SE1/4NW1/4SW1/4 sec.9, T.11 S., R.6 W., Beaverhead County, Hydrologic Unit 10020001, at culvert on county road 1 mi upstream from East Fork, 17.5 mi northeast of Dell, and 27 mi southeast of Dillon.	51.2		04-15-87 05-06-87 05-19-87 06-30-87 08-25-87 09-21-87	23.7 15.4 19.9 14.2 15.2 10.1
East Fork Blacktail Deer Creek at mouth 4453541121827	Blacktail Deer Creek	Lat 44°53'54", long 112°18'27", in NW1/4NW1/4NW1/4 sec.11, T.11 S., R.6 W., Beaverhead County, Hydrologic Unit 10020001, downstream from Anderson Ranch buildings, 22.5 mi northwest of Dell, and 27.5 mi southeast of Dillon.	58.6		04-15-87 05-06-87 06-30-87 08-25-87 09-21-87	15.6 50.3 33.0 32.8 18.6

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES--Continued

Discharge measurements made at miscellaneous sites during water year 1987

Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements Date	Measurements Discharge (ft^3/s)
		BEAVERHEAD RIVER BASIN--Continued				
Blacktail Deer Creek 06017500	Beaverhead River	Lat 45°02'45", long 112°32'55", in NE1/4SE1/4SE1/4 sec.14, T.9 S., R.8 W., Beaverhead County, Hydrologic Unit 10020002, on left bank 12.5 mi southeast of Dillon, 14 mi upstream from mouth, and at site of former gaging station.	312	1946-53 1955-66 1984-85	04-15-87 05-06-87 05-19-87 06-30-87 08-20-87 08-25-87 09-21-87	51.1 64.4 92.1 59.1 59.4 78.2 47.8
		RUBY RIVER BASIN				
Mill Creek 4528391120526	Ruby River	Lat 45°28'39", long 112°05'26", in SW1/4NW1/4NW1/4 sec.22, T. 4 S., R.4 W., Madison County, Hydrologic Unit 10020003, at U.S Forest Service boundary, 0.15 mi downstream from Cow Creek, and 5.5 mi east of Sheridan.	19.6		04-10-87 05-07-87 05-19-87 06-26-87 08-25-87 09-21-87	9.12 70.3 72.6 30.2 26.8 9.57
Mill Creek at Sheridan 4547271121148	Ruby River	Lat 45°47'27", long 112°11'48" in NW1/4NE1/4SE1/4 sec.27, T.4 S., R. 5 W., Madison County, Hydrologic Unit 10020003, at bridge on U.S. Highway 287, at Sheridan.			04-10-87	2.48
Wisconsin Creek nr Forest Service boundary 4530521120908	Ruby River	Lat 45°30'52", long 112°09'08", in SW1/4NW1/4SW1/4 sec.6, T.4 S., R.5 W., Madison County, Hydrologic Unit 10020003, 1 mi downstream from U.S. Forest Service boundary, and 5 mi northeast of Sheridan.	16.2		04-10-87 05-07-87 05-19-87 06-26-87 08-25-87 09-21-87	4.92 35.8 46.3 23.8 19.9 7.20
Ruby River 06023000	Beaverhead River	Lat 45°30'28", long 112°19'48", in SE1/NE1/4NW1/4 sec.10, T.4 S., R.6 W., Madison County, Hydrologic Unit 10020003, on right bank 300 ft upstream from county bridge, 1.2 mi upstream from mouth, 2.6 mi south of Twin Bridges, and at site of former gaging station.	935	1940-43 1946-65 1972 1980-82 1985-86	10-20-86	215
		BIG HOLE RIVER BASIN				
Steel Creek above Francis Creek 4536081132314	Big Hole River	Lat 45°36'08", long 113°23'14", in NE1/4NE1/4SE1/4 sec.1, T.3 S., R. 15 W., Beaverhead County, Hydrologic Unit 10020004, at private road crossing 2.5 mi upstream of Francis Creek, and 3.2 mi east of Wisdom.	19.1		04-14-87 05-05-87 05-19-87 06-30-87 08-19-87 09-30-87	4.61 15.9 19.1 6.02 2.07 2.28
Steel Creek 4538071132633	Big Hole River	Lat 45°38'07", long 113°26'33", in NW1/4SE1/4NW1/4 sec.27, T.2 S., R.15 W., Beaverhead County, Hydrologic Unit 10020004, at bridge on State Highway 43, 1.5 mi north of Wisdom.	79.9	1982	04-14-87 05-05-87 05-19-87 06-30-87 08-19-87 09-30-87	13.3 31.9 36.0 8.74 5.11 3.81
Swamp Creek nr mouth 4539331132809	Big Hole River	Lat 45°39'33", long 113°28'09", in SW1/4NW1/4SW1/4 sec.16, T.2 S., R. 15 W., Beaverhead County, Hydrologic Unit 10020004, at bridge on county road 1.2 mi above mouth, 2.5 mi north of State Highway 43, and 3 mi northwest of Wisdom.	66.1		04-14-87 05-05-87 05-19-87 06-30-87 08-19-87 09-29-87	35.8 15.9 62.7 4.23 1.57 12.3
Trail Creek 06024500	North Fork Big Hole River	Lat 45°39'24", long 113°42'56", in SW1/4 sec.16, T.2 S., R.17 W., Beaverhead County, Hydrologic Unit 10020004, Beaverhead National Forest, on left bank 250 ft downstream from Runaway Creek, 4 mi upstream from Ruby Creek, 13.1 mi west of Wisdom, and at site of former gaging station.	72.6	1948-54 1966-73 1975 1982-83	04-14-87 05-05-87 05-19-87 06-29-87 08-19-87 09-29-87	36.8 145 90.9 28.1 14.2 12.2
North Fork Big Hole River nr mouth 4542191132730	Big Hole River	Lat 45°42'19", long 113°27'30", NW1/4NW1/4SE1/4 sec.33, T.1 S., R.15 W., Beaverhead County, Hydrologic Unit 10020004, at bridge on county road 2.9 mi upstream from mouth, 5.5 mi north of State Highway 43, and 6 mi north of Wisdom.	280		04-14-87 05-05-87 05-19-87 06-30-87 08-19-87 09-29-87	95.0 356 220 46.1 19.2 27.4

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES--Continued

Discharge measurements made at miscellaneous sites during water year 1987

Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements Date	Measurements Discharge (ft^3/s)
		BIG HOLE RIVER BASIN--Continued				
Pintler Creek near mouth 4547061132446	Big Hole River	Lat 45°47'06", long 113°24'46", in NE1/4NW1/4NE1/4 sec.2, T.1 S., R.15 W., Deer Lodge County, Hydrologic Unit 10020004, at culvert on county road 3 mi upstream of mouth and 12 mi north of Wisdom.	27.6		04-14-87 05-05-87 05-19-87 06-30-87 08-19-87 09-29-87	15.9 94.8 80.4 12.0 3.44 1.32
Fishtrap Creek at mouth 4552131131344	Big Hole River	Lat 45°52'13", long 113°13'44", in SE1/4NW1/4NW1/4 sec.4, T.1 N., R.13 W., Deer Lodge County, Hydrologic Unit 10020004, at bridge on State Highway 43, just upstream from mouth, and 15 mi west of Wise River.	52.4		04-13-87 05-04-87 05-18-87 06-29-87 08-19-87 09-29-87	21.6 68.1 20.5 5.40 1.06 2.53
La Marche Creek at mouth 4552441131156	Big Hole River	Lat 45°52'44", long 113°11'56", in NE1/4NW1/4SE1/4 sec.34, T.2 N., R.13 W., Deer Lodge County, Hydrologic Unit 10020004, at bridge on State Highway 43, 0.4 mi upstream from mouth, and 14 mi northwest of Wise River.	46.1	1972	04-13-87 05-04-87 05-18-87 06-29-87 08-18-87 09-29-87	14.7 93.2 99.3 30.6 12.7 9.57
Deep Creek at mouth 4554001130630	Big Hole River	Lat 45°54'00", long 113°06'30", in NE1/4NE1/4NE1/4 sec.29, T. 2 N., R.12 W., Deer Lodge County, Hydrologic Unit 10020004, at county bridge 1 mi upstream of mouth and 11 mi northwest of Wise River.	101		04-13-87 05-04-87 05-18-87 06-29-87 08-18-87 09-28-87	66.3 125 104 30.4 21.2 17.9
Bear Creek at mouth 4552171130504	Big Hole River	Lat 45°52'17", long 113°05'04", in NE1/4NW1/4NW1/4 sec.3, T.1 N., R.12 W., Deer Lodge County, Hydrologic Unit 1002004, at culert on State Highway 43, at mouth, and 8.5 mi northwest of Wise River.	8.41		04-13-87 05-04-87 05-18-87 06-29-87 08-18-87 09-28-87	.96 4.67 7.20 2.26 .36 1.15
Jerry Creek at Forest Service Boundary 4548541125326	Big Hole River	Lat 45°48'54", long 112°53'26", in NW1/4NW1/4NE1/4 sec.30, T.1 N., R.10 W., Silver Bow County, Hydrologic Unit 10020004, at bridge on county road 2.0 mi upstream of mouth and 8.2 mi northwest of Wise River.	42.2		04-13-87 05-04-87 05-18-87 06-29-87 08-18-87 09-28-87	6.02 41.1 30.9 14.0 7.41 5.18
North Fork Divide Creek at Forest Service Boundary 4552361124235	Big Hole River	Lat 45°52'36", long 112°42'35", in SE1/4NW1/4SW1/4 sec.34, T.2 N., R.9 W., Silver Bow County, Hydrologic Unit 10020004, at U.S. Forest Service Boundary, at culvert on county road 2 mi west of old Highway 191 and 9 mi north of Divide.			08-20-87	.59
Divide Creek at Divide 4545051124441	Big Hole River	Lat 45°45'05", long 112°44'41", in SE1/4SE1/4NW1/4 sec.17, T.1 S., R.9 W., Silver Bow County, Hydrologic Unit 10020004, at culvert on State Highway 43, at Divide.	91.2		04-13-87 05-04-87 05-18-87 06-29-87 08-18-87 09-28-87	12.8 17.0 2.19 3.31 1.35 10.8
Canyon Creek at Forest Service Boundary 4541331124549	Big Hole River	Lat 45°41'33", long 112°45'49", in SE1/4SE1/4NW1/4 sec.6, T.2 S., R.9 W., Beaverhead County, Hydrologic Unit 10020004, at bridge at U.S. Forest Service boundary, 1.5 mi upstream of mouth, and 4 mi south of Divide.	48.6		04-13-87 05-04-87 05-18-87 06-29-87 08-18-87 09-28-87	2.48 19.7 39.5 10.6 3.47 1.63
Moose Creek nr Divide 06025300	Big Hole River	Lat 45°42'21", long 112°42'15", in NW1/4NE1/4NW1/4 sec.34, T.1 S., R.9 W., Silver Bow County, Hydrologic Unit 10020004, at culvert on U.S. Interstate 15 and U.S. Highway 91, 3.5 mi southeast of Divide, and at site of former crest-stage.	42.3	1959-74	04-13-87 05-04-87 05-18-87 06-29-87 08-18-87 09-28-87	12.0 14.9 28.5 5.23 8.16 5.10

Discharge measurements made at miscellaneous sites during water year 1987

Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements Date	Measurements Discharge (ft^3/s)
		BIG HOLE RIVER BASIN--Continued				
Camp Creek at mouth 4537401124058	Big Hole River	Lat 45°37'40", long 112°40'58", in SW1/4SE1/4SW1/4 sec.26, T.2 S., R.9 W., Silver Bow County, Hydrologic Unit 10020004, at culvert on State Highway 191, at Melrose.	40.2		04-13-87 05-04-87 05-18-87 06-29-87 08-18-87 09-28-87	6.24 5.87 25.8 19.2 6.20 21.9
Trapper Creek at Forest Service boundary 4538311124755	Big Hole River	Lat 45°38'31", long 112°47'55", in SW1/4SE1/4SE1/4 sec.23, T. 2 S., R.10 W., Beaverhead County, Hydrologic Unit 10020004, upstream of ditch, 0.7 mi downstream from U.S. Forest Service boundary, and 5.5 mi west of Melrose.	25.4		04-13-87 05-04-87 05-18-87 06-29-87 08-18-87 09-28-87	3.50 12.2 24.8 12.4 8.10 6.47
Big Hole River 06026400	Jefferson River	Lat 45°32'50", long 112°21'59", in SW1/4NW1/4SE1/4 sec.29, T.3 S.,R.6 W., Madison County, Hydrologic Unit 10020004, on left bank 0.4 mi upstream of bridge on secondary Highway 361, 0.4 mi upstream fom Rochester Creek, 1.8 mi west of Twin Bridges, at mile 2.8, and at site of former gaging station.	2762	1980-82 1985-86	10-20-86	550
		JEFFERSON RIVER BASIN				
Hells Canyon Creek at mouth 4537041121935	Jefferson River	Lat 45°37'04", long 112°19'35", in NW1/4NW1/4SE1/4 sec.34, T.2 S., R.6 Madison County, Hydrologic Unit 10020005, at bridge at mouth, 5.5 mi north of Twin Bridges.	37.7		04-10-87 05-07-87 05-19-87 06-26-87 08-25-87 09-29-87	4.10 7.74 13.3 5.90 10.4 2.32
Boulder River near Cardwell 06033900	Jefferson River	Lat 45°52'14", long 111°56'30", in NW1/4SE1/4NW1/4 sec.2, T.1 N., R.3 E., Jefferson County, Hydrologic Unit 10020006, at bridge on Interstate Highway 15, 0.5 mi upstream from mouth, and 0.8 mi northeast of Cardwell.		1986	10-20-86	116
South Boulder River near Cardwell 06034300	Jefferson River	Lat 45°48'10", long 111°55'26", in SE1/4SW1/4NW1/4 sec. 25, T.1 N., R.3 W., Madison County, Hydrologic Unit 10020005, 100 ft upstream from bridge on State Highway 359 and 3.5 mi south of Cardwell.		1972 1986	10-20-86	28.6
South Willow Creek below Camp Creek 4538341115112	Willow Creek	Lat 45°38'34", long 111°51'12", in NW1/4SW1/4SE1/4 sec.21, T.2 S., R.2 W., Madison County, Hydroloic Unit 10020005, at bridge on county road downstream of Camp Creek and 2.0 mi southeast of Pony.			04-07-87 04-29-87 05-19-87 06-22-87 08-17-87 09-24-87	19.4 56.5 82.5 97.5 45.4 24.3
North Willow Creek bl Pony Creek 4539301115327	Willow Creek	Lat 45°39'30", long 111°53'27", in NE1/4SW1/4SE1/4 sec.18, T.2 S., R.2 W., Madison County, Hydrologic Unit 10020005, at culvert 500 ft downstream of Pony Creek, at Pony.	21.5		04-07-87 04-29-87 05-19-87 06-22-87 08-17-87 09-24-87	12.7 31.8 31.5 43.3 25.4 22.0
		MADISON RIVER BASIN				
Madison River nr West Yellowstone 06037500	Jefferson River	Lat 44°39'25", long 111°04'03", in SW1/4 sec.36, T.13 S., R.5 E.(unsurveyed), Gallatin County, Hydro-10020007, Yellowstone National Park, 0.7 mi downstream of MT-WY Stateline, 1.5 mi east of West Yellowstone and west boundary of YNP, 16.4 mi downstream from Gibbon River, at mile 132.7, and at site of former gaging station.	420	1913-73 1978 1982 1984-86	05-19-87	683
Madison River ab Hebgen Lake, nr West Yellowstone 06037600	Missouri River	Lat 44°43'00", long 111°06'05", in SW1/4SE1/4NE1/4 sec.10, T.13 S., R.5 E., Gallatin County, Hydrologic Unit 10020007, at bridge on U.S. Highway 191, 3.6 mi north of West Yellowstone, and at site of former eutophication study.		1974-75 1986	03-04-87 04-12-87 05-05-87 05-19-87 06-02-87	515 496 662 683 581

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES--Continued

Discharge measurements made at miscellaneous sites during water year 1987

Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements Date	Measurements Discharge (ft^3/s)
		MADISON RIVER BASIN--Continued				
S.F. Madison R ab Denny Crk, near West Yellowstone 06037700	Hebgen Lake	Lat 44°40'50", long 111°11'35", in NW1/4NW1/4 sec.25, T.13 S., R.4 E., Gallatin County, Hydrologic Unit 10020007, at bridge on U.S. Highways 20 and 191, 2.0 mi upstream from Denny Creek, and 4.5 mi west of West Yellowstone.		1959-61 1974-75	10-21-86	134
South Fork Madison River bl Denny Creek 4442461111230	Hebgen Lake	Lat 44°42'46", long 111°12'30", in SW1/4NE1/4SW1/4 sec.1, T.12 S., R.4 E., Gallatin County, Hydrologic Unit 10020007, 0.1 mi downstream from Denny Creek, 0.8 mi upstream from mouth, and 6.5 mi west of West Yellowstone.	94.7	1935 1959	04-16-87 04-30-87 05-21-87 06-24-87 08-18-87 09-23-87	136 259 90.2 152 127 113
Duck Creek above Canyon Creek 4446481110645	Hebgen Lake	Lat 44°46'48', long 111°06'45", in NE1/4NE1/4NE1/4 sec.21, T.12 S., R.5 E., Gallatin County, Hydrologic Unit 10020007, at culvert on State Highway 191, 0.5 mi downstream from former eutrophication station 3005GI, and 8 mi north of West Yellowstone.	41.4		04-08-87 05-01-87 05-21-87 06-25-87 08-18-87 09-24-87	35.3 71.2 60.3 40.6 25.9 26.4
Cougar Creek nr mouth 4446131110645	Duck Creek then into Hebgen Lake	Lat 44°46'13", long 111°06'45", in SE1/4NE1/4SE1/4 sec.21, T.12 S., R.5 E., Gallatin County, Hydrologic Unit 10020007, at bridge on State Highway 191, 7.5 mi north of West Yellowstone.	80.0	1959-61 1966	04-09-87 05-01-87 05-21-87 06-25-87 08-18-87 09-24-87	9.73 98.7 50.8 18.8 9.13 7.48
Grayling Creek nr mouth 4447471110907	Hebgen Lake	Lat 44°47'47", long 111°09'07", in SW1/4SW1/4SW1/4 sec.8, T.12 S., R.5 E., Gallatin County, Hydrologic Unit 10020007, at bridge on U.S. Highway 287 9.0 mi north of West Yellowstone.	70.0	1959-61 1966	04-09-87 05-01-87 05-20-87 06-25-87 08-19-87 09-24-87	9.33 255 182 54.1 30.4 22.6
Red Canyon Creek nr mouth 4448151111153	Hebgen Lake	Lat 44°48'15", long 111°11'53", in SW1/4SE1/4NE1/4 sec.11, T.12 S., R.4 E., Gallatin County, Hydrologic Unit 10020007, at culvert on U.S. Highway 287, 11 mi northwest of West Yellowstone.	9.93		04-09-87 05-01-87 05-20-87 06-25-87 08-19-87 09-24-87	.00 10.8 4.22 .97 .42 .46
Watkins Creek at mouth 4448021111702	Hebgen Lake	Lat 44°48'02", long 111°17'82", in SW1/4NW1/4SE1/4 sec.7, T.12 S., R.4 E., Gallatin County, Hydrologic Unit 10020007, at culvert on U.S. Forest Service road, 0.8 mi upstream of mouth, 5.5 mi upstream from Hebgen Dam, and 13.5 mi northwest of West Yellowstone.	11.4		04-30-87 05-21-87 06-24-87 08-18-87 09-23-87	24.7 15.4 5.66 2.93 2.19
Trapper Creek nr mouth nr West Yellowstone 4450531114848	Hebgen Lake	Lat 44°50'53", long 111°48'48" in, NW1/4SW1/4NW1/4 sec.36, T.11 S., R.3 E., Gallatin County, Hydrologic Unit 10020007, at culvert on Forest Service road, 200 ft upstream from Hebgen Lake, 2.5 mi upstream from Hebgen Dam, 16 miles northwest of West Yellowstone.			06-24-87 08-18-87 09-23-87	4.41 2.63 2.30
Cabin Creek nr West Yellowstone 06038550	Madison River	Lat 44°52'19", long 111°20'29" in SW1/4NW1/4SE1/4 sec.15, T.11 S., R.4 E., Gallatin County, Hydrologic Unit 10020007, at the Forest Service Cabin Creek Campground, just off U.S. Highway 287, 12.8 mi west of State Highway 191, 19 mi northwest of West Yellowstone and at site of present crest-stage gage.	30.3	1959-61 1966 1971-72 1975-	04-09-87 05-01-87 05-20-87 06-25-87 08-19-87 09-24-87	2.14 184 83.2 21.8 9.69 5.70
Beaver Creek near mouth 4451451112100	Madison River	Lat 44°51'45", long 111°21'00", in SE1/4SE1/4NW1/4 sec.21, T.11 S., R.3 E., Gallatin County, Hydrologic Unit 10020007, at bridge on U.S. Highway 287, 0.8 mi upstream from mouth, and 19 mi northwest of West Yellowstone.	44.2	1959-61 1966 1971-72	04-09-87 05-01-87 05-20-87 06-25-87 08-19-87 09-24-87	22.1 165 152 74.7 52.3 36.2

Discharge measurements made at miscellaneous sites during water year 1987

Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements Date	Measurements Discharge (ft^3/s)
		MADISON RIVER BASIN--Continued				
West Fork Madison River near Cameron 06039200	Madison River	Lat 44°53'15", long 111°34'55", in SW1/4NE1/4SE1/4 sec.10, T.11 S., R.1 E., Madison County, Hydrologic Unit 10020007, 0.25 mi upstream from mouth and 22 mi southeast of Cameron.	220	1959 1961 1965-67 1972-73 1986	10-21-86 04-09-87	62.3 48.6
Squaw Creek at mouth 4454521113603	Madison River	Lat 44°54'52", long 111°36'03", in NW1/4SE1/4SE1/4 sec.33, T.10. S., R.1 E., Madison County, Hydrologic Unit 10020007, at culvert on U.S. Highway 287, 0.3 mi upstream from mouth, 2 mi downstream from West Fork, and 20.5 mi south of Cameron.	18.3	1961 1972	04-09-87 05-01-87 05-20-87 06-25-87 08-19-87 09-24-87	8.89 20.9 42.9 7.95 13.6 10.4
Standard Creek below Wolverine Creek 4453401114024	Madison River	Lat 44°53'40", long 111°40'24", in SE1/4NW1/4NW1/4 sec.12, T.11 S., R.1 W., Madison County, Hydrologic Unit 10020007, at U.S. Forest Service bridge, 3 mi downstream of Wolverine Creek, 4 mi upstream of mouth, and 21 mi south of Cameron.	18.5		05-07-87 05-20-87 06-25-87 08-19-87 09-24-87	34.7 53.1 17.3 13.4 7.83
Ruby Creek at mouth 4503341113948	Madison River	Lat 45°03'34", long 111°39'48', in NE1/4SW/1/4SE1/4 sec.12, T.9 S., R.1 W., Madison County, Hydrologic Unit 10020007, 500 ft upstream from mouth, 2.5 mi upstream from McAtee Bridge, and 10 mi south of Cameron.	32.3	1972	04-09-87 05-01-87 05-20-87 08-20-87 09-24-87	4.79 16.7 3.62 8.03 3.80
Indian Creek at Forest Service boundary 4506101113353	Madison River	Lat 45°06"10", long 111°33'53", in SW1/4SW1/4SE1/4 sec.26, T.8 S., R. 2 E., Madison County, Hydrologic Unit 10020007, above ditches, downstream of South Fork, at Wonder Ranch, and 9 mi southeast of Cameron.	60.3	1972	04-09-87 05-01-87 05-20-87 06-25-87 08-20-87 09-24-87	11.4 147 134 80.3 61.1 42.6
O'Dell Creek nr mouth 4521491114219	Bear Creek	Lat 45°21'49", long 111°42'19", in NE1/4NW1/4NE1/4 sec.34, T.5 S., R. 1 W., Madison County, Hydrologic Unit 10020007, near mouth, 0.9 mi north of Jeffers and 1.5 mi northwest of Ennis.	129		04-09-87 05-01-87 05-20-87 06-25-87 08-20-87 09-24-87	99.0 99.4 107 105 107 120
Jack Creek nr Ennis 06040300	Madison River	Lat 45°21'23", long 111°34'51", in NW1/4NE1/4SE1/4 sec.34, T.5 S., R.1 E., Madison County, Hydrologic Unit 10020007, Beaverhead National Forest, on left bank 800 ft upstream from bridge at forest boundary, 8.8 mi east of Ennis, at mile 6.5, and at site of former gaging station.	51.5	1972-86	06-25-87 08-20-87 09-24-87	40.5 27.8 23.1
Moore Spring Creek 4520591114342	Ennis Lake	Lat 45°20'59", long 111°43'42", in SW1/4SW1/4SE1/4 sec.33, T.5 S., R. 1 W., Madison County, Hydrologic Unit 10020007, downstream of culvert in town of Ennis.	31.2		04-09-87 04-29-87 05-20-87 06-26-87 08-20-87 09-25-87	.97 2.45 .99 2.55 .85 .33
North Meadow Creek at Forest Service Boundary 4531461115059	Madison River	Lat 45°31'46", long 111°50'59", in SE1/4NW1/4SE1/4 sec.33, T.3 S., R. 2 W., Madison County, Hydrologic Unit 10020007, at bridge 0.3 mi upstream from U.S. Forest Service boundary and 8 mi northwest of McAllister.	18.4		04-09-87 04-29-87 05-19-87 06-22-87 08-17-87 09-25-87	4.00 33.9 59.1 54.8 25.1 12.5
Hot Springs Creek near Norris 06041300	Madison River	Lat 45°35'07", long 111°35'38", in NE1/4SW1/4SW1/4 sec.10, T.3 S., R.1 E., Madison County, Hydrologic Unit 10020007, just upstream of mouth, 0.1 mi south of State Highway 84, and 4.8 mi northeast of Norris.		1986	04-07-87 04-29-87 05-19-87 06-22-87 08-17-87 09-24-87	9.99 4.58 14.1 19.6 13.4 9.72
Cherry Creek near Norris 06041700	Madison River	Lat 45°37'20", long 111°32'50", in NE1/4SE1/4NW1/4 sec.36, T.2 S., R.1 E., Madison County, Hydrologic Unit 10020007, at bridge on State Highway 84, 7.8 mi northeast of Norris, and at mile 0.1.		1986	04-07-87 04-29-87 05-19-87 06-22-87 08-17-87 09-24-87	33.9 80.9 68.2 139 42.3 22.9

Discharge measurements made at miscellaneous sites during water year 1987

Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements Date	Measurements Discharge (ft^3/s)
		MADISON RIVER BASIN--Continued				
Madison River at Three Forks 06042600	Missouri River	Lat 45°54'05", long 111°31'29", in SE1/4NE1/4NW1/4 sec.30, T.2 N., R.2 E., Gallatin County, Hydrologic Unit 10020007, at bridge on old U.S. Highway 10, 1.5 mi east of Three Forks, and at mile 3.0.		1976-77 1986	10-22-86 03-05-87 04-01-87 05-06-87 05-18-87 06-03-87 06-17-87 06-29-87	2360 1600 1160 1090 705 1260 1270 983
		GALLATIN RIVER BASIN				
Taylor Fork nr Grayling 06043000	Gallatin River	Lat 45°04'14", long 111°12'16", in SE1/4NW1/4NW1/4 sec. 11, T.9 S., R. 4 E., Gallatin County, Hydrologic Unit 10020008, 0.5 mi upstream from mouth, 0.4 mi west of State Highway 191, 17 mi north of Grayling, and at site of former gaging station.	98.0	1946-53 1955-57 1966-67	04-09-87 04-30-87 05-21-87 06-23-87 08-18-87 09-25-87	28.5 217 196 86.4 44.4 31.6
Porcupine Creek at mouth 4513351111443	Gallatin River	Lat 45°13'35", long 111°14'43", in SE1/4SW1/4NW1/4 sec.16, T.7 S., R. 4 E., Gallatin County, Hydrologic Unit 10020008, at bridge at Montana Fish, Wildlife, and Parks building, 0.3 mi east of State Highway 191, and 25.5 mi south of Gallatin Gateway.	25.8		04-08-87 04-30-87 05-21-87 06-23-87 08-18-87 09-25-87	5.02 38.4 31.3 30.7 7.45 5.26
Middle Fork of West Fork Gallatin River at mouth 4515591111913	West Fork Gallatin River	Lat 45°15'59", long 111°19'13", in NW1/4NW1/4SE1/4 sec.35, T.6 S., R. 3 E., Gallatin County, Hydrologic Unit 10020008, at mouth, 3.4 mi west of State Highway 191, and 23.5 mi south of Gallatin Gateway.	18.4		04-08-87 04-30-87 05-21-87 06-23-87 08-18-87 09-25-87	9.49 61.3 33.0 42.0 7.76 5.53
South Fork of West Fork Gallatin River nr mouth 4515571111708	West Fork Gallatin River	Lat 45°15'57", long 111°17'08", in SW1/4NE1/4SW1/4 sec.31, T.6 S., R. 4 E., Gallatin County, Hydrologic Unit 10020008, at river ford, 0.7 mi upstream from mouth, 1.6 mi west of State Highway 191, and 23 mi south of Gallatin Gateway.	46.2		04-08-87 04-30-87 05-21-87 06-23-87 08-18-87 09-25-87	15.3 193 129 39.4 23.7 10.3
West Fork Gallatin River at mouth 4515581111514	Gallatin River	Lat 45°15'58", long 111°15'14", in SW1/4NE1/4SE1/4 sec.32, T.6 S., R. 4 E., Gallatin County, Hydrologic Unit 10020008, at bridge on road to Meadow Village, 0.1 mi west of State Highway 191, and 22.5 mi south of Gallatin Gateway.	80.0		04-08-87 04-30-87 05-21-87 06-23-87 08-18-87 09-25-87	33.3 319 199 91.1 39.7 24.8
Squaw Creek nr Gallatin Gateway 06043200	Gallatin Gateway	Lat 45°26'28", long 111°13'20", in NE1/4SW1/4SW1/4 sec.34, T.4 S., R. 4 E., Gallatin County, Hydrologic Unit 10020008, at footbridge 0.2 mi upstream from mouth, 10 mi south of Gallatin Gateway, and at site of former crest-stage gage.	40.5	1959-74	04-08-87 04-30-87 05-21-87 06-23-87 08-18-87 09-25-87	21.1 62.7 38.8 36.7 21.7 18.5
Hellroaring Creek at mouth 4526551111411	Gallatin River	Lat 45°26'55", long 111°14'14", in NW1/4SW1/4NE1/4 sec.33, T.4 S., R. 4 E., Gallatin County, Hydrologic Unit 10020008, at culvert on State Highway 191 9.5 mi south of Gallatin Gateway.	29.8		04-08-87 04-30-87 05-21-87 06-23-87 08-18-87 09-25-87	13.5 86.5 68.9 74.3 39.2 26.9
South Fork Spanish Creek at Forest Service boundary 4527001112232	Spanish Creek	Lat 45°27'00", long 111°22'32", in SW1/4NE1/4NE1/4 sec.32, T.4 S., R.2 E., Madison County, Hydrologic Unit 10020008, at U.S. Forest Service bridge, 5 mi upstream of mouth, and 13 mi south of Gallatin Gateway.	21.2		04-08-87 04-30-87 05-21-87 06-23-87 08-18-87 09-24-87	9.33 112 76.4 62.3 23.3 13.7
Spanish Creek at mouth 4529381151617	Gallatin River	Lat 45°29'38", long 115°16'17", in SW1/4NE1/4NE1/4 sec.18, T.4 S., R. 4 E., Gallatin County, Hydrologic Unit 10020008, at bridge on State Highway 191, 7.0 mi south of Gallatin Gateway.	86.0		04-08-87 04-30-87 05-21-87 06-23-87 08-18-87 09-24-87	26.9 222 162 121 50.9 33.5

Discharge measurements made at miscellaneous sites during water year 1987

Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements Date	Measurements Discharge (ft^3/s)
		GALLATIN RIVER BASIN--Continued				
Sourdough Creek nr Bozeman 06047500	Gallatin River	Lat 45°34'56", long 111°01'19", in SE1/4NE1/4NE1/4 sec.18, T.3 S., R. 6 E., Gallatin County, Hydrologic Unit 10020008, just upstream from U.S. Forest Service boundary, 6.5 mi south of Bozeman, and at site of former gaging station.	28.2	1951-53	04-07-87 04-29-87 05-22-87 06-22-87 08-17-87 09-24-87	11.0 41.4 18.9 16.7 12.1 6.09
Hyalite Creek at county road 4543451110915	East Gallatin River	Lat 45°43'45", long 111°09'15", in NE1/4NE1/4NW1/4 sec.30, T.1 S., R. 5 E., Gallatin County, Hydrologic Unit 10020008, at bridge on county road, 1.5 mi east of State Highway 291, and 3.0 mi south of Belgrade.	89.3		04-07-87 04-29-87 05-22-87 06-22-87 08-17-87 09-24-87	5.27 5.63 44.2 16.4 19.0 19.3
East Gallatin River nr Manhattan 4552271111354	Gallatin River	Lat 45°52'27", long 111°13'54", in NW1/4NW1/4NE1/4 sec.4, T.1 N., R.4 E.,Gallatin County, Hydrologic Unit 10020008, at bridge on State Secondary Highway 346, 1 mi downstream from Dry Creek, 3.5 mi east of Manhatten, and at site of former 208 project.		1976-77	04-07-87 04-29-87 05-22-87 06-22-87 08-17-87 09-24-87	342 459 363 354 319 271
		SIXTEENMILE CREEK BASIN				
Sixteenmile Creek at mouth 4606221112350	Missouri River	Lat 46°06'22", long 111°23'50", in NE1/4NW1/4NE1/4 sec.18, T.4 N., R. 3 E., Broadwater-Gallatin County, Hydrologic Unit 10030101, at railroad bridge 100 ft upstream from mouth and 5 mi south of Toston.	532		04-02-87 04-28-87 05-19-87 06-19-87 08-20-87 09-18-87	60.7 94.7 93.3 47.4 31.3 28.2
		CROW CREEK BASIN				
Crow Creek 06055500	Missouri River	Lat 46°16'05", long 111°41'30", near west edge of SE1/4 sec.14, T.6 N., R.1 W., Broadwater County, Hydrologic Unit 10030101, Helena National Forest, on left bank 1.5 mi upstream from Slim Sam Creek, 6 mi northwest of Radersburg, and at site of former gaging station.	76.6	1901-03 1910-11 1919-29 1966-73 1975 1981 1985-86	04-10-87 04-28-87 05-18-87 06-19-87 08-20-87 09-18-87	13.8 94.7 68.9 39.0 20.0 14.6
		DRY CREEK BASIN				
Dry Creek at Forest Service boundary 4615171111817	Missouri River	Lat 46°15'17", long 111°18'17", in SE1/4SE1/4SE1/4 sec.23, T.6 N., R. 3 E., Broadwater County, Hydrologic Unit 10030101, at bridge 0.4 downstream of U.S. Forest Service boundary and 9.0 mi northeast of Toston.	28.6		04-02-87 04-28-87 05-18-87 06-19-87 08-21-87 09-18-87	5.10 8.21 7.68 5.88 1.60 2.34
		DEEP CREEK BASIN				
Deep Creek bl North Fork, near Townsend 06056600	Missouri River	Lat 46°19'31", long 111°16'56", in NW1/4NW1/4NW1/4 sec.31, T.7 N., R. 4 E., Broadwater County, Hydrologic Unit 10030101, at bridge on county road, 100 ft downstream from North Fork, and 11 mi east of Townsend.	87.7	1959-73	04-02-87 04-28-87 05-18-87 06-19-87 08-21-87 09-18-87	9.34 36.2 37.4 22.1 11.4 10.2
		DUCK CREEK BASIN				
Duck Creek above Mill Gulch 4628341112422	Canyon Ferry Reservoir	Lat 46°28'34", long 111°24'22", in NE1/4NW1/4SW1/4 sec.6, T.8 N., R. 3 E., Broadwater County, Hydrologic Unit 10030101, at culvert on county road, 0.1 mi upstream from Mill Gulch, 2.2 mi east of FAS 284, and 12 mi northwest of Townsend.	17.9		04-02-87 04-28-87 05-18-87 06-19-87 08-21-87 09-18-87	3.49 13.1 12.6 8.82 4.16 4.23
		CONFEDERATE CREEK BASIN				
Confederate Gulch below Jimmys Gulch 4634391112659	Canyon Ferry Reservoir	Lat 46°34'39", long 111°26'59", in NE1/4SE/14SE1/4 sec.34, T.10 N., R. 2 E., Broadwater County, Hydrologic Unit 10030101, 0.2 mi downstream of Jimmys Gulch, 2 mi downstream of Diamond City, 3.5 mi northeast of FAS 284, and 12 mi northeast of Winston.	28.7		04-02-87 04-28-87 05-18-87 06-19-87 08-21-87 09-18-87	4.89 17.5 32.2 12.8 8.49 7.40

Discharge measurements made at miscellaneous sites during water year 1987

Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements Date	Measurements Discharge (ft^3/s)
		AVALANCHE CREEK BASIN				
Avalanche Gulch at Forest Service boundary 4638041113341	Canyon Ferry Reservoir	Lat 46°38'04", long 111°33'41", in NE1/4SW1/4SE1/4 sec.11, T.10 N., R. 1 E., Broadwater County, Hydrologic Unit 10030101, at culvert 0.3 mi upstream of U.S. Forest Service boundary, 3 mi northeast of FAS 284, and 11.5 mi north of Winston.	34.5		04-02-87	2.05
					04-28-87	3.63
					05-18-87	2.78
					06-19-87	1.94
					08-21-87	1.26
					09-18-87	1.14
		MARIAS RIVER BASIN				
Two Medicine River 06093600	Marias River	Lat 48°28'20", long 112°21'25", in NW1/4SW1/4SW1/3 sec.2, T.31 N., R.6 W., Glacier Counyt, Hydrologic Unit 10030201, 8.5 river miles upstream from Birch Creek and the eastern boundary of Blackfoot Indian Reservation and 11.5 mi south of Cut Bank.		1982-86	10-22-86	279
					11-20-86	291
					12-16-86	282
					01-22-87	189
					02-18-87	212
					03-23-87	330
					04-15-87	615
					05-21-87	718
					06-17-87	505
					07-28-87	812
					08-26-87	343
					09-24-87	144
Blacktail Creek 06097200	Birch Creek	Lat 48°21'11", long 112°33'22", in NE1/4NE1/4NE1/4 sec.19, T.30 N., R.7 W., Pondera County, Hydrologic Unit 10030201, 12.0 mi north of Dupuyer at bridge on State Highway 89, and 2.3 mi upstream from Birch Creek.		1964	10-22-86	9.52
				1982-86	11-20-86	9.32
					12-16-86	10.9
					01-22-87	5.63
					02-18-87	7.58
					03-23-87	25.9
					04-15-87	21.4
					05-22-87	8.08
					06-18-87	14.0
					07-28-87	12.0
					08-26-87	7.42
					09-24-87	8.70
Big Rock Coulee 06098900	Cut Bank Creek	Lat 48°30'06", long 112°22'34", in NE1/4NE1/4NW1/4 sec.15, T.34 N., R. 6 W., Glacier County, Hydrologic Unit 10030202, 1.5 mi upstream from mouth, 2.5 mi west of Santa Rita, and 4.9 mi northwest of Cut Bank.		1982-86	10-22-86	.64
					11-19-86	.63
					12-16-86	.87
					01-22-87	.20
					02-18-87	.76
					03-23-87	2.58
					04-15-87	2.27
					05-22-87	.43
					06-17-87	.22
					07-28-87	.24
					08-26-87	.90
					09-23-87	.26
Spring Creek 06099100	Cut Bank Creek	Lat 48°34'53", long 112°22'35", in SW1/4SE1/4SW1/4 sec.26, T.33 N., R. 6 W., Glacier County, Hydrologic Unit 10030202, 4.5 mi south of Cut Bank on Highway 358 and approximately 4 river miles upstream from junction with Cut Bank Creek and boundary of Blackfeet Indian Reservation.		1982-86	10-22-86	4.06
					11-19-86	2.62
					12-16-86	2.40
					01-22-87	.00
					02-18-87	2.59
					03-23-87	5.14
					04-15-87	3.32
					05-22-87	3.45
					06-17-87	5.26
					07-28-87	6.80
					08-26-87	9.89
					09-24-87	2.99
		MILK RIVER BASIN				
Duck Creek 06137540	Milk River	Lat 48°14'37", long 109°50'42", in SW1/4SW1/4NW1/4 sec.30, T.29 N., R. 15 E., Hill County, Hydrologic Unit 10050005, Rocky Boys Indian Reservation, on left bank 5.5 mi southwest of Rocky Boy Agency, and 10.1 mi southeast of Box Elder.		1982-86	10-21-86	2.41
					11-18-86	2.02
					12-15-86	1.78
					01-21-87	1.48
					02-17-87	1.25
					03-18-87	1.08
					04-14-87	2.39
					05-20-87	1.96
					06-16-87	1.09
					07-16-87	.34
					08-18-87	.15
					09-22-87	.06

Discharge measurements made at miscellaneous sites during water year 1987

Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements Date	Measurements Discharge (ft^3/s)
		MILK RIVER BASIN--Continued				
Boxelder Creek 06137575	Milk River	Lat 48°18'38", long 110°01'09", in SE1/4 sec.35, T.30 N., R.13 E., Hill County, Hydrologic Unit 10050005, Rocky Boys Indian Reservation, upstream side of bridge 0.7 mi southwest of Box Elder.	67.1	1982-86	10-21-86	12.6
					11-18-86	12.0
					12-15-86	18.0
					01-21-87	6.50
					02-17-87	11.3
					03-18-87	19.1
					04-14-87	25.5
					05-20-87	6.72
					06-16-87	4.37
					07-16-87	1.25
					08-18-87	.02
					09-22-87	.00
Sage Creek 06138300	Milk River	Lat 48°23'34", long 110°02'43", in SE1/4 sec.33, T.31 N., R.13 E., Hill County, Hydrologic Unit 10050006, at culvert in county road 2.9 mi west of Box Elder.	985	1982-86	10-14-86	.00
Beaver Creek 06139900	Milk River	Lat 48°13'18", long 109°39'03", in SE1/4 sec.33, T.29 N., R.16 E., Hill County, Hydrologic Unit 10050004, on left bank, 0.1 mi downstream from Rocky Boys Indian Reservation boundary, and 6.5 mi southeast of Rocky Boy.	16.1	1982-86	10-21-86	9.00
					11-18-86	7.49
					12-15-86	6.01
					01-21-87	4.27
					02-17-87	4.73
					03-19-87	7.20
					04-14-87	14.2
					05-20-87	6.23
					06-16-87	4.11
					07-16-87	2.85
					08-18-87	2.75
					09-22-87	1.94
Threemile Creek 06154130	Milk River	Lat 48°26'02", long 108°36'42", in SE1/4NW1/4NE1/4 sec.21, T.31 N., R. 24 E., Blaine County, Hydrlogic Unit 10050004, Fort Belknap Indian Reservation, at culvert in U.S. Highway 2, 3 mi upstream from mouth, and 10 mi southeast of Harlem.		1982-86	10-14-86	.00
					04-06-87	.00
					05-13-87	.00
					07-14-87	.00
White Bear Creek 06154150	Milk River	Lat 48°22'23", long 108°32'19", in SW1/4SW1/4NW1/4 sec.7, T.30 N., R.25 E., Phillips County, Hydrologic Unit 10050004, Fort Belknap Indian Reservation, 1 mi downstream from Fifteenmile Creek, and 14 mi west of Dodson.		1982-86	10-19-86	3.97
					11-17-86	1.49
					12-16-86	.40
					01-13-87	.50
					02-17-87	.50
					03-17-87	1.50
					04-06-87	10.8
					05-13-87	.00
					06-16-87	.20
					07-14-87	.20
					09-14-87	.01
Peoples Creek 06154390	Milk River	Lat 48°15'49", long 108°52'12", in SW1/4SE1/4SE1/4 sec.16, T.29 N., R.22 E., Blaine County, Hydrologic Unit 10050009, at bridge on coutny road, 0.7 mi upstream from St. Johns Coulee, and 13 mi east of Cleveland.		1965-66 1982-86	10-14-86	34.6
					12-16-86	19.1
					01-12-87	5.02
					02-17-87	14.7
					03-17-87	23.3
					04-06-87	50.1
					05-13-87	4.83
					06-16-87	.45
					07-14-87	.00
					09-14-87	.00
Little Peoples Creek ab St. Pauls Mission nr Hays 4758151084007	Peoples Creek	Lat 47°58"15", long 108°40"07", in SW1/4NW1/4NW1/4 sec.32, T.26 N., R. 24 E., Blaine County, Hydrologic Unit 10050009, at culvert on private road, 0.6 mi southeast of St. Pauls Mission, and 1.7 miles southeast of Hays.			11-04-86	3.93
Little Peoples Creek at Hays 4759271084138	Peoples Creek	Lat 47 59'27", long 108 41'38", in NE1/4SE1/4SE1/4 sec.24, T.26 N., R. 24 E., Blaine County, Hydrologic Unit 10050009, at culverts on county road, in Hays.			11-04-86	3.49

Discharge measurements made at miscellaneous sites during water year 1987

Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements Date	Measurements Discharge (ft^3/s)
		MILK RIVER BASIN--Continued				
Little Peoples Creek below Hays 4800461084255	Peoples Creek	Lat 48°00'46", long 108°42'55",in NE1/4SE1/4NE1/4 sec.14, T.26 N., R.23 E., Blaine County, Hydrologic Unit 10050009, at bridge on county road, 2 mi below Hays.		1960	11-04-86	7.16
Little Peoples Creek below Lodge Pole 4803271084238	Peoples Creek	Lat 48°03'27" long 108°42'38", in SW1/4NW1/4NW1/4 sec.36, T.27 N., R.23 E., Blaine County, Hydrologic Unit 10050009, at private road, 13 mi downstream from Lodge Pole road, and 4.6 mi downstream from Hays.			11-04-86	8.87
Little Peoples Creek ab Duck Creek nr Hays 4806441084529	Peoples Creek	Lat 48°06'44", long 108°45'29", in NW1/4 sec.9, T.26 N., R.23 E., Blaine County, Hydrologic Unit 10050009, at private road 2.6 mi northwest of State Highway 376, and 7.8 mi northwest of Hays.			11-04-86	9.23
Little Peoples Creek at Highway 376 nr Hays 4805251084225	Peoples Creek	Lat 48°05'25", long 108°42'25", in SE1/4SE1/4SE1/4 sec.14, T.27 N., R. 23 E., Blaine County, Hydrologic Unit 10050009, at culvert on State Highway 376, 3.6 mi below Lodge Pole road, and 7 mi downstream of Hays.			11-04-86	8.73
Lodge Pole Creek ab Lodge Pole 4801191083151	Peoples Creek	Lat 48°01'19', long 108°31'51", in NE1/4NE1/4SW1/4 sec.8, T.26 N., R. 25 E., Blaine County, Hydologic Unit 10050009, at culvert on county road 0.9 mi south of Lodge Pole.			11-05-86	1.03
Lodge Pole Creek below Lodge Pole 4802251083156	Peoples Creek	Lat 48°02"25', long 108°31'56", in NE1/4SW1/4NW1/4 sec.5, T.26 N., R. 25 E., Blaine County, Hydrologic Unit 10050009, at bridge on county road 0.3 mi north of Lodge Pole.			11-05-86	6.00
		POPLAR RIVER BASIN				
East Fork Poplar River 06179000	Poplar River	Lat 48°51'08", long 105°25'15", in NE1/4NW1/4 sec.27, T.36 N., R.48 E., Daniels County, Hydrologic Unit 10060003, on right bank at downstream side of bridge on State Highway 13, 2.5 mi upstream from mouth, 4 mi north of Scobey, and at site of former gaging station.	722	1935-39 1975-86	10-15-86 12-15-86 01-15-87 05-20-87	3.00 3.20 3.50 13.0
Poplar River 06179200	Missouri River	Lat 48°33'05", long 105°21'55", in NW1/4SW1/4SW1/4 sec.4, T.32 N., R.49 E., Roosevelt County, Hydrologic Unit 10060004, on county road bridge 3.8 mi upstream from mouth, and 4.4 mi northwest of Bredette, at site of water-quality station.	1745	1976-86	10-14-86 11-12-86 12-15-86 01-14-87 03-18-87 04-16-87 05-20-87 06-18-87 07-17-87 08-19-87 09-16-87	27.6 13.4 9.36 13.8 46.1 60.1 21.2 3.28 1.20 6.76 4.51
West Fork Poplar River 06180400	Poplar River	Lat 48°33'01", long 105°25'42", in SW1/4SW1/4 sec.1, T.32 N., R.48 E., Roosevelt County, Hydrologic Unit 10060004, at bridge on State Highway 13, 5.9 mi upstream from mouth, 6.6 mi northwest of Bredette, and at site of water-quality station.	1010	1974 1976-86	10-14-86 11-12-86 12-15-86 01-14-87 03-18-87 04-16-87 05-20-87 06-18-87 07-17-87 08-19-87 09-16-87	25.1 9.29 16.0 8.76 53.9 38.6 16.7 2.65 1.56 5.76 3.21

Discharge measurements made at miscellaneous sites during water year 1987

Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements Date	Measurements Discharge (ft^3/s)
		BIG MUDDY CREEK BASIN				
Wolf Creek 06183900	Big Muddy Creek	Lat 49°36'26", long 104°48'29", in NW1/4NW1/4NE1/4 sec.20, T.33 N., R.53 E., Sheridan County, Hydrologic Unit 10060006, Fort Peck Indian Reservation, on county road bridge 15 mi west of Reserve.		1982-86	10-14-86 11-12-86 12-15-86 01-15-87 02-17-87 03-18-87 04-15-87 05-20-87 07-17-87 07-22-87 08-19-87 09-16-87	.00 .00 .10 .00 .33 .48 .47 .42 .00 .20 .15 .00
		YELLOWSTONE RIVER BASIN				
Mammouth Springs at Mammouth 06190410	Gardiner River	Lat 44°58'11", long 110°41'33", unsurveyed, Hydrologic Unit 10070001, Yellowstone National Park, 100 ft downstream from south most bridge in Park Service residential area and about 1 mi upstream of mouth.		1967 1986	01-15-87 09-03-87	3.74 2.03
Hot River nr Mammoth Hot Springs 06190540	Gardner River	Lat 44°59'10", long 110°41'15", 50 ft downstream from outfall, 0.8 mi northeast of U.S. Post Office at Mammoth, Yellowstone National Park.		1938-44 1966-67	01-15-87 09-03-87	21.6 25.1
LaDuke Hot Springs nr Gardiner 4505351104625	Gardiner River	Lat 45°05'35", long 110°46'25", in NW1/4SE1/4SW1/4 sec.32, T.9 S., R.8 E., Park County, downstream end of concrete culvert under U.S. Highway 89 about 4.5 mi north of Gardiner.		1986	09-03-87 09-05-87 09-24-87	.26 .27 .25
Pryor Creek ab Pryor 06215000	Yellowstone River	Lat 45°20'26", long 108°34'07", in SW1/4NE1/4 sec.6, T.6 S., R.26 E., Big Horn County, Hydrologic Unit 10070008, on right bank 1.2 mi upstream from headworks of Pryor ditch No. 1 and 6.7 mi south of Pryor.	39.6	1921-24 1966-74	04-30-87 06-02-87 07-23-87 09-03-87	4.50 7.12 1.36 1.06
Bighorn River nr Hardin 06288500	Yellowstone River	Lat 45°43'46", long 107°34'52", in NE1/4SE1/4 sec.24, T.1 S., R.33 E., Big Horn County, Hydrologic Unit 10080015, on left bank at city water plant, 0.5 mi upstream from former gaging station, 1 mi upstream from Little Bighorn River, 1.4 mi east of Hardin, and at mile 41.0.	20722	1904-25 1928-33 1962-74	06-02-87 07-29-87 08-19-87	2160 2320 2220
Tongue River 4510151064438	Yellowstone River	Lat 45°10'15", long 106°44'38", in SW1/4SW1/4 sec.32, T.71/2 S., R.41 E., Big Horn County, Hydrologic Unit 10090101, at mouth of Post Creek, 4.3 mi downstream from Tongue River Dam, 12 mi northeast of Decker, and at mi 184.1.			04-01-87 04-02-87 04-07-87	30.9 12.4 14.3
Hanging Woman Creek 06307570	Tongue River	Lat 45°08'02", long 106°29'00", in NW1/4SE1/4SE1/4 sec.17, T.8 S., R.43 E., Big Horn County, Hydrologic Unit 10090101, on county road bridge, 0.6 mi downstream from Horse Creek, 0.8 mi upstream from Circle Bar Draw, 13.2 mi southeast of Birney, and at site of water-quality station.	321	1977-83	11-19-86 01-06-87 02-14-87 04-01-87 05-12-87 06-23-87 09-15-87	.41 .32 .56 .72 .28 .15 .13
Pumpkin Creek nr Miles City 06308400	Tongue River	Lat 46°13'42", long 105°41'24", in SW1/4NE1/4SW1/4 sec.35, T.6 N., R.48 E., Custer County, Hydrologic Unit 10090102, on right bank, 12 ft upstream from bridge on U.S. Highway 312, 7.5 mi upstream from mouth, and 16 mi southeast of Miles City.	697	1949 1952 1972-85	04-03-87	11.7

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 to SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
05014500 SWIFTCURRENT CREEK AT MANY GLACIER, MT (LAT 48 47 57 LONG 113 39 21)					
OCT , 1986					
27...	1710	56	111	6.5	6.0
DEC					
11...	1210	27	111	-2.0	.0
FEB , 1987					
10...	1445	21	117	6.0	1.0
APR					
15...	1430	98	105	8.5	3.0
APR , 1987					
30...	1630	701	96	16.5	7.5
JUN					
17...	1725	309	90	18.0	12.0
AUG					
17...	1525	167	107	14.0	12.5
05016000 SWIFTCURRENT CREEK AT SHERBURNE, MT (LAT 48 49 49 LONG 113 30 59)					
MAR , 1987					
02...	1500	.37	236	2.0	2.0
APR					
15...	1610	93	146	9.0	2.0
JUN , 1987					
17...	1610	427	120	--	--
AUG					
17...	1810	595	125	11.5	15.0
05017500 ST MARY RIVER NEAR BABB, MT (LAT 48 50 04 LONG 113 25 03)					
OCT , 1986					
01...	1200	301	147	3.0	7.5
28...	1345	355	148	9.5	9.0
DEC					
10...	1430	152	158	-4.0	.0
FEB , 1987					
10...	1630	75	157	6.0	4.0
MAY , 1987					
12...	1430	2040	155	14.0	11.0
JUN					
18...	0900	1610	138	12.0	10.0
AUG					
18...	1820	1020	140	17.5	16.0
443557111325701 HELLROARING CREEK NEAR WEST YELLOWSTONE, MT (LAT 44 35 57 LONG 111 32 57)					
APR , 1987					
16...	1110	11	218	--	3.0
MAY					
07...	0825	53	180	--	2.0
21...	1200	37	156	--	2.0
JUN					
24...	1115	17	212	--	7.0
AUG , 1987					
19...	1230	9.5	224	--	9.0
SEP					
23...	1215	8.1	231	--	7.0
443611111351401 CORRAL CREEK NEAR WEST YELLOWSTONE, MT (LAT 44 36 11 LONG 111 35 14)					
APR , 1987					
16...	1145	.90	225	--	3.0
MAY					
07...	0755	5.2	130	--	2.0
21...	1140	3.8	132	--	2.0
JUN					
24...	1050	2.2	214	--	7.0
AUG , 1987					
19...	0920	1.4	231	--	5.0
SEP					
23...	1140	1.7	237	--	6.0
443640111365401 ANTELOPE CREEK AT MOUTH, NEAR WEST YELLOWSTONE, MT (LAT 44 36 40 LONG 111 36 54)					
MAY , 1987					
07...	0720	.60	176	--	2.0
21...	1045	.31	159	--	.0
JUN					
24...	--	E.35	213	--	9.0
AUG , 1987					
19...	0935	.38	233	--	6.0
SEP					
23...	1015	.30	241	--	5.0
443701111392101 RED ROCK RIVER ABOVE UPPER RED ROCK LAKE, NEAR WEST YELLOWSTONE, MT (LAT 44 37 01 LONG 111 39 21)					
APR , 1987					
16...	1000	41	191	--	1.0
MAY					
06...	--	59	211	--	14.0
21...	0940	27	190	--	2.0
JUN					
24...	1015	25	248	--	9.0
AUG , 1987					
19...	1000	17	256	--	9.0
SEP					
23...	0905	14	264	--	7.0

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 to SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06007000 TOM CREEK NEAR WEST YELLOWSTONE, MT (LAT 44 35 18 LONG 111 39 48)											
APR , 1987						AUG , 1987					
16...	--	E.50	373	--	.0	19...	1045	.69	279	--	7.0
MAY						SEP					
06...	1740	7.7	187	--	13.0	23...	0840	.41	291	--	4.0
21...	1015	3.3	215	--	.0						
JUN											
24...	0955	.72	283	--	7.0						
443533111471601 ODELL CREEK NEAR LIMA, MT (LAT 44 35 33 LONG 111 47 16)											
APR , 1987						AUG , 1987					
16...	0905	7.4	194	--	.0	19...	1150	7.9	196	--	8.0
MAY						SEP					
06...	1640	32	173	--	12.0	23...	0810	5.9	202	--	4.0
20...	1415	11	158	--	4.0						
JUN											
24...	0930	12	193	--	6.0						
06011400 LONG CREEK NEAR LAKEVIEW, MT (LAT 44 43 00 LONG 112 04 00)											
APR , 1987						AUG , 1987					
15...	1945	32	347	--	2.0	26...	1520	4.6	442	--	13.0
MAY						SEP					
06...	1530	11	423	--	14.0	21...	1420	2.7	412	--	9.0
19...	1500	16	403	--	10.0						
JUN											
30...	1610	5.7	409	--	18.0						
06012500 RED ROCK RIVER BELOW LIMA RESERVOIR, NEAR MONIDA, MT (LAT 44 39 20 LONG 112 22 05)											
OCT , 1986						MAY , 1987					
01...	1035	125	333	6.0	7.5	12...	1010	109	417	15.0	10.5
MAR , 1987						JUN					
25...	1200	5.5	587	3.0	1.0	24...	1015	382	394	19.5	16.5
443242112480201 DEADMAN CREEK AT MOUTH, NEAR LIMA, MT (LAT 44 32 42 LONG 112 48 02)											
APR , 1987						AUG , 1987					
15...	1700	13	309	--	5.0	20...	0840	5.6	344	10.0	10.0
MAY						SEP					
06...	1320	6.9	330	--	12.0	22...	1630	5.6	347	--	14.0
20...	1400	8.3	367	--	8.0						
JUL											
01...	0840	6.5	356	--	11.0						
06013500 BIG SHEEP CREEK BELOW MUDDY CREEK, NEAR DELL, MT (LAT 44 39 00 LONG 112 47 00)											
JUL , 1987						SEP , 1987					
01...	0910	60	620	--	11.0	22...	1705	47	563	--	16.0
AUG											
20...	0745	62	573	10.0	10.0						
445152113192701 BLACK CANYON CREEK AT FOREST BOUNDARY, NEAR GRANT, MT (LAT 44 51 52 LONG 113 19 27)											
APR , 1987						AUG , 1987					
15...	1350	3.3	187	--	5.0	26...	1200	2.3	192	--	11.0
MAY						SEP					
05...	1750	4.5	124	--	11.0	22...	0945	1.6	201	--	8.0
JUL											
01...	1245	3.3	157	--	14.0						

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
445649113260501 FRYING PAN CREEK BELOW FORKS, NEAR GRANT, MT (LAT 44 56 49 LONG 113 26 05)											
APR , 1987						AUG , 1987					
15...	1145	5.0	96	--	.0	26...	1040	1.5	80	--	7.0
MAY						SEP					
05...	1345	4.7	82	--	9.0	22...	1125	1.2	83	--	5.0
20...	1030	7.7	45	--	2.0						
JUL											
01...	1435	3.0	66	--	14.0						
445728113213501 BEAR CREEK AT MOUTH, NEAR GRANT, MT (LAT 44 57 28 LONG 113 21 35)											
APR , 1987						AUG , 1987					
15...	1240	6.5	117	--	.0	26...	1005	3.5	133	--	10.0
MAY						SEP					
05...	1640	13	90	--	14.0	22...	1055	2.5	142	--	8.0
20...	0940	26	64	--	4.0						
JUL											
01...	1400	5.8	112	--	18.0						
445959113211101 BLOODY DICK CREEK ABOVE MAGPIE GULCH, NEAR GRANT, MT (LAT 44 59 59 LONG 113 21 11)											
APR , 1987						AUG , 1987					
14...	1640	32	48	--	8.0	26...	0905	15	47	--	8.0
MAY						SEP					
05...	1425	62	34	--	9.0	22...	1245	8.9	59	--	8.0
20...	0850	84	38	--	5.0						
JUL											
01...	1635	26	42	--	14.0						
06015000 HORSE PRAIRIE CREEK NEAR GRANT, MT (LAT 45 01 00 LONG 113 13 00)											
APR , 1987						AUG , 1987					
14...	1805	87	169	--	9.0	26...	0805	52	271	--	10.0
MAY						SEP					
06...	1440	69	95	--	8.0	22...	0845	22	241	--	9.0
20...	0800	177	180	--	6.0						
JUL											
01...	1150	39	231	--	16.0						
445216113002501 MEDICINE LODGE CREEK BELOW SCHWARTZ CREEK, NEAR GRANT, MT (LAT 44 52 16 LONG 113 00 25)											
APR , 1987						AUG , 1987					
15...	1515	12	515	--	6.0	20...	1130	19	483	18.0	10.0
MAY						26...	1320	24	487	--	10.0
06...	1135	9.4	557	--	7.0	SEP					
20...	1215	32	506	--	6.0	22...	0750	14	494	--	7.0
JUL											
01...	1055	13	613	--	12.0						
06016000 BEAVERHEAD RIVER AT BARRETTS, MT (LAT 45 06 59 LONG 112 44 59)											
NOV , 1986						MAY , 1987					
19...	1520	369	515	5.5	4.5	12...	1420	838	562	27.0	13.0
FEB , 1987						JUN					
17...	1635	286	584	2.0	5.0	24...	1710	479	547	19.5	18.0
MAR						AUG					
31...	1400	--	544	11.0	7.5	05...	1345	688	550	31.5	18.0
APR						SEP					
02...	0930	266	534	.5	5.5	16...	1455	284	559	24.0	15.0
445322112204801 WEST FORK BLACKTAIL DEER CREEK AT MOUTH, NEAR DELL, MT (LAT 44 53 22 LONG 112 20 48)											
APR , 1987						AUG , 1987					
15...	0830	24	671	--	3.0	25...	1320	15	703	--	12.0
MAY						SEP					
06...	0755	15	698	--	8.0	21...	1320	10	72	--	11.0
19...	1525	20	600	--	9.0						
JUN											
30...	1430	14	662	--	19.0						

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
445354112182701 EAST FORK BLACKTAIL DEER CREEK AT MOUTH, NEAR DELL, MT (LAT 54 53 22 LONG 112 18 27)					
APR , 1987					
15...	0910	16	377	--	3.0
MAY					
06...	0840	50	319	--	5.0
19...	1440	68	295	--	8.0
JUN					
30...	1320	33	356	--	13.0
AUG , 1987					
25...	1405	33	365	--	9.0
SEP					
21...	1235	19	382	--	9.0
06017500 BLACKTAIL DEER CREEK NEAR DILLON, MT (LAT 45 02 45 LONG 112 32 55)					
APR , 1987					
15...	0745	51	497	--	5.0
MAY					
06...	0720	64	485	--	9.0
19...	1345	92	469	--	11.0
JUN					
30...	1210	59	478	--	15.0
AUG , 1987					
20...	1310	59	469	27.0	20.0
25...	1240	78	492	--	11.0
SEP					
21...	1145	48	484	--	9.0
06018500 BEAVERHEAD RIVER NEAR TWIN BRIDGES, MT (LAT 45 23 01 LONG 112 27 07)					
OCT , 1986					
01...	1635	512	644	11.0	10.5
NOV					
19...	1310	528	615	3.5	3.0
JAN , 1987					
07...	1455	436	625	-2.0	.5
FEB					
18...	1515	428	631	3.5	4.0
APR					
01...	1545	403	617	5.5	9.5
MAY , 1987					
12...	1655	45	815	22.0	18.0
JUN					
25...	1650	125	860	22.0	18.0
AUG					
05...	1810	80	766	28.0	20.5
SEP					
16...	1740	195	713	23.0	15.5
06019500 RUBY RIVER ABOVE RESERVOIR, NEAR ALDER, MT (LAT 45 10 31 LONG 112 08 52)					
OCT , 1986					
02...	0915	135	693	7.0	6.5
NOV					
19...	0930	130	678	4.0	3.5
JAN , 1987					
07...	1105	95	659	-9.5	.5
FEB					
18...	1035	107	651	2.0	3.0
APR , 1987					
01...	0945	110	651	4.0	6.0
JUN					
25...	1050	111	636	21.5	14.5
SEP					
17...	1055	106	696	18.0	9.0
06020600 RUBY RIVER BELOW RESERVOIR, NEAR ALDER, MT (LAT 45 14 32 LONG 112 06 36)					
OCT , 1986					
02...	1225	90	649	11.0	9.5
NOV					
19...	1050	66	653	2.5	3.0
JAN , 1987					
07...	1220	55	678	-6.5	2.5
FEB					
18...	1230	33	681	1.0	3.5
APR					
01...	1140	35	685	5.0	5.5
MAY , 1987					
13...	1000	669	628	17.0	8.5
JUN					
25...	1230	341	564	20.5	15.0
AUG					
06...	1050	205	585	20.0	16.5
SEP					
17...	1245	274	627	20.0	15.5
452839112052601 MILL CREEK AT FOREST SERVICE BOUNDARY, NEAR SHERDIAN, MT (LAT 45 28 39 LONG 112 05 26)					
MAY , 1987					
07...	1320	70	85	--	5.0
19...	1155	73	70	--	6.0
JUN					
26...	0955	30	98	--	7.0
AUG , 1987					
25...	1045	27	100	--	8.0
SEP					
21...	1000	9.6	149	--	5.0
454727112114801 MILL CREEK AT SHERDIAN, MT (LAT 45 47 27 LONG 112 11 48)					
APR , 1987					
10...	0925	2.5	317	--	1.0

SUPPLEMENTAL WATER-QUALITY DATA FOR GAGING STATIONS AND MISCELLANEOUS SITES--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
453052112090801 WISCONSIN CREEK NEAR FOREST SERVICE BOUNDARY, NEAR SHERIDAN, MT (LAT 45 30 52 LONG 112 09 08)											
APR , 1987						AUG , 1987					
10...	1010	4.9	173	--	.5	25...	0945	20	118	--	8.0
MAY						SEP					
07...	1420	36	92	--	7.0	21...	0905	7.2	168	--	5.5
19...	1045	46	89	--	5.0						
JUN											
26...	0950	24	119	--	7.0						
453608113231401 STEEL CREEK ABOVE FRANCIS CREEK, NEAR WISDOM, MT (LAT 45 36 08 LONG 113 23 14)											
APR , 1987						AUG , 1987					
14...	1405	4.6	77	--	3.0	19...	1430	2.1	52	18.0	15.0
MAY						SEP					
05...	1215	16	37	--	6.0	30...	0855	2.3	60	--	4.0
19...	1045	19	31	--	5.0						
JUN											
30...	0935	6.0	41	--	10.0						
453807113263301 STEEL CREEK NEAR WISDOM, MT (LAT 45 38 07 LONG 113 26 33)											
APR , 1987						AUG , 1987					
14...	1435	13	104	--	8.5	19...	1350	5.1	125	21.0	15.0
MAY						SEP					
05...	1145	32	155	--	9.0	30...	0835	3.8	151	--	5.0
19...	1020	36	125	--	7.5						
JUN											
30...	0905	8.7	155	--	13.0						
453933113280901 SWAMP CREEK NEAR MOUTH, NEAR WISDOM, MT (LAT 45 39 33 LONG 113 28 09)											
APR , 1987						AUG , 1987					
14...	1320	36	117	--	6.0	19...	1305	1.6	64	18.0	15.0
MAY						SEP					
05...	0955	16	135	--	8.0	29...	1340	12	133	--	11.0
19...	0740	63	152	--	8.0						
JUN											
30...	0640	4.2	212	--	12.0						
06024500 TRAIL CREEK NEAR WISDOM, MT (LAT 45 39 24 LONG 113 42 56)											
APR , 1987						AUG , 1987					
14...	1220	37	68	--	.0	19...	1210	14	59	--	--
MAY						SEP					
05...	1050	145	67	--	4.0	29...	1615	12	62	--	7.0
19...	0645	91	44	--	6.0						
JUN											
30...	1850	28	53	--	17.0						
454219113273001 NORTH FORK BIG HOLE RIVER NEAR MOUTH, NEAR WISDOM, MT (LAT 45 42 19 LONG 113 27 30)											
APR , 1987						AUG , 1987					
14...	1130	94	98	--	2.0	19...	1100	19	79	15.5	10.0
MAY						SEP					
05...	0905	356	46	--	6.0	29...	1305	27	79	--	9.0
19...	0810	220	52	--	7.0						
JUN											
30...	0655	46	73	--	14.0						
454706113244601 PINTLAR CREEK, NEAR MOUTH NEAR WISDOM, MT (LAT 45 47 06 LONG 113 24 46)											
APR , 1987						AUG , 1987					
14...	1025	16	87	--	.0	19...	0930	3.4	102	15.5	10.0
MAY						SEP					
05...	1830	95	41	--	6.0	29...	1020	1.3	144	--	7.0
19...	0845	80	52	--	6.0						
JUN											
30...	0745	12	74	--	17.0						

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
455213113134401 FISHTRAP CREEK AT MOUTH, NEAR WISE RIVER, MT (LAT 45 52 13 LONG 113 13 44)					
APR , 1987					
13...	1420	22	87	--	4.0
MAY					
04...	1515	68	67	--	9.0
18...	1650	21	85	--	11.0
JUN					
29...	1620	5.4	113	--	22.0
AUG , 1987					
19...	0825	1.1	130	13.0	5.0
SEP					
29...	0915	2.5	133	--	3.0
455244113115601 LA MARCHE CREEK AT MOUTH, NEAR WISE RIVER, MT (LAT 45 52 44 LONG 113 11 56)					
APR , 1987					
13...	1500	15	69	--	5.0
MAY					
04...	1435	93	35	--	8.0
18...	1535	99	29	--	6.0
JUN					
29...	1505	31	44	--	15.0
AUG , 1987					
18...	1640	13	51	21.5	15.0
SEP					
29...	0805	9.6	60	--	6.0
455400113063001 DEEP CREEK AT MOUTH, NEAR WISE RIVER, MT (LAT 45 54 00 LONG 113 06 30)					
APR , 1987					
13...	1350	66	113	--	.0
MAY					
04...	1340	125	83	--	9.0
18...	1440	104	75	--	9.0
JUN					
29...	1420	30	112	--	19.0
AUG , 1987					
18...	1545	21	124	21.5	15.0
SEP					
28...	1600	18	140	--	11.0
455217113050401 BEAR CREEK AT MOUTH, NEAR WISE RIVER, MT (LAT 45 52 17 LONG 113 05 04)					
APR , 1987					
13...	1310	.96	112	--	.0
MAY					
04...	1330	4.7	94	--	7.0
18...	1420	7.2	60	--	7.0
JUN					
29...	1350	2.3	124	--	13.0
AUG , 1987					
18...	1450	.36	114	21.5	15.0
SEP					
28...	1520	1.2	132	--	6.0
454854112532601 JERRY CREEK AT FOREST SERVICE BOUNDARY, NEAR WISE RIVER, MT (LAT 45 48 54 LONG 112 53 26)					
APR , 1987					
13...	1230	6.0	242	--	6.0
MAY					
04...	1220	41	134	--	4.0
18...	1255	31	122	--	5.0
JUN					
29...	1210	14	193	--	9.0
AUG , 1987					
18...	1345	7.4	205	15.5	10.0
SEP					
28...	1425	5.2	229	--	7.0
455236112423501 NORTH FORK DIVIDE CREEK AT FOREST SERVICE BOUNDRY, NEAR DIVIDE, MT (LAT 45 52 36 LONG 112 42 35)					
AUG , 1987					
20...	1520	.59	206	27.0	17.0
454505112444101 DIVIDE CREEK AT DIVIDE, MT (LAT 45 45 05 LONG 112 44 41)					
APR , 1987					
13...	1250	13	250	--	3.0
MAY					
04...	0850	17	174	--	7.0
18...	1215	2.2	199	--	8.5
JUN					
29...	1120	3.3	250	--	15.0
AUG , 1987					
18...	1235	1.4	182	15.5	10.0
SEP					
28...	1330	11	273	--	8.0

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
454133112454901 CANYON CREEK AT FOREST SERVICE BOUNDARY, NEAR DIVIDE, MT (LAT 45 41 33 LONG 112 45 49)					
APR , 1987					
13...	1100	2.5	265	--	1.0
MAY					
04...	1120	20	182	--	5.0
18...	1115	40	142	--	5.0
JUN					
29...	1040	11	248	--	8.5
AUG , 1987					
18...	1120	3.5	237	--	10.0
SEP					
28...	1235	1.6	274	--	6.0
06025300 MOOSE CREEK NEAR DIVIDE, MT (LAT 45 43 00 LONG 112 42 00)					
APR , 1987					
13...	1015	12	237	--	.0
MAY					
04...	1045	15	205	--	6.0
18...	1045	29	206	--	8.0
JUN					
29...	1000	5.2	369	--	12.0
AUG , 1987					
18...	0850	8.2	306	--	--
SEP					
28...	1205	5.1	367	--	8.0
453740112405801 CAMP CREEK AT MOUTH AT MELROSE, MT (LAT 45 37 40 LONG 112 40 58)					
APR , 1987					
13...	0935	6.2	300	--	1.0
MAY					
04...	1015	5.9	323	--	6.5
18...	1015	26	242	--	8.0
JUN					
29...	0925	19	370	--	11.0
AUG , 1987					
18...	0925	6.2	352	--	5.0
SEP					
28...	0955	22	345	--	8.0
453831112475501 TRAPPER CREEK AT FOREST SERVICE BOUNDARY, NEAR MELROSE, MT (LAT 45 38 31 LONG 112 47 55)					
APR , 1987					
13...	0845	3.5	393	--	.0
MAY					
04...	0945	12	215	--	4.0
18...	0855	25	151	--	4.0
JUN					
29...	0840	12	243	--	8.0
AUG , 1987					
18...	1025	8.1	219	15.5	7.0
SEP					
28...	0900	6.5	252	--	5.0
453704112193501 HELLS CANYON CREEK AT MOUTH, NEAR TWIN BRIDGES, MT (LAT 45 37 04 LONG 112 19 35)					
APR , 1987					
10...	1215	4.1	180	--	3.0
MAY					
07...	1515	7.7	108	--	12.0
19...	0925	13	113	--	8.0
JUN					
26...	1045	5.9	138	--	12.0
AUG , 1987					
25...	0830	10	128	--	10.0
SEP					
21...	0805	2.3	181	--	7.0
06033000 BOULDER RIVER NEAR BOULDER, MT (LAT 46 12 40 LONG 112 05 27)					
NOV , 1986					
20...	1035	43	189	8.0	2.0
JAN , 1987					
08...	1355	30	200	-4.5	.5
FEB					
19...	1340	29	197	-3.0	3.0
MAR					
30...	1105	46	193	5.0	3.0
MAY , 1987					
11...	0920	155	108	11.5	10.5
JUN					
26...	1230	54	148	18.0	16.5
AUG					
07...	1035	39	163	16.0	11.5
SEP					
14...	1435	17	209	20.5	14.5
453834111511201 SOUTH WILLOW CREEK BELOW CAMP CREEK, NEAR PONY, MT (LAT 45 38 34 LONG 111 51 12)					
APR , 1987					
07...	1055	19	119	--	3.0
29...	0905	57	71	--	3.5
MAY					
19...	1500	83	87	--	7.0
JUN					
22...	0935	98	68	--	7.0
AUG , 1987					
17...	0920	45	90	--	5.0
SEP					
24...	0940	24	122	--	--

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 to SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
453930111532701 NORTH WILLOW CREEK BELOW PONY CREEK, AT PONY, MT (LAT 45 39 30 LONG 111 53 27)											
APR , 1987						AUG , 1987					
07...	0950	13	83	--	2.0	17...	0835	25	85	--	6.0
29...	0815	32	91	--	4.0	SEP					
MAY						24...	0850	22	75	--	--
19...	1420	32	55	--	7.0						
JUN											
22...	0835	43	60	--	7.0						
06035000 WILLOW CREEK NEAR HARRISON, MT (LAT 45 43 23 LONG 111 44 25)											
OCT , 1986						MAY , 1987					
06...	1000	45	200	14.0	6.0	21...	1110	59	205	5.0	4.0
NOV						JUN					
03...	0930	42	190	5.0	3.0	29...	0900	27	231	15.0	14.0
APR , 1987						AUG					
01...	1800	33	212	5.0	7.0	17...	1020	43	223	15.0	10.0
06036650 JEFFERSON RIVER NEAR THREE FORKS, MT (LAT 45 53 52 LONG 111 35 45)											
OCT , 1986						APR , 1987					
09...	1600	1980	465	20.0	9.5	06...	1030	2150	372	13.0	7.5
DEC						AUG					
02...	1500	1720	468	4.0	2.0	19...	1545	616	500	18.0	20.0
JAN , 1987											
09...	1200	1140	536	-5.0	.0						
06037500 MADISON RIVER NEAR WEST YELLOWSTONE, MT (LAT 44 39 25 LONG 111 04 03)											
OCT , 1986											
07...	1200	519	411	13.0	13.0						
44246111123001 SOUTH FORK MADISON RIVER BELOW DENNY CREEK, NEAR WEST YELLOWSTONE, MT (LAT 44 42 46 LONG 111 12 30)											
APR , 1987						AUG , 1987					
16...	1315	136	121	--	6.0	18...	1905	127	105	--	15.0
30...	1750	259	94	--	9.0	SEP					
MAY						23...	1455	113	104	--	11.0
21...	0815	90	99	--	6.0						
JUN											
24...	1545	152	108	--	14.0						
444648111064501 DUCK CREEK ABOVE COUGAR CREEK, NEAR WEST YELLOWSTONE, MT (LAT 44 46 48 LONG 111 06 45)											
APR , 1987						AUG , 1987					
08...	1600	35	111	--	5.0	18...	1425	26	122	--	16.0
MAY						SEP					
01...	0740	71	87	--	7.0	24...	0755	26	137	--	10.0
21...	1015	60	87	--	--						
JUN											
25...	0720	41	112	--	14.0						
444613111064501 COUGAR CREEK NEAR MOUTH, NEAR WEST YELLOWSTONE, MT (LAT 44 46 13 LONG 111 06 45)											
APR , 1987						AUG , 1987					
09...	0755	9.7	110	--	.0	18...	1500	9.1	103	--	14.0
MAY						SEP					
01...	0710	99	48	--	5.0	24...	0730	7.5	113	--	10.0
21...	0945	51	60	--	--						
JUN											
25...	0700	19	99	--	9.0						

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)	DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
444747111090701 GRAYLING CREEK NEAR MOUTH, NEAR WEST YELLOWSTONE, MT (LAT 44 47 47 LONG 111 09 07)											
APR , 1987						AUG , 1987					
09...	0825	9.3	140	--	2.0	19...	1755	30	136	--	13.0
MAY						SEP					
01...	0815	255	83	--	2.0	24...	0820	23	145	--	6.0
20...	1715	182	98	--	--						
JUN											
25...	0805	54	127	--	8.0						
444815111115301 RED CANYON CREEK NEAR MOUTH, NEAR WEST YELLOWSTONE, MT (LAT 44 48 15 LONG 111 11 53)											
MAY , 1987						AUG , 1987					
01...	0850	11	345	--	2.5	19...	1720	.42	1350	--	11.0
20...	1640	4.2	606	--	--	SEP					
JUN						24...	0850	.46	1500	--	5.0
25...	0830	.97	1090	--	3.0						
444802111170201 WATKINS CREEK AT MOUTH, NEAR WEST YELLOWSTONE, MT (LAT 44 48 02 LONG 111 17 02)											
APR , 1987						AUG , 1987					
30...	1450	25	178	--	4.0	18...	1630	2.9	222	--	13.0
MAY						SEP					
21...	0835	15	220	--	--	23...	1325	2.2	232	--	9.0
JUN											
24...	1340	5.7	230	--	10.0						
445053111484801 TRAPPER CREEK AT MOUTH, NEAR WEST YELLOWSTONE, MT (LAT 44 50 53 LONG 111 48 48)											
JUN , 1987						SEP , 1987					
24...	1305	4.4	90	--	8.0	23...	1400	2.3	91	--	7.0
AUG											
18...	1700	2.6	89	--	10.0						
06038500 MADISON RIVER BELOW HEBGEN LAKE, NEAR GRAYLING, MT (LAT 44 52 00 LONG 111 20 15)											
OCT , 1986						AUG , 1987					
07...	1045	1840	244	5.0	10.0	18...	1530	1050	277	12.0	18.0
NOV											
17...	1500	1130	253	1.0	5.0						
06038550 CABIN CREEK NEAR WEST YELLOWSTONE, MT (LAT 44 52 19 LONG 111 20 29)											
APR , 1987						AUG , 1987					
09...	0930	2.1	694	--	.0	19...	1655	9.7	586	--	13.0
MAY						SEP					
01...	0945	184	175	--	2.0	24...	0940	5.7	686	--	5.0
20...	1540	83	254	--	--						
JUN											
25...	1015	22	502	--	5.0						
445145111210001 BEAVER CREEK NEAR MOUTH NEAR WEST YELLOWSTONE, MT (LAT 44 51 45 LONG 111 21 00)											
APR , 1987						AUG , 1987					
09...	1010	22	176	--	.0	19...	1630	52	135	--	14.0
MAY						SEP					
01...	1025	165	107	--	2.5	24...	0950	36	145	--	5.0
20...	1500	152	113	--	--						
JUN											
25...	1055	75	130	--	8.0						

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 to SEPTEMBER 1987

DATE	TIME	STREAM FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06038800 MADISON RIVER AT KIRBY RANCH NEAR CAMERON, MT (LAT 44 53 22 LONG 111 34 46)					
APR , 1987					
15...	1100	668	321	15.0	5.5
MAY					
18...	1515	756	240	12.5	9.0
JUN , 1987					
29...	1555	801	264	18.0	20.0
AUG					
06...	1100	1200	265	35.0	16.5
06039200 WEST FORK MADISON RIVER NEAR CAMERON, MT (LAT 44 53 15 LONG 111 34 55)					
APR , 1987					
09...	1040	49	240	--	--
445452111360301 SQUAW CREEK AT MOUTH NEAR CAMERON, MT (LAT 44 54 52 LONG 111 36 03)					
APR , 1987					
09...	1120	8.9	147	--	1.0
MAY					
01...	1110	21	103	--	5.5
20...	1235	43	77	--	--
JUN					
25...	1315	8.0	116	--	11.0
AUG , 1987					
19...	1345	14	122	--	10.0
SEP					
24...	1320	10	142	--	9.0
445340111402401 STANDARD CREEK BELOW WOLVERINE CREEK NEAR CAMERON, MT (LAT 44 53 40 LONG 111 40 24)					
MAY , 1987					
07...	1010	35	216	--	3.0
20...	1330	53	224	--	--
JUN					
25...	1220	17	255	--	9.0
AUG , 1987					
19...	1430	13	259	--	11.0
SEP					
24...	1125	7.8	259	--	7.0
450334111394801 RUBY CREEK AT MOUTH NEAR CAMERON, MT (LAT 45 03 34 LONG 111 39 48)					
APR , 1987					
09...	1300	4.8	337	--	4.5
MAY					
01...	1410	17	263	--	9.5
20...	0930	3.6	326	--	--
JUN					
25...	--	12	290	--	15.0
AUG , 1987					
20...	0820	8.0	335	--	10.0
SEP					
24...	1500	3.8	330	--	11.0
450610111335301 INDIAN CREEK AT FOREST SERVICE BOUNDARY, NEAR CAMERON, MT (LAT 45 06 10 LONG 111 33 53)					
APR , 1987					
09...	1220	11	292	--	2.0
MAY					
01...	1345	147	193	--	4.0
20...	1115	134	176	--	--
JUN					
25...	1405	80	219	--	10.0
AUG , 1987					
20...	1055	61	245	--	9.0
SEP					
24...	1410	43	256	--	8.0
452149111421901 ODELL CREEK NEAR MOUTH NEAR ENNIS, MT (LAT 45 21 49 LONG 111 42 19)					
APR , 1987					
09...	1400	99	358	--	5.0
MAY					
01...	1500	99	349	--	13.0
20...	0715	107	369	--	7.0
JUN					
25...	1730	55	339	--	19.0
AUG , 1987					
20...	1300	107	356	--	15.0
SEP					
24...	1710	120	344	--	14.0

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06040300 JACK CREEK NEAR ENNIS, MT (LAT 45 21 23 LONG 111 34 51)					
JUN , 1987					
25...	1625	41	188	--	15.0
AUG					
20...	1155	28	205	--	11.0
SEP , 1987					
24...	1600	23	209	--	11.0
452059111434201 MOORE SPRING CREEK NEAR ENNIS, MT (LAT 45 20 59 LONG 111 43 42)					
APR , 1987					
09...	1430	.97	528	--	7.0
29...	1030	2.5	412	--	11.0
MAY					
20...	0730	.94	598	--	9.0
JUN					
26...	--	2.6	450	--	12.0
AUG , 1987					
20...	1330	.85	544	--	14.0
SEP					
25...	0730	.33	515	--	9.0
453146111505901 NORTH MEADOW CREEK AT FOREST SERVICE BOUNDARY, NEAR McALLISTER, MT (LAT 45 31 46 LONG 111 50 59)					
APR , 1987					
09...	1515	4.0	322	--	7.0
29...	1140	34	70	--	5.0
MAY					
19...	1750	59	80	--	9.0
JUN					
22...	1100	55	70	--	8.0
AUG , 1987					
17...	1050	25	83	--	6.0
SEP					
25...	0835	13	97	--	6.0
06041300 HOT SPRINGS CREEK NEAR NORRIS, MT (LAT 45 35 07 LONG 111 35 38)					
APR , 1987					
07...	1230	10	355	--	9.0
29...	1235	4.6	151	--	12.0
MAY					
19...	1700	14	448	--	16.0
JUN					
22...	1205	20	349	--	14.0
AUG , 1987					
17...	1215	13	353	--	13.0
SEP					
24...	1100	9.7	397	--	10.0
06041700 CHERRY CREEK NEAR NORRIS, MT (LAT 45 37 20 LONG 111 32 50)					
APR , 1987					
07...	1315	34	219	--	9.0
29...	1320	81	111	--	12.0
MAY					
19...	1635	68	152	--	12.0
JUN					
22...	1245	139	187	--	13.0
AUG , 1987					
17...	1255	42	194	--	12.0
SEP					
24...	1140	23	253	21.5	15.0
06043000 TAYLOR CREEK NEAR GRAYLING, MT (LAT 45 04 15 LONG 111 12 15)					
APR , 1987					
09...	1720	29	410	--	.0
30...	1500	217	187	--	8.0
MAY					
21...	1115	196	205	--	--
JUN					
23...	1826	86	248	--	13.0
AUG , 1987					
18...	1335	44	290	--	12.0
SEP					
25...	1230	32	337	21.5	10.0

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)	DATE	TIME	FLOW, INSTAN-TANEOUS (CFS) (00061)	CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
451335111144301 PORCUPINE CREEK AT MOUTH NEAR GALLATIN GATEWAY, MT (LAT 45 13 35 LONG 111 14 43)											
APR , 1987						AUG , 1987					
08...	1450	5.0	231	--	.0	18...	1245	7.5	179	--	8.0
30...	1345	38	120	--	6.0	SEP					
MAY						25...	1150	5.3	198	21.5	10.0
21...	1200	31	123	--	--						
JUN											
23...	1740	31	150	--	12.0						
451559111191301 MIDDLE FORK OF WEST FORK GALLATIN R AT MOUTH NR GALLATIN GATEWAY, MT (LAT 45 15 59 LONG 111 19 13)											
APR , 1987						AUG , 1987					
08...	1345	9.5	183	--	.0	18...	1215	7.8	175	--	8.0
30...	1250	61	95	--	7.0	SEP					
MAY						25...	1110	5.5	189	15.5	10.0
21...	1355	33	115	--	--						
JUN											
23...	1705	42	141	--	12.5						
451557111170801 SOUTH FORK OF WEST FORK GALLATIN R NR MOUTH NR GALLATIN GATEWAY, MT (LAT 45 15 57 LONG 111 17 08)											
APR , 1987						AUG , 1987					
08...	1300	15	229	--	.0	18...	1150	24	242	--	6.0
30...	1210	193	136	--	3.0	SEP					
MAY						25...	1020	10	235	10.0	10.0
21...	--	129	157	--	--						
JUN											
23...	1425	39	207	--	10.0						
451558111151401 WEST FORK GALLATIN RIVER AT MOUTH NEAR GALLATIN GATEWAY, MT (LAT 45 15 58 LONG 111 15 14)											
APR , 1987						AUG , 1987					
08...	1200	33	235	--	.0	18...	1105	40	239	--	7.0
30...	1125	319	126	--	3.5	SEP					
MAY						25...	0935	25	269	13.0	10.0
21...	1240	199	151	--	--						
JUN											
23...	1540	91	194	--	13.0						
06043200 SQUAW CREEK NEAR GALLATIN GATEWAY, MT (LAT 45 26 00 LONG 111 13 00)											
APR , 1987						AUG , 1987					
08...	1020	21	168	--	2.0	18...	0920	22	169	--	5.0
30...	0950	63	113	--	4.0	SEP					
MAY						25...	0800	19	178	10.0	10.0
21...	1530	39	128	--	--						
JUN											
23...	1410	37	139	--	11.0						
452655111141101 HELLROARING CREEK AT MOUTH NEAR GALLATIN GATEWAY (LAT 45 26 55 LONG 111 14 11)											
APR , 1987						AUG , 1987					
08...	1100	14	100	--	1.0	18...	1000	39	83	--	4.0
30...	1025	87	45	--	3.0	SEP					
MAY						25...	0840	27	77	7.0	8.0
21...	1455	69	46	--	--						
JUN											
23...	1450	74	54	--	9.0						

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
452700111223201 SOUTH F SPANISH C AT FOREST SERVICE BOUNDRY NR GALLATIN GATEWAY,MT (LAT 45 27 00 LONG 111 22 32)					
APR , 1987					
30...	0835	112	37	--	2.0
MAY					
21...	1700	76	40	--	--
JUN					
23...	0815	62	45	--	6.0
AUG , 1987					
18...	0830	23	58	--	5.0
SEP					
24...	1520	14	66	27.0	8.0
452938111161701 SPANISH CREEK AT MOUTH NEAR GALLATIN GATEWAY, MT (LAT 45 29 38 LONG 111 16 17)					
APR , 1987					
08...	0825	27	118	--	1.0
30...	0730	222	51	--	3.0
MAY					
21...	1610	162	635	--	--
JUN					
23...	0720	121	67	--	7.0
AUG , 1987					
18...	0745	51	97	--	6.0
SEP					
24...	1610	34	116	29.5	8.0
06043500 GALLATIN RIVER NEAR GALLATIN GATEWAY, MT (LAT 45 29 51 LONG 111 25 12)					
OCT , 1986					
08...	1630	542	266	19.0	8.5
NOV					
18...	1500	381	263	1.0	2.0
JAN , 1987					
07...	1215	327	313	-5.0	.5
FEB					
18...	1400	329	322	-3.0	1.5
APR					
03...	1300	334	310	15.0	7.0
APR , 1987					
07...	1045	406	282	15.0	8.0
MAY					
20...	1500	1360	136	5.0	6.0
JUL					
01...	1200	684	206	25.0	15.0
AUG					
19...	1100	475	248	21.0	14.0
06047500 BOZEMAN CREEK NEAR BOZEMAN, MT (LAT 45 34 40 LONG 111 01 15)					
APR , 1987					
07...	1720	11	217	--	4.0
29...	1715	41	165	--	7.0
MAY					
22...	0820	19	182	--	--
JUN					
22...	1420	17	187	--	11.0
AUG , 1987					
17...	1720	2.1	207	--	10.0
SEP					
24...	1720	6.1	219	24.0	10.0
06048500 BRIDGER CREEK NEAR BOZEMAN, MT (LAT 45 42 20 LONG 110 57 40)					
MAR , 1987					
05...	0830	15	342	8.5	.0
APR					
06...	1645	28	313	--	--
23...	1400	50	280	15.0	10.0
MAY					
20...	0830	45	321	3.0	7.0
JUL , 1987					
01...	1550	18	366	19.5	27.0
AUG					
19...	0845	8.2	369	15.0	13.0
06050000 HYALITE CREEK AT HYALITE RANGER STATION NEAR BOZEMAN, MT (LAT 45 33 42 LONG 111 04 12)					
OCT , 1986					
09...	0945	26	154	5.0	6.0
NOV					
19...	0900	24	156	2.0	.5
JAN , 1987					
07...	1000	16	163	-10.0	.5
FEB					
19...	0915	11	186	--	--
APR , 1987					
06...	1500	15	195	--	--
MAY					
20...	1100	109	99	2.5	4.0
JUL					
01...	1345	99	89	27.0	14.0
AUG					
24...	1245	57	109	16.5	12.5
454345111091501 HYALITE CREEK AT COUNTY ROAD NR BELGRADE, MT (LAT 45 43 15N LONG 111 09 15W)					
APR , 1987					
07...	1615	5.3	238	--	13.0
29...	1455	5.6	191	--	19.0
MAY					
22...	0955	44	233	--	--
JUN					
22...	1450	16	286	--	18.0
AUG					
17...	1500	19	308	--	16.0
SEP					
24...	1415	19	330	27.0	15.0

WATER QUALITY DATA, WATR YEAR OCTOBER 1986 to SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
455227111135401 EAST GALLATIN RIVER NEAR MOUTH NEAR MANHATTAN, MT (LAT 45 52 27 LONG 111 13 54)											
APR , 1987						AUG , 1987					
07...	1435	342	396	--	11.0	17...	1415	319	402	--	13.0
29...	1605	459	342	--	15.0	SEP					
MAY						24...	1320	271	411	24.0	10.0
22...	1100	363	378	--	--						
JUN											
22...	1405	354	388	--	15.0						
06052500 GALLATIN RIVER AT LOGAN, MT (LAT 45 53 07 LONG 111 26 15)											
OCT , 1986						APR , 1987					
09...	1300	948	383	9.5	9.0	15...	1530	632	380	15.5	10.0
NOV						MAY					
19...	1115	886	387	3.0	3.0	21...	0845	762	355	4.0	7.0
JAN , 1987						JUL					
07...	1512	777	394	-5.0	.5	01...	0935	411	395	23.0	18.0
FEB						AUG					
19...	1145	689	398	--	--	19...	1330	609	374	27.0	16.5
APR											
06...	1230	661	394	--	--						
460622111235001 SIXTEENMILE CREEK AT MOUTH NEAR TOSTON, MT (LAT 46 06 22 LONG 111 23 50)											
APR , 1987						AUG , 1987					
02...	1430	61	448	--	9.0	20...	1620	31	485	--	21.0
28...	1220	95	407	--	14.0	SEP					
MAY						18...	1205	28	527	--	10.0
19...	1420	93	442	--	12.0						
JUN											
19...	1245	47	431	--	17.0						
06055500 CROW CREEK NEAR RADERSBURG, MT (LAT 46 16 05 LONG 111 41 30)											
APR , 1987						AUG , 1987					
10...	1425	14	126	--	6.0	20...	1515	20	106	--	17.0
28...	1400	95	66	--	9.0	SEP					
MAY						18...	1300	15	107	--	10.0
18...	1435	69	76	--	9.0						
JUN											
19...	1345	39	82	--	12.0						
461517111181701 DRY CREEK AT FOREST SERVICE BOUNDRY NEAR TOSTON, MT (LAT 46 15 17 LONG 111 18 17)											
APR , 1987						AUG , 1987					
02...	1300	5.1	265	--	5.0	21...	0955	1.6	341	--	9.0
28...	1100	8.2	286	--	8.0	SEP					
MAY						18...	1045	2.3	338	--	7.0
18...	1225	7.7	285	--	9.0						
JUN											
19...	1145	5.9	291	--	10.0						
06056600 DEEP CREEK BELOW NORTH FORK DEEP CREEK, NEAR TOWNSEND, MT (LAT 46 20 00 LONG 111 17 00)											
APR , 1987						AUG , 1987					
02...	1215	9.3	346	--	4.0	21...	0920	11	368	--	9.0
28...	1005	36	248	--	6.0	SEP					
MAY						18...	1015	10	381	--	7.0
18...	1125	37	255	--	8.0						
JUN											
19...	1105	22	315	--	10.0						

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
462834111242201 DUCK CREEK ABOVE MILL GULCH NEAR TOWNSEND, MT (LAT 46 28 34 LONG 111 24 22)											
APR , 1987						AUG , 1987					
02...	1100	3.5	309	--	.0	21...	0835	4.2	326	--	10.0
28...	0910	13	192	--	5.0	SEP					
MAY						18...	0925	4.2	339	--	6.0
18...	1020	13	224	--	7.5						
JUN											
19...	1015	8.8	246	--	9.0						
463439111265901 CONFEDERATE GULCH BELOW JIMMYS GULCH NEAR WINSTON, MT (LAT 46 34 39 LONG 111 26 59)											
APR , 1987						AUG , 1987					
02...	0950	4.9	388	--	3.0	21...	0800	8.5	363	--	10.0
28...	0820	18	314	--	5.0	SEP					
MAY						18...	0850	7.4	400	--	8.0
18...	0940	32	253	--	6.0						
JUN											
19...	0935	13	232	--	9.0						
463804111334101 - AVALANCHE GULCH AT FOREST SERVICE BOUNDRY NEAR WINSTON, MT (LAT 46 38 04 LONG 111 33 41)											
APR , 1987						AUG , 1987					
02...	0900	2.1	500	--	.0	21...	0715	1.3	581	--	8.0
28...	0730	3.6	566	--	4.5	SEP					
MAY						18...	0755	1.1	579	--	5.0
18...	0840	2.8	568	--	6.0						
JUN											
19...	0815	1.9	558	--	7.0						
06061500 PRICKLY PEAR CREEK NEAR CLANCY, MT (LAT 46 31 09 LONG 111 56 45)											
OCT , 1986						APR , 1987					
03...	1515	34	268	10.0	8.0	28...	1110	64	179	16.0	8.5
NOV						MAY					
13...	1745	27	287	-10.0	.5	15...	1145	33	234	26.5	14.0
DEC						29...	1440	129	137	19.0	14.0
23...	1425	24	290	4.5	.5	JUN					
JAN , 1987						12...	1010	50	191	21.5	12.5
30...	1305	21	307	2.0	.5	JUL					
MAR						15...	1120	36	244	25.0	15.0
04...	1145	27	287	17.0	4.0	AUG					
APR						28...	1055	31	242	18.0	11.5
06...	1200	48	232	12.0	5.5						
06062500 TENMILE CREEK NEAR RIMINI, MT (LAT 46 31 27 LONG 112 15 22)											
OCT , 1986						APR , 1987					
07...	1530	5.0	123	22.5	10.0	28...	1245	59	48	18.5	6.5
NOV						MAY					
17...	1300	2.3	128	--	1.0	14...	1440	21	71	22.0	15.0
DEC						28...	1040	125	52	10.0	6.5
24...	1310	2.2	124	1.0	.0	JUN					
FEB , 1987						12...	--	--	58	--	--
02...	1330	2.6	120	.5	.0	JUL					
MAR						16...	1042	7.7	78	19.0	12.5
04...	1335	1.5	135	12.0	4.0	AUG					
APR						27...	1340	3.6	100	19.5	14.5
06...	1600	12	115	--	8.0						

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06066500 MISSOURI RIVER BELOW HOLTER DAM, NEAR WOLF CREEK, MT (LAT 46 59 41 LONG 112 00 37)											
OCT , 1986						MAY , 1987					
02...	1140	3920	338	4.5	12.0	18...	0920	2060	382	12.0	13.0
NOV						JUL					
17...	1150	5860	366	-12.0	--	09...	1600	3500	383	19.0	17.0
JAN , 1987						AUG					
07...	1350	5130	351	-2.0	1.0	14...	1340	3600	386	17.5	17.5
APR						SEP					
07...	0910	3820	393	9.0	5.0	21...	0830	3580	393	8.5	16.0
06076690 SMITH RIVER NEAR FORT LOGAN, MT (LAT 46 47 45 LONG 111 10 41)											
OCT , 1986						MAY , 1987					
28...	1120	141	485	9.5	5.5	19...	1840	114	531	10.0	11.0
DEC						JUN					
05...	1045	109	526	-4.0	.0	23...	1030	74	507	13.0	13.0
JAN , 1987						AUG					
16...	1300	63	525	-10.0	.0	06...	1110	64	444	22.0	18.0
MAR						SEP					
02...	1030	99	483	7.0	1.0	23...	1100	64	473	16.0	11.5
APR											
09...	0930	112	492	2.0	2.5						
06078200 MISSOURI RIVER NEAR ULM, MT (LAT 47 26 06 LONG 111 23 07)											
OCT , 1986						MAY , 1987					
09...	1330	4480	349	20.0	12.0	19...	1240	--	374	12.0	14.0
DEC						JUN					
01...	1220	--	348	6.0	2.5	11...	1140	3650	288	22.0	18.0
JAN , 1987						25...	1400	3510	385	21.0	19.0
13...	1030	--	356	3.0	.5	AUG					
MAR						20...	1545	3700	378	32.0	20.0
03...	1315	4050	370	10.0	3.0						
APR											
07...	1330	--	393	17.5	10.0						
06088300 MUDDY CREEK NEAR VAUGHN, MT (LAT 47 37 30 LONG 111 38 05)											
OCT , 1986						MAY , 1987					
02...	1315	82	1040	2.5	5.0	01...	1215	26	1270	19.0	16.5
NOV						JUN					
17...	1300	50	1050	-4.0	.0	10...	1700	117	593	26.0	22.5
JAN , 1987						30...	1100	168	626	27.0	15.5
08...	1200	25	1200	1.5	.0	JUL					
FEB						23...	1720	226	705	25.0	20.5
11...	1730	53	1220	11.5	.0	AUG					
MAR						31...	1415	155	696	29.0	18.5
16...	1330	30	1720	2.0	3.0						
06088500 MUDDY CREEK AT VAUGHN, MT (LAT 47 33 42 LONG 111 32 33)											
OCT , 1986						APR , 1987					
02...	1615	150	915	5.0	6.5	27...	1530	26	1380	28.0	21.5
22...	1345	59	1060	15.5	7.0	MAY					
NOV						13...	1515	183	553	25.0	17.0
17...	0945	52	1110	-7.0	.0	JUN					
JAN , 1987						11...	1115	111	673	23.5	18.5
08...	1415	23	1280	2.5	.0	30...	1300	208	611	35.0	19.0
FEB						JUL					
12...	1215	38	1250	12.0	.0	24...	1220	294	717	23.0	18.0
MAR						AUG					
16...	1515	34	1820	3.0	3.5	31...	1615	250	712	29.0	19.5

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06090300 MISSOURI RIVER NEAR GREAT FALLS, MT (LAT 47 34 55 LONG 111 03 35)											
OCT , 1986						MAY , 1987					
03...	1230	6320	428	11.0	11.0	19...	0800	3600	427	12.0	15.0
29...	1510	--	402	11.0	9.5	28...	1700	2810	448	23.0	15.5
DEC						JUN					
01...	1400	7340	390	11.0	3.5	24...	1750	4720	457	23.0	18.0
JAN , 1987						AUG					
13...	0810	--	384	-1.0	1.0	14...	0830	4970	451	14.5	18.0
FEB						SEP					
23...	0920	4830	422	-2.0	2.5	21...	1430	4520	458	26.0	16.5
APR											
07...	1500	--	497	18.0	11.0						
06090800 MISSOURI RIVER AT FORT BENTON, MT (LAT 47 49 03 LONG 110 39 59)											
OCT , 1986						MAY , 1987					
29...	1030	6320	408	7.5	9.0	18...	1340	3780	416	22.0	18.0
DEC						JUN					
02...	1030	6930	396	1.5	2.5	24...	0625	3970	446	9.0	17.0
JAN , 1987						AUG					
12...	1150	9340	409	15.0	2.0	13...	1050	4130	473	20.0	20.0
FEB						SEP					
24...	1345	--	421	-7.0	1.5	22...	0830	4650	459	10.0	15.0
APR											
08...	1030	5540	508	15.0	10.0						
06091700 TWO MEDICINE RIVER BELOW SOUTH FORK NEAR BROWNING, MT (LAT 48 25 36 LONG 112 59 20)											
DEC , 1986						MAY , 1987					
01...	1055	173	244	1.0	.0	21...	1130	538	130	2.0	5.5
JAN , 1987						JUN					
05...	1330	81	225	.0	.0	08...	1515	596	120	17.0	11.5
FEB						JUL					
09...	1400	73	240	11.0	.0	21...	1340	449	136	17.0	15.5
MAR						AUG					
23...	1445	159	247	12.5	2.0	06...	0945	177	189	18.0	14.5
APR						SEP					
09...	0930	533	162	3.5	.5	03...	1015	125	181	14.5	12.0
28...	1530	1200	129	28.0	11.5						
06091800 TWO MEDICINE CANAL NEAR BROWNING, MT (LAT 48 28 41 LONG 112 48 47)											
JUN , 1987						AUG , 1987					
18...	0730	139	138	16.0	14.0	26...	1015	38	247	16.0	10.0
JUL											
28...	1105	93	161	27.0	20.0						
06092600 FOUR HORNS CANAL NEAR BROWNING, MT (LAT 48 20 50 LONG 112 50 17)											
APR , 1987						AUG , 1987					
28...	1030	3.7	325	26.0	5.5	26...	0930	62	531	15.0	7.0
JUN						SEP					
18...	0920	112	441	22.0	10.0	24...	1110	70	587	27.0	12.0
JUL											
28...	0935	115	480	25.0	12.0						

WATER QUALITY DATA, WATER YEAR OCTOBER TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06093200 BADGER CREEK BELOW FOUR HORNS CANAL NEAR BROWNING, MT (LAT 48 22 12 LONG 112 48 07)					
NOV , 1986					
21...	1145	190	538	4.5	2.0
DEC					
01...	0900	151	549	.5	.0
JAN , 1987					
05...	1100	106	584	.0	.0
FEB					
09...	1115	90	600	10.5	1.5
MAR					
23...	1310	113	543	7.5	4.0
APR , 1987					
28...	1215	563	337	27.5	7.0
JUN					
08...	1130	244	404	16.0	10.0
JUL					
21...	1010	133	469	21.0	12.5
AUG					
06...	1215	101	508	23.0	14.0
06093600 TWO MEDICINE RIVER NEAR CUT BANK, MT (LAT 48 28 20 LONG 112 21 25)					
OCT , 1986					
22...	1330	279	454	2.5	7.0
NOV					
20...	0915	291	456	8.0	.0
DEC					
16...	1110	282	448	3.0	.0
FEB , 1987					
18...	1021	212	464	2.0	.0
MAR					
23...	1015	330	442	.0	1.0
APR , 1987					
15...	1045	615	312	19.0	8.0
JUN					
17...	1810	505	276	23.0	17.0
JUL					
28...	1350	812	275	33.0	22.0
SEP					
24...	0855	144	432	7.0	12.0
06097200 BLACKTAIL CREEK NEAR DUPUYER, MT (LAT 48 21 11 LONG 112 33 22)					
OCT , 1986					
22...	1450	9.5	710	20.5	6.5
NOV					
20...	1135	9.3	700	9.5	.0
DEC					
16...	1255	11	694	3.0	.0
FEB , 1987					
18...	1150	7.6	724	8.0	.0
MAR					
23...	1125	26	645	4.0	.5
APR , 1987					
15...	1320	21	620	24.5	10.0
JUN					
18...	1025	14	566	14.0	15.0
JUL					
28...	0800	12	589	15.0	17.0
SEP					
24...	0855	8.7	608	23.0	12.0
06098900 BIG ROCK COULEE NEAR SANTA RITA, MT (LAT 48 42 35 LONG 112 22 34)					
OCT , 1986					
22...	1130	.64	3990	11.5	5.0
NOV					
19...	1510	.63	4150	.0	.0
DEC					
16...	0846	.87	3880	-10.0	.0
FEB , 1987					
18...	0800	.76	3740	3.0	.0
MAR					
23...	0800	2.6	3690	-4.0	.0
APR , 1987					
15...	0735	2.3	2920	9.0	8.5
JUN					
17...	1550	.22	3400	24.0	23.0
JUL					
28...	1520	.24	4140	35.0	25.0
SEP					
23...	1730	.26	2530	30.0	15.0
06099100 SPRING CREEK NEAR CUT BANK, MT (LAT 48 34 53 LONG 112 22 35)					
OCT , 1986					
22...	1230	4.1	1930	15.0	5.0
NOV					
19...	1650	2.6	1980	.0	.0
DEC					
16...	1000	2.4	2060	1.0	.0
FEB , 1987					
18...	0900	2.6	2130	1.0	.0
MAR					
23...	0900	5.1	3440	-1.0	.0
APR , 1987					
15...	0830	3.3	2220	8.0	6.0
JUN					
17...	1700	5.3	619	23.0	20.0
JUL					
28...	1435	6.8	615	32.0	24.0
SEP					
24...	0755	3.0	1280	3.0	10.0

WATER QUALITY DATA, WATER YEAR OCTOBER TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06099500 MARIAS RIVER NEAR SHELBY, MT (LAT 48 25 38 LONG 111 53 20)					
OCT , 1986					
01...	1230	506	534	6.5	9.0
22...	0930	458	548	2.0	5.0
NOV					
19...	1030	371	610	-9.0	.0
DEC					
30...	1000	418	561	3.0	.0
JAN , 1987					
06...	1300	308	589	-1.0	.0
FEB					
10...	1315	417	563	12.5	.0
MAR					
18...	1000	661	600	8.5	4.0
APR					
08...	1130	1180	626	14.5	7.5
APR , 1987					
29...	1300	2120	277	25.5	15.5
MAY					
05...	1100	2000	259	18.0	11.5
JUN					
09...	1345	1130	324	25.0	18.5
JUL					
08...	1000	250	564	22.0	19.5
23...	1130	2470	345	22.0	15.5
AUG					
05	1515	510	406	23.0	21.5
SEP					
02...	0930	403	508	20.0	19.0
06101500 MARIAS RIVER NEAR CHESTER, MT (LAT 48 18 23 LONG 111 04 47)					
OCT , 1986					
02...	1800	1230	766	8.0	11.0
NOV					
19...	1430	657	565	-1.5	6.0
JAN , 1987					
07...	1500	608	587	1.0	2.5
FEB					
11...	1330	--	635	11.0	4.0
MAR					
17...	1300	--	635	12.5	7.0
APR , 1987					
30...	1345	508	605	27.5	13.5
JUN					
10...	1145	--	593	23.5	12.0
JUL					
22...	1020	492	560	15.0	11.5
SEP					
01...	1300	499	581	30.0	15.5
06108000 TETON RIVER NEAR DUTTON, MT (LAT 47 55 49 LONG 111 33 07)					
OCT , 1986					
02...	0945	104	1400	2.0	7.0
22...	1100	80	1390	8.0	6.0
NOV					
18...	1415	77	1020	6.5	.0
JAN , 1987					
08...	0900	41	905	-7.0	.0
FEB					
11...	1545	87	745	16.5	.0
MAR					
17...	0930	114	1090	4.0	2.5
MAY , 1987					
01...	0900	56	1300	14.5	16.5
JUN					
10...	1345	47	1340	25.5	23.0
JUL					
23...	1320	99	954	23.0	21.0
AUG					
05...	1215	86	955	22.5	20.5
SEP					
01...	0945	--	1140	19.5	18.0
06109500 MISSOURI RIVER AT VIRGELLE, MT (LAT 48 00 18 LONG 110 15 25)					
OCT , 1986					
29...	1300	--	457	13.0	9.5
DEC					
02...	1210	--	443	2.5	2.5
JAN , 1987					
12...	1640	--	445	14.0	1.5
FEB					
24...	0910	5760	471	-7.0	.5
APR					
08...	0840	--	571	9.0	10.0
MAY , 1987					
18...	1820	--	450	23.0	17.5
JUN					
24...	1300	3970	469	21.0	19.5
AUG					
13...	1330	4640	476	23.5	20.0
SEP					
22...	1345	5470	491	28.0	17.5

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06120500 - MUSSELSHELL RIVER AT HARLOWTON, MT (LAT 46 25 48 LONG 109 50 24)											
OCT , 1986						APR , 1987					
09...	1555	118	875	--	--	02...	1540	60	880	13.5	5.0
NOV						MAY					
18...	1553	76	920	-4.0	.5	29...	1008	326	855	--	--
DEC						JUL					
30...	1108	65	805	1.5	.0	16...	1420	59	950	20.0	21.0
FEB , 1987						AUG					
18...	1142	58	715	-1.0	.5	20...	1332	33	970	26.5	20.0
06122800 - MUSSELSHELL RIVER NEAR SHAWMUT, MT (LAT 46 21 02 LONG 109 33 18)											
OCT , 1986						JUN , 1987					
09...	1358	10	1110	15.5	13.5	10...	1007	54	1160	21.5	17.0
FEB , 1987						JUL					
18...	0953	.67	960	-3.5	.5	16...	1140	30	1100	22.0	18.5
APR						AUG					
02...	1118	.97	1340	12.5	6.5	20...	1059	16	1190	22.5	15.5
MAY											
18...	1322	34	890	14.5	13.0						
06126470 HALFBREED CREEK NEAR KLEIN, MT (LAT 46 23 15 LONG 108 32 15)											
JUL , 1987						AUG , 1987					
01...	1430	.26	1650	31.0	23.0	20...	1145	.35	1670	25.5	17.0
06126500 MUSSELSHELL RIVER NEAR ROUNDUP, MT (LAT 46 25 41 LONG 108 34 19)											
OCT , 1986						APR , 1987					
15...	1500	65	2100	20.0	12.0	03...	1335	53	2700	18.0	12.0
NOV						MAY					
17...	1330	48	2900	4.5	.0	20...	1100	211	1380	4.0	11.0
DEC						JUL					
31...	1030	36	2800	5.0	.0	01...	1615	211	1200	25.5	25.0
FEB , 1987						AUG					
19...	1545	67	2340	7.0	2.0	18...	1025	154	1430	14.0	16.0
06127500 MUSSELSHELL RIVER AT MUSSELSHELL, MT (LAT 46 31 21 LONG 108 06 29)											
OCT , 1986						JUL , 1987					
15...	1335	80	1900	21.0	11.5	02...	1045	109	1400	24.5	23.0
APR , 1987						AUG					
03...	1125	61	2800	16.0	10.0	10...	1500	66	1900	35.5	27.5
MAY											
22...	0945	219	1460	14.0	10.5						
06131000 BIG DRY CREEK NEAR VAN NORMAN, MT (LAT 47 20 58 LONG 106 21 26)											
JAN , 1987						JUN , 1987					
13...	0920	5.6	1800	2.0	.0	02...	0900	79	2000	16.0	15.5
MAY						AUG					
13...	1320	2.0	2050	24.0	16.5	20...	0855	3.9	1650	21.0	19.0
28...	1040	1740	1750	15.0	16.5						

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06132200 SOUTH FORK MILK RIVER NEAR BABB, MT (LAT 48 45 14 LONG 113 10 00)					
OCT , 1986					
27...	1220	15	427	10.0	7.0
MAR , 1987					
02...	1310	9.8	430	8.0	.0
APR					
06...	1515	77	310	11.0	5.5
07...	1110	65	329	6.5	3.0
15...	1145	35	382	8.0	6.0
MAY , 1987					
12...	1150	25	410	12.5	13.0
JUN					
10...	1305	31	393	18.0	15.0
JUL					
01...	1150	10	408	25.0	17.5
AUG					
19...	1020	25	409	16.0	11.5
06133500 NORTH FORK MILK RIVER ABOVE ST MARY CANAL NEAR BROWNING, MT (LAT 48 58 15 LONG 113 03 19)					
OCT , 1986					
28...	1750	8.4	463	5.0	5.5
MAR , 1987					
03...	0935	11	450	8.0	.0
APR					
06...	1800	63	271	10.0	7.5
07...	0925	47	330	8.5	3.0
APR , 1987					
30...	1405	14	457	24.0	17.0
JUN					
30...	1305	7.8	400	22.0	20.0
SEP					
01...	1550	8.2	404	25.0	20.0
06135000 MILK RIVER AT EASTERN CROSSING OF INTERNATIONAL BOUNDARY (LAT 48 59 03 LONG 110 28 10)					
OCT , 1986					
29...	1330	50	842	8.0	6.0
MAR , 1987					
04...	1400	60	737	18.0	.0
11...	1045	196	524	-3.0	.0
18...	1330	611	291	7.0	3.5
APR					
08...	1400	1080	356	11.5	9.5
20...	1245	243	391	14.5	8.5
MAY , 1987					
01...	1025	254	401	19.0	19.0
18...	1238	556	257	21.0	14.0
JUN					
16...	1340	550	234	24.0	22.0
29...	1400	540	234	26.0	22.0
AUG					
17...	1410	585	232	19.0	12.0
06137540 DUCK CREEK NEAR BOX ELDER, MT (LAT 48 14 37 LONG 109 50 42)					
OCT , 1986					
21...	0935	2.4	694	14.5	6.5
NOV					
18...	1205	2.0	701	1.5	.0
DEC					
15...	1050	1.8	678	5.0	.0
FEB , 1987					
17...	1030	1.3	744	10.0	1.0
MAR					
18...	1335	1.1	769	12.0	5.5
APR , 1987					
14...	1042	2.4	651	16.5	7.0
JUN					
16...	1020	1.1	699	25.0	19.0
JUL					
16...	1010	.34	722	21.0	18.0
AUG					
18...	1030	.15	782	22.0	12.0
SEP					
22...	1205	.06	872	29.0	15.0
06137570 BOXELDER CREEK NEAR ROCKY BOY, MT (LAT 48 18 07 LONG 109 50 37)					
OCT , 1986					
01...	1800	34	517	8.0	9.0
21...	1150	29	521	14.5	6.0
NOV					
18...	1110	17	523	-5.0	.0
DEC					
15...	0845	15	528	3.5	.0
FEB , 1987					
17...	0935	9.0	528	6.0	.0
MAR					
18...	1210	11	498	6.0	4.5
APR					
14...	0955	22	484	14.5	6.0
MAY , 1987					
20...	0815	16	513	4.0	9.0
JUN					
16...	0920	8.1	404	23.0	19.0
JUL					
16...	1200	4.6	550	24.0	19.0
AUG					
18...	0945	4.3	552	21.0	12.0
SEP					
22...	1105	2.6	625	24.0	12.0

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06137575 BOXELDER CREEK AT BOX ELDER, MT (LAT 48 18 38 LONG 110 01 09)											
OCT , 1986						APR , 1987					
21...	1330	13	567	19.0	7.5	14...	0822	26	510	8.0	8.0
NOV						JUN					
18...	0830	12	564	-12.5	.0	16...	0820	4.4	608	24.0	19.0
DEC						JUL					
15...	0825	18	569	-2.0	.0	16...	1515	1.3	726	28.0	22.0
FEB , 1987						AUG					
17...	0825	11	574	-1.0	.5	18...	0800	.02	724	17.0	13.0
MAR											
18...	0920	19	557	5.5	5.0						
06137580 SAGE CREEK NEAR WHITLASH, MT (LAT 48 53 29 LONG 111 01 49)											
NOV , 1986						APR , 1987					
20...	1000	2.4	445	10.5	1.5	30...	0900	2.7	412	18.5	10.0
JAN , 1987						JUN					
07...	1015	.76	524	-1.0	.0	10...	0800	1.6	401	17.0	12.0
FEB						JUL					
11...	1015	1.1	525	9.0	.5	22...	1450	2.7	363	17.0	14.0
MAR						SEP					
17...	1445	1.3	509	12.5	5.0	01...	1730	6.3	340	27.0	17.0
06139900 BEAVER CREEK AT RESERVATION BOUNDARY NEAR ROCKY BOY, MT (LAT 48 13 18 LONG 109 39 03)											
OCT , 1986						APR , 1987					
21...	1230	9.0	280	17.0	6.0	14...	1418	14	217	18.5	7.5
NOV						JUN					
18...	1706	7.5	278	5.0	1.0	16...	1315	4.1	293	32.0	17.0
DEC						JUL					
15...	1340	6.0	282	3.0	1.0	16...	1330	2.9	299	23.0	15.0
FEB , 1987						AUG					
17...	1323	4.7	286	6.5	2.0	18...	1340	2.8	306	17.0	11.0
MAR						SEP					
19...	1245	7.2	282	1.0	3.0	22...	1505	1.9	324	35.0	13.0
06140500 MILK RIVER AT HAVRE, MT (LAT 48 33 23 LONG 109 40 14)											
OCT , 1986						MAR , 1987					
21...	1700	161	514	18.0	9.5	19...	0915	58	852	1.0	4.0
NOV						APR					
19...	1140	119	523	-10.0	.0	14...	1605	136	580	19.5	10.0
DEC						JUN					
15...	1520	98	637	4.0	.0	16...	1600	895	323	31.0	21.0
JAN , 1987						JUL					
13...	1220	93	690	6.0	.0	15...	2000	1230	370	29.0	23.5
FEB						SEP					
17...	1451	35	876	7.0	1.0	23...	1250	70	406	31.0	12.0
06142400 CLEAR CREEK NEAR CHINOOK, MT (LAT 48 34 44 LONG 109 23 26)											
MAR , 1987						JUL , 1987					
26...	1250	24	947	5.0	4.0	24...	1010	4.7	920	24.0	16.0
APR						AUG					
09...	1605	58	606	10.5	8.5	20...	0800	.41	973	14.0	14.0
24...	0815	24	988	6.0	7.0	SEP					
MAY						30...	1125	.36	1040	16.0	11.0
22...	1130	14	824	16.0	10.5						
JUN											
22...	1330	18	788	21.0	19.0						

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06151000 LYONS CREEK AT INTERNATIONAL BOUNDARY (LAT 49 00 17 LONG 109 13 48)											
FEB , 1987						APR , 1987					
26...	0850	3.2	194	-12.0	.0	22...	1225	.07	645	14.0	12.0
MAR											
08...	1025	14	122	-4.0	.0						
25...	0930	1.6	241	4.0	.0						
06151500 BATTLE CREEK NEAR CHINOOK, MT (LAT 48 39 00 LONG 109 14 00)											
MAR , 1987						JUL , 1987					
26...	1025	66	509	5.0	3.5	24...	0825	1.8	1530	18.0	19.0
APR						AUG					
08...	1900	113	443	9.5	11.0	19...	1605	6.3	1300	24.0	20.0
23...	1440	41	817	7.0	10.0	SEP					
MAY						30...	0955	1.6	1390	7.0	10.0
21...	1715	17	901	10.0	12.0						
JUN											
22...	1535	23	1050	23.5	20.5						
06154100 MILK RIVER NEAR HARLEM, MT (LAT 48 29 22 LONG 108 45 28)											
OCT , 1986						JUL , 1987					
03...	0830	2300	487	4.5	8.0	29...	1010	431	525	29.0	25.0
JUN , 1987						SEP					
03...	1400	467	702	28.0	17.0	23...	0900	97	670	25.0	15.0
17...	1110	334	466	25.0	23.0						
06154150 WHITE BEAR CREEK BELOW FIFTEENMILE CREEK, NEAR DODSON, MT (LAT 48 22 23 LONG 108 32 19)											
OCT , 1986						APR , 1987					
19...	1055	4.0	2150	10.0	6.5	06...	1600	11	1080	17.0	13.5
NOV						JUN					
17...	1145	1.5	3800	9.0	.0	16...	1010	.20	4000	25.0	23.0
DEC						JUL					
16...	1010	.40	4820	-10.0	.0	14...	1000	.20	4000	27.0	23.0
JAN , 1987											
13...	0930	.50	4280	.0	.0						
06154390 PEOPLES CREEK NEAR CLEVELAND, MT (LAT 48 15 49 LONG 108 52 12)											
DEC , 1986						MAR , 1987					
16...	1300	19	940	2.0	.0	17...	0855	233	1000	1.0	2.0
JAN , 1987						APR					
12...	1330	5.0	948	15.5	.0	06...	1405	50	940	15.0	12.0
FEB						MAY					
17...	1230	15	770	3.0	.0	13...	1325	4.8	942	18.0	17.0
06154400 PEOPLES CREEK NEAR HAYS, MT (LAT 48 13 25 LONG 108 42 48)											
NOV , 1986						APR , 1987					
17...	1350	23	1030	-8.0	.0	01...	1250	44	1020	7.0	5.5
DEC						MAY					
16...	1155	14	930	.0	.0	13...	1440	4.2	329	19.0	18.5
JAN , 1987						JUN					
12...	1440	4.3	982	15.0	.0	16...	1150	2.2	1020	25.0	23.0
FEB						JUL					
17...	1330	20	882	3.0	.5	14...	1145	.03	3850	27.0	22.0
MAR						SEP					
17...	1025	23	1000	2.0	2.5	14...	1415	.06	3820	26.0	20.0

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
475815108400701 LITTLE PEOPLES CREEK ABOVE ST PAUL MISSION NEAR HAYS, MT (LAT 47 58 15 LONG 108 40 07)					
NOV , 1986					
04...	1535	3.9	462	14.0	8.0
475927108413801 LITTLE PEOPLES CREEK AT HAYS, MT (LAT 47 59 27 LONG 108 41 38)					
NOV , 1986					
04...	1410	3.5	630	12.5	8.5
480327108423801 LITTLE PEOPLES CREEK BELOW LODGE POLE ROAD NEAR HAYS, MT (LAT 48 03 27 LONG 108 42 38)					
NOV , 1986					
04...	1515	8.9	590	12.0	6.0
480644108452901 LITTLE PEOPLES CREEK ABOVE DUCK CREEK NEAR HAYS, MT (LAT 48 06 44 LONG 108 45 29)					
NOV , 1986					
04...	1615	9.2	610	8.5	6.0
480525108422501 LITTLE PEOPLES CREEK AT HIGHWAY 376 NEAR HAYS, MT (LAT 48 05 25 LONG 108 42 25)					
NOV , 1986					
04...	1740	8.7	735	9.0	5.5
480225108315601 LODGE POLE CREEK BELOW LODGE POLE, MT (LAT 48 02 25 LONG 108 31 56)					
NOV , 1986					
05...	130	6.0	544	6.5	6.0
06154490 WILLOW COULEE NEAR DODSON, MT (LAT 48 19 31 LONG 108 24 52)					
APR , 1987					
01...	1455	--	166	--	--
06154510 KUHR COULEE TRIBUTARY NEAR DODSON, MT (LAT 48 20 21 LONG 108 23 17)					
APR , 1987					
01...	1530	.36	188	7.0	5.5
06155030 MILK RIVER NEAR DODSON, MT (LAT 48 24 11 LONG 108 17 35)					
AUG , 1987					
13...	1005	7.4	700	16.0	20.0
SEP , 1987					
16...	0855	6.2	687	10.0	15.0

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06164630 BIG WARM CREEK NEAR ZORTMAN, MT (LAT 48 04 37 LONG 108 16 54)											
OCT , 1986						MAR , 1987					
14...	1445	9.8	1700	17.0	18.0	16...	1230	6.5	1550	3.0	13.0
NOV						APR					
19...	1320	8.6	1800	-5.0	10.5	29...	1720	6.2	1720	18.0	19.5
JAN , 1987											
14...	0905	7.9	1620	-5.0	8.0						
06170050 ROCK CREEK BELOW MCEACHERN CREEK NEAR INTERNATIONAL BOUNDARY (LAT 48 52 53 LONG 106 53 54)											
NOV , 1986						APR , 1987					
24...	1130	2.2	1500	3.0	.0	07...	1010	100	275	10.0	8.0
JAN , 1987						13...	1220	27	498	10.0	7.0
13...	1115	.79	1820	1.0	.0	JUN					
FEB						11...	1140	1.5	1300	21.0	19.5
20...	1115	85	220	1.0	.5	AUG					
MAR						18...	1100	2.8	765	18.0	15.0
25...	1015	51	325	1.0	.5						
06172000 MILK RIVER NEAR VANDALIA, MT (LAT 48 22 21 LONG 106 58 25)											
MAR , 1987											
19...	1310	2170	635	2.0	2.0						
06172310 MILK RIVER AT TAMPICO, MT (LAT 48 18 29 LONG 106 49 19)											
JUN , 1987						AUG , 1987					
18...	1245	18	1150	26.0	25.0	14...	1045	107	950	20.0	21.5
06176500 WOLF CREEK NEAR WOLF POINT, MT (LAT 48 06 00 LONG 105 41 00)											
SEP , 1987											
01...	1300	.89	1050	24.0	16.5						
06177000 MISSOURI RIVER NEAR WOLF POINT, MT (LAT 48 04 00 LONG 105 31 55)											
OCT , 1986						JUN , 1987					
14...	1100	16000	525	7.0	7.5	09...	1145	6160	575	18.5	15.5
MAR , 1987						SEP					
16...	1220	8110	608	1.0	2.0	01...	1200	5980	650	21.0	16.0
06177500 REDWATER RIVER AT CIRCLE, MT (LAT 47 24 56 LONG 105 34 50)											
OCT , 1986						MAY , 1987					
30...	1145	8.2	4350	10.0	6.5	28...	1140	36	5800	15.5	16.0
MAR , 1987						AUG					
19...	0940	12	4050	2.0	1.5	20...	1020	.33	5150	22.0	20.0
APR											
03...	1235	27	4250	9.5	3.5						
06183750 LAKE CREEK NEAR DAGMAR, MT (LAT 48 33 51 LONG 104 10 38)											
MAR , 1987						MAY , 1987					
26...	1000	2.4	950	3.0	.5	18...	1245	1.6	1800	10.0	11.0
APR											
08...	1305	31	635	10.5	8.5						
14...	1330	16	1110	18.0	8.5						

SUPPLEMENTAL WATER-QUALITY DATA FOR GAGING STATIONS AND MISCELLANEOUS SITES--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06183800 COTTONWOOD CREEK NEAR DAGMAR, MT (LAT 48 30 35 LONG 104 10 23)											
MAR , 1987						APR , 1987					
26...	1030	6.0	1250	3.0	.5	14...	1230	3.5	1500	17.5	9.0
APR											
08...	1400	12	615	17.5	12.5						
06183850 SAND CREEK NEAR DAGMAR, MT (LAT 48 30 19 LONG 104 16 41)											
MAR , 1987						APR , 1987					
26...	1115	6.1	1900	4.0	.5	14...	1130	8.4	2120	16.0	9.0
APR											
08...	1510	11	734	18.0	12.5						
06185500 MISSOURI RIVER NEAR CULBERTSON, MT (LAT 48 07 20 LONG 104 28 31)											
JUN , 1987						SEP , 1987					
23...	1050	7580	940	20.0	22.5	15...	1130	6610	1000	20.0	19.0
06191000 GARDNER RIVER NEAR MAMMOTH, YELLOWSTONE NATIONAL PARK (LAT 44 59 35 LONG 110 41 25)											
OCT , 1986						MAY , 1987					
22...	0930	137	621	-1.0	10.5	20...	1040	337	320	3.0	9.0
DEC						JUN					
04...	0830	98	736	-7.0	9.0	30...	1650	151	526	26.0	21.5
JAN , 1987						AUG					
14...	1650	110	705	-7.0	9.5	11...	1915	120	623	19.5	21.5
FEB						SEP					
25...	1610	100	746	-8.0	10.0	24...	1730	99	690	22.5	20.5
APR											
10...	0930	102	734	4.5	11.5						
06195600 SHIELDS RIVER NEAR LIVINGSTON, MT (LAT 45 44 01 LONG 110 28 22)											
OCT , 1986						MAY , 1987					
20...	1510	171	416	19.0	8.5	21...	1210	132	470	5.0	7.0
DEC						JUL					
04...	1720	95	461	.0	.0	01...	1020	108	518	20.0	17.5
JAN , 1987						AUG					
16...	0800	44	485	-16.0	.0	12...	1450	88	483	20.0	18.5
FEB						SEP					
25...	1040	67	462	-10.5	.0	23...	1545	81	469	30.0	16.5
APR											
09...	1430	154	361	8.0	6.0						
06200000 BOULDER RIVER AT BIG TIMBER, MT (LAT 45 50 03 LONG 109 56 17)											
OCT , 1986						MAY , 1987					
10...	0920	234	242	15.0	8.0	14...	1035	1490	71	24.0	8.5
NOV						JUN					
19...	0843	229	235	4.0	1.0	19...	0950	609	154	16.5	11.0
DEC						JUL					
30...	1334	152	235	3.0	1.5	15...	1535	428	180	25.0	19.0
FEB , 1987						30...	1442	342	200	28.0	21.0
18...	1412	111	150	4.0	2.5						
APR											
03...	0836	93	278	-2.0	6.5						

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06202510 STILLWATER RIVER ABOVE NYE CREEK NEAR NYE, MT (LAT 45 23 46 LONG 109 52 14)					
OCT , 1986					
16...	1125	116	205	15.0	10.0
DEC					
09...	1500	60	240	-5.0	1.5
JAN , 1987					
28...	1505	61	160	6.0	3.0
MAR					
25...	1515	33	80	8.0	6.5
MAY , 1987					
01...	1210	1040	60	17.5	7.0
JUN					
30...	1030	373	85	--	--
SEP					
01...	1520	233	120	26.5	19.5
06204050 WEST ROSEBUD CREEK NEAR ROSCOE, MT (LAT 45 14 35 LONG 109 43 50)					
OCT , 1986					
16...	1400	90	40	9.0	7.0
DEC					
09...	1220	76	50	-10.0	.5
JAN , 1987					
28...	1220	80	50	5.5	2.5
MAR , 1987					
25...	1230	25	45	4.0	3.5
JUN					
10...	1210	99	40	17.0	10.0
SEP					
01...	1205	89	48	21.0	12.0
06205000 STILLWATER RIVER NEAR ABSAROKEE, MT (LAT 45 33 04 LONG 109 23 12)					
NOV , 1986					
19...	1341	493	165	3.5	3.0
DEC					
31...	0946	243	135	-1.0	.0
FEB , 1987					
19...	1040	210	135	-.5	.5
APR					
03...	1150	213	225	15.0	6.5
MAY , 1987					
14...	1443	1630	67	29.5	13.5
28...	0835	2470	138	11.5	9.5
JUL					
15...	1145	1260	120	29.0	16.0
AUG					
21...	1245	516	155	26.5	16.5
06208500 CLARKS FORK YELLOWSTONE RIVER AT EDGAR, MT (LAT 45 27 57 LONG 108 50 35)					
MAY , 1987					
01...	1650	2530	175	23.0	14.0
07...	1615	1390	43	29.0	--
14...	1300	2350	170	19.5	14.0
16...	1855	2840	170	11.0	14.0
18...	1545	3900	150	21.0	12.0
JUN					
03...	1445	2040	280	17.0	14.0
JUL , 1987					
08...	0830	373	650	18.0	21.0
13...	1630	1660	380	28.0	19.0
17...	0940	967	480	14.5	16.5
AUG					
12...	0755	260	870	11.0	15.5
24...	1625	214	1080	20.5	20.0
06211000 RED LODGE CREEK ABOVE COONEY RESERVOIR, NEAR BOYD, MT (LAT 45 26 16 LONG 109 15 11)					
MAR , 1987					
19...	1115	54	440	9.0	7.0
APR					
23...	1100	81	360	9.0	11.0
MAY					
12...	1545	14	285	30.0	21.0
28...	1100	795	300	15.0	9.5
29...	1140	546	290	18.0	11.0
JUN , 1987					
01...	1535	355	310	14.0	11.5
JUL					
14...	1300	145	320	26.0	18.0
SEP					
02...	1320	77	300	28.0	20.5
06211500 WILLOW CREEK NEAR BOYD, MT (LAT 45 25 20 LONG 109 13 47)					
MAR , 1987					
19...	1315	29	520	9.0	8.0
APR					
29...	1055	24	380	18.0	16.5
MAY					
28...	1345	298	295	16.0	12.0
29...	1030	179	310	18.0	12.0
JUN , 1987					
02...	1100	102	265	11.5	10.0
JUL					
14...	1025	88	250	23.0	16.5
SEP					
02...	1440	52	245	25.0	20.0

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06212500 RED LODGE CREEK BELOW COONEY RESERVOIR NEAR BOYD, MT (LAT 45 26 59 LONG 109 11 06)											
NOV , 1986						JUN , 1987					
06...	1345	73	315	1.0	1.0	01...	1150	493	330	14.0	13.0
DEC						JUL					
16...	1020	82	475	-.5	.5	01...	1040	200	320	24.0	16.0
JAN , 1987						AUG					
29...	1525	15	380	4.0	5.0	11...	1515	134	310	19.0	--
MAR						SEP					
19...	1455	6.4	390	9.0	10.5	15...	1530	125	300	18.0	18.0
APR											
29...	1400	119	370	25.5	10.0						
06214000 ROCK CREEK AT ROCKVALE, MT (LAT 45 31 00 LONG 108 52 00)											
NOV , 1986						MAY , 1987					
05...	1530	217	270	15.0	7.0	13...	0935	18	335	18.0	15.0
DEC						28...	1825	1100	280	19.0	16.0
16...	1600	230	305	5.0	1.0	JUN					
JAN , 1987						03...	1100	728	270	17.0	12.0
27...	1610	121	290	7.5	1.5	JUL					
MAR						08...	1045	7.3	435	24.0	19.0
18...	1500	132	320	12.0	7.5	AUG					
APR						03...	1000	137	280	20.5	16.0
30...	1000	319	220	22.0	--	SEP					
MAY						03...	0900	230	265	17.0	16.0
07...	1355	1.0	430	28.5	22.0						
06216000 PRYOR CREEK AT PRYOR, MT (LAT 45 26 06 LONG 108 32 01)											
NOV , 1986						MAY , 1987					
05...	1105	26	500	14.0	7.0	28...	1035	96	425	17.0	11.0
DEC						JUN					
16...	1345	27	515	7.0	4.0	30...	1535	24	470	31.0	23.0
JAN , 1987						JUL					
27...	1135	26	510	9.5	5.5	30...	1045	44	410	24.0	19.5
MAR						SEP					
20...	0950	25	480	3.0	5.0	03...	1430	--	480	17.0	16.5
APR											
30...	1210	24	500	24.0	17.0						
06216900 PRYOR CREEK NEAR HUNTLEY, MT (LAT 45 49 19 LONG 108 17 23)											
OCT , 1986						APR , 1987					
17...	0913	41	955	10.5	6.5	10...	1251	54	1030	13.5	9.5
DEC						JUN					
05...	1257	37	985	-1.0	.5	04...	1307	69	945	20.5	13.5
JAN , 1987						JUL					
12...	1430	32	1100	16.0	.5	09...	1055	18	1220	--	20.5
FEB						30...	0842	28	1070	25.0	23.0
25...	1500	44	565	4.5	.5						
06287000 BIGHORN RIVER NEAR ST. XAVIER, MT (LAT 45 19 00 LONG 107 55 05)											
DEC , 1986						APR , 1987					
04...	1427	3840	780	5.5	6.5	09...	1317	3900	835	12.0	4.5
JAN , 1987						JUN					
08...	1452	3220	255	-4.0	4.5	03...	1239	2010	830	21.0	8.0
FEB						AUG					
27...	1200	2850	810	-1.0	3.5	05...	1105	2050	830	23.5	11.5

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06289000 LITTLE BIGHORN RIVER AT STATE LINE NEAR WYOLA, MT (LAT 45 00 25 LONG 107 36 52)											
OCT , 1986						APR , 1987					
14...	1510	75	330	--	--	08...	1407	66	330	19.0	8.0
DEC						MAY					
03...	1406	52	310	2.0	1.5	12...	1608	254	210	28.0	11.0
JAN , 1987						JUL					
08...	0950	48	725	-5.0	1.0	07...	1447	120	300	20.5	11.5
FEB						AUG					
27...	0847	--	255	--	--	07...	0954	90	295	18.0	10.5
06290000 PASS CREEK NEAR WYOLA, MT (LAT 45 03 00 LONG 107 21 00)											
OCT , 1986						MAY , 1987					
15...	0935	21	634	3.5	4.5	13...	0849	39	378	18.0	13.5
DEC						JUN					
04...	1025	8.4	690	-4.0	.5	03...	0921	44	545	11.0	11.5
JAN , 1987						JUL					
07...	1445	18	535	.0	.0	08...	0914	11	640	16.5	13.5
FEB						AUG					
26...	1548	21	510	-9.0	1.0	06...	1500	7.2	550	21.5	19.0
APR											
09...	0852	42	705	3.0	6.0						
06290500 LITTLE BIGHORN RIVER BELOW PASS CREEK, NEAR WYOLA, MT (LAT 45 10 38 LONG 107 23 36)											
OCT , 1986						MAY , 1987					
15...	1052	133	578	13.0	6.0	13...	1003	292	318	19.5	12.0
DEC						JUN					
03...	1215	98	525	--	--	02...	1212	327	455	11.0	8.5
JAN , 1987						JUL					
07...	1251	86	410	-1.0	1.0	07...	1301	123	502	23.0	19.5
FEB						AUG					
26...	1423	84	395	-6.0	1.5	06...	1334	98	500	21.0	19.5
APR											
08...	1242	130	675	15.5	10.5						
06291000 OWL CREEK NEAR LODGE GRASS, MT (LAT 45 15 58 LONG 107 18 00)											
OCT , 1986						APR , 1987					
14...	1033	4.7	1020	7.5	9.0	08...	1102	15	860	15.0	8.5
DEC						JUN					
03...	1004	6.5	980	.0	.5	02...	1002	10	855	14.0	12.0
JAN , 1987						JUL					
07...	1032	5.3	1040	-2.5	.0	07...	1144	3.0	1030	19.5	20.5
FEB						AUG					
26...	1104	6.8	675	-2.5	.0	06...	0845	1.8	1010	21.0	18.5
06291500 LODGE GRASS CREEK ABOVE WILLOW CREEK DIVERSION, NEAR WYOLA, MT (LAT 45 07 39 LONG 107 36 01)											
OCT , 1986						MAY , 1987					
14...	1215	20	540	10.0	7.5	12...	1330	116	285	29.5	12.5
DEC						JUN					
04...	1156	16	575	.5	1.0	03...	1022	129	380	17.5	7.5
JAN , 1987						JUL					
08...	1313	12	520	.0	.0	08...	1106	35	408	18.5	11.5
FEB						AUG					
26...	1244	17	595	-3.5	.5	06...	1055	27	420	22.0	13.5
APR											
09...	1025	26	610	4.5	3.5						

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (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-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
06294500 BIGHORN RIVER ABOVE TULLOCK CREEK NEAR BIGHORN, MT (LAT 46 07 32 LONG 107 28 02)											
OCT , 1986						MAY , 1987					
02...	1100	4530	930	10.0	11.0	27...	1045	2730	858	13.5	13.0
17...	1730	1050	759	18.0	14.5	JUL					
20...	1145	--	772	17.0	11.5	28...	1210	2560	860	30.0	24.0
DEC						AUG					
23...	1125	3660	790	6.0	3.0	18...	1030	--	872	25.0	16.0
MAR , 1987											
04...	1055	3080	852	9.0	4.5						
06295000 YELLOWSTONE RIVER AT FORSYTH, MT (LAT 46 15 53 LONG 106 41 43)											
OCT , 1986						MAY , 1987					
21...	1055	9520	640	18.0	10.5	18...	1440	13700	398	18.0	15.0
DEC						JUL					
18...	1025	7650	750	1.0	.0	20...	1200	11300	518	22.0	19.5
MAR , 1987						SEP					
26...	1025	5550	760	4.0	3.0	15...	1110	5880	680	20.0	18.5
06295113 ROSEBUD CREEK AT RESERVATION BOUNDARY NEAR KIRBY, MT (LAT 45 21 39 LONG 106 59 10)											
NOV , 1986						JUN , 1987					
17...	1215	4.3	1040	1.0	.0	22...	1000	3.3	920	15.0	17.0
JAN , 1987						AUG					
05...	1130	3.7	1040	2.0	.0	03...	1145	2.1	926	24.0	19.0
MAR						SEP					
27...	1000	8.5	940	.5	2.0	14...	1100	1.7	1000	24.0	13.5
MAY											
11...	1150	4.8	910	23.5	17.0						
06295250 ROSEBUD CREEK NEAR COLSTRIP, MT (LAT 45 46 03 LONG 106 34 10)											
OCT , 1986						APR , 1987					
27...	1210	11	1560	17.5	6.5	27...	1210	21	1440	21.0	14.5
DEC						JUN					
15...	1135	14	1750	4.0	.0	01...	1205	28	1200	15.0	15.5
JAN , 1987						JUL					
26...	1125	9.1	1620	2.0	.0	17...	0835	6.5	1180	16.5	20.5
MAR						AUG					
23...	1105	17	1580	1.0	2.0	17...	1220	4.3	1360	16.0	17.0
06296003 ROSEBUD CREEK AT MOUTH, NEAR ROSEBUD, MT (LAT 46 15 53 LONG 106 28 30)											
OCT , 1986						JUN , 1987					
31...	0810	11	2370	-1.0	4.0	01...	1420	26	1660	21.0	18.5
DEC						JUL					
15...	1330	12	2660	4.0	.0	13...	1240	2.6	2350	25.0	21.0
JAN , 1987						AUG					
26...	1330	8.9	2350	1.0	.0	21...	0810	2.5	1290	19.5	18.5
MAR						SEP					
23...	1310	17	1560	2.0	3.0	29...	0815	1.9	2430	4.5	9.5
APR											
27...	1430	20	1920	25.5	18.0						

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (US/CM) (00095)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)
451015106443801 TONGUE RIVER AT MOUTH OF POST CREEK, NEAR DECKER, MT (LAT 45 10 15 LONG 106 44 38)					
APR , 1987					
07...	1330	14	885	20.5	15.0
06309000 YELLOWSTONE RIVER AT MILES CITY, MT (LAT 46 25 16 LONG 105 51 51)					
OCT , 1986					
21...	1430	10200	660	18.0	12.0
DEC					
17...	1020	7060	810	1.0	.0
JAN , 1987					
28...	1120	6920	870	-1.0	.0
MAR , 1987					
25...	1300	5780	800	3.0	2.0
MAY					
19...	0840	14900	390	14.0	15.0
JUL					
21...	0900	12500	495	21.0	20.0
06326600 O'FALLON CREEK NEAR ISMAY, MT (LAT 46 25 17 LONG 104 45 40)					
OCT , 1986					
30...	0915	1.1	2240	5.0	5.0
DEC					
16...	0925	1.4	5450	3.0	.0
JAN , 1987					
27...	0945	.72	5100	.0	.0
MAR					
24...	0855	7.3	2380	2.0	1.0
APR					
28...	1345	2.9	2700	--	20.5
JUN , 1987					
02...	1345	2.5	3800	17.0	17.5
JUL					
14...	1100	.41	3500	23.0	20.5
AUG					
19...	1350	6.8	1120	26.5	22.5
SEP					
30...	0830	.09	2510	12.0	10.5

CHEMICAL QUALITY OF PRECIPITATION

PRICKLY PEAR CREEK BASIN

462905112035401 MC BEATH RESIDENCE NEAR CLANCY, MT (MT07)
(National trends network)

LOCATION.--Lat 46°29'05", long 112°03'54", in NE¼NW¼NE¼ sec.2, T.8 N., R.4 W., Jefferson County, at National Forest boundary fence at private residence on Lump Gulch Road, 5.1 mi west of Clancy and 10 mi south of Helena.

PERIOD OF RECORD.--Water years 1981-1982, 1984 to current year. Prior to October 1984, published as 462905112034001.

EQUIPMENT.--The sample collector is an Aerochem Metrics Model 301 precipitation collector. An automatic sensor detects occurrences of precipitation, activating a motor which removes a cover from the wetfall collection vessel. When precipitation ceases the cycle is reversed. The sampling vessel is polyethylene and has a collection diameter of 28.6 cm and a capacity of 13 liters. Precipitation is measured using a Belfort Universal rain gage, series 5-780 with a event recorder.*

REMARKS.--Because laboratory quality assurance may not have been completed, data contained in the tables are considered preliminary and are subject to updating.

RAINFALL, ACCUMULATED (INCHES), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.03	.00	.00	.09	.00	.00	.00	.00
2	.00	.00	.00	.02	.00	.00	.00	.00	.00	.22	.00	.00
3	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00
5	.00	.33	.21	.00	.00	.00	.00	.00	.01	.00	.00	.00
6	.00	.14	.03	.00	.00	.00	.00	.00	.03	.00	.00	.00
7	.00	.04	.00	.00	.00	.00	.00	.00	.08	.00	.00	.00
8	.00	.10	.07	.00	.00	.00	.01	.00	.38	.34	.00	.00
9	.00	.17	.00	.00	.00	.00	.00	.00	.02	.45	.00	.00
10	.18	.00	.00	.00	.00	.01	.00	.00	.00	.80	.03	.00
11	.00	.31	.00	.00	.00	.00	.03	.00	.00	.02	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.07	.00	.00	.00	.00
13	.00	.00	.00	.00	.01	.20	.00	.00	.00	.00	.17	.00
14	.00	.10	.00	.12	.00	.00	.00	.00	.00	.00	.08	.00
15	.00	.00	.00	.00	.00	.01	.00	.01	.01	.00	.02	.79
16	.00	.10	.00	.00	.00	.02	.00	.26	.00	.00	.00	.00
17	.00	.07	.00	.00	.00	.10	.00	.07	.26	.82	.00	.00
18	.00	.11	.00	.04	.00	.11	.36	.12	.65	.64	.00	.00
19	.00	.01	.00	.02	.00	1.04	.22	.57	.00	.04	.00	.00
20	.00	.00	.00	.00	.00	.09	.00	.08	.00	.00	.00	.00
21	.00	.08	.00	.00	.00	.05	.00	.41	.02	.05	.00	.00
22	.00	.00	.00	.00	.02	.13	.00	.03	.00	.15	.00	.00
23	.00	.01	.00	.00	.22	.00	.28	.05	.00	.11	.02	.00
24	.00	.01	.00	.00	.03	.00	.00	.00	.00	.00	.03	.00
25	.00	.00	.00	.00	.00	.00	.00	.13	.00	.00	.06	.03
26	.00	.01	.00	.00	.00	.06	.00	.10	.00	.00	.00	.00
27	.02	.00	.00	.02	.00	.29	.00	.46	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.04	.00	.04	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.04	.00	.00	.01	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.06	---	.04	.00	---
TOTAL	.20	1.59	.31	.22	.32	2.15	.94	2.55	1.46	3.74	.41	.82

WTR YR 1987 TOTAL 14.71

*The use of the brand name in this report is for indentification purposes only and does not imply endorsement by the U.S. Geological Survey.

PRICKLY PEAR CREEK BASIN

462905112035401 MC BEATH RESIDENCE NEAR CLANCY, MT (MT07)--Continued

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

WEEKLY COMPOSITE

DATE	PRECIP-ITATION INCHES (46529)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	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)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS NO3) (71851)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4) (71846)	PHOS-PHATE, DIS-SOLVED (MG/L AS PO4) (00653)
SEP 30 1986-OCT 07	0.01	--	--	--	--	--	--	--	--	--	--	--
OCT 07-14	0.18	7.3	4.72	0.051	0.008	0.141	0.007	0.48	0.04	0.43	<0.02	<0.01
OCT 14-21	0.0	--	--	--	--	--	--	--	--	--	--	--
OCT 21-28	0.02	--	--	--	--	--	--	--	--	--	--	--
OCT 28-NOV 04	0.0	--	--	--	--	--	--	--	--	--	--	--
NOV 04-11	0.78	5.8	4.86	0.034	0.006	0.044	0.006	0.20	0.05	0.47	0.04	<0.01
NOV 11-18	0.58	6.4	4.75	0.106	0.011	0.033	0.016	0.42	<0.03	0.53	0.03	<0.01
NOV 18-25	0.22	3.2	5.02	0.021	0.003	0.031	0.008	0.09	<0.03	0.12	0.04	<0.01
NOV 25-DEC 02	0.01	--	--	--	--	--	--	--	--	--	--	--
DEC 02-09	0.31	6.6	4.75	0.087	0.013	0.278	0.006	0.36	0.12	0.77	0.05	<0.01
DEC 09-16	0.0	--	--	--	--	--	--	--	--	--	--	--
DEC 16-23	0.0	--	--	--	--	--	--	--	--	--	--	--
DEC 23-30	0.0	--	--	--	--	--	--	--	--	--	--	--
DEC 30 1986-JAN 06 1987	0.02	--	--	--	--	--	--	--	--	--	--	--
JAN 06-13	0.0	--	--	--	--	--	--	--	--	--	--	--
JAN 13-20	0.18	5.4	5.15	0.264	0.034	0.158	0.028	0.58	0.10	0.49	0.06	<0.01
JAN 20-27	0.02	--	--	--	--	--	--	--	--	--	--	--
JAN 27-FEB 03	0.04	--	--	0.088	0.016	0.136	0.027	0.19	0.11	0.12	0.04	<0.01
FEB 03-10	0.0	--	--	--	--	--	--	--	--	--	--	--
FEB 10-17	0.01	--	--	--	--	--	--	--	--	--	--	--
FEB 17-24	0.26	4.4	5.45	0.444	0.051	0.055	0.037	0.55	0.13	0.69	0.15	<0.01
FEB 24-MAR 03	0.01	--	--	--	--	--	--	--	--	--	--	--
MAR 03-10	0.0	--	--	--	--	--	--	--	--	--	--	--
MAR 10-17	0.24	8.7	4.78	0.086	0.011	0.091	<0.003	0.67	0.08	0.70	0.25	<0.01
MAR 17-24	1.52	4.4	5.04	0.183	0.033	0.011	0.031	0.44	<0.03	0.34	0.05	0.02
MAR 24-31	0.39	6.7	4.77	0.078	0.016	0.021	0.011	0.57	0.06	0.40	0.12	<0.01
MAR 31-APR 07	0.0	--	--	--	--	--	--	--	--	--	--	--

PRICKLY PEAR CREEK BASIN

462905112035401 MC BEATH RESIDENCE NEAR CLANCY, MT (MT07)--Continued

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

WEEKLY COMPOSITE

DATE	PRECIP-ITATION INCHES (46529)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	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)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS NO3) (71851)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4) (71846)	PHOS-PHATE, DIS-SOLVED (MG/L AS PO4) (00653)
APR 07-14	0.04	12.8	4.48	0.508	0.076	0.600	0.063	0.60	0.22	0.45	0.03	<0.01
APR 14-21	0.58	7.9	5.93	0.629	0.068	0.358	0.035	0.69	0.24	0.58	0.07	<0.01
APR 21-28	0.28	8.1	5.01	0.312	0.034	0.089	0.068	1.17	0.09	0.78	0.28	<0.01
APR 28-MAY 05	0.13	14.1	4.93	0.630	0.074	0.110	0.102	2.28	0.16	1.76	0.55	<0.01
MAY 05-12	0.0	--	--	--	--	--	--	--	--	--	--	--
MAY 12-19	0.53	13.0	4.46	0.181	0.039	0.055	0.093	0.83	0.10	0.66	0.22	<0.01
MAY 19-26	1.29	9.1	4.59	0.121	0.025	0.045	0.102	0.77	0.08	0.51	0.14	<0.01
MAY 26-JUN 02	0.64	4.4	5.19	0.021	0.004	0.050	0.013	0.27	<0.03	0.34	<0.02	<0.01
JUN 02-09	0.50	14.7	4.46	0.210	0.025	0.082	0.112	1.19	0.11	0.81	0.22	<0.01
JUN 09-16	0.03	--	--	--	--	--	--	--	--	--	--	--
JUN 16-23	0.93	8.0	4.94	0.292	0.035	0.093	0.071	0.93	0.18	0.91	0.20	<0.02
JUN 23-30	0.0	--	--	--	--	--	--	--	--	--	--	--
JUN 30-JUL 07	0.27	11.5	4.38	0.146	0.025	0.058	0.036	0.67	0.09	0.82	0.09	<0.02
JUL 07-14	1.61	7.4	4.86	0.046	0.008	0.023	0.014	0.51	0.04	0.30	0.05	<0.02
JUL 14-21	1.50	6.3	5.03	0.100	0.016	0.044	0.008	0.30	0.07	0.34	0.05	<0.02
JUL 21-28	0.31	6.0	5.01	0.161	0.022	0.061	0.012	0.54	0.06	0.41	<0.02	<0.02
JUL 28-AUG 04	0.05	41.7	4.20	0.538	0.103	0.550	0.071	2.00	0.56	3.82	0.72	0.20
AUG 04-11	0.03	--	--	0.877	0.124	0.709	0.154	2.94	0.30	3.32	0.35	0.20
AUG 11-18	0.27	10.0	4.75	0.108	0.015	0.114	0.017	0.40	0.08	0.46	0.09	<0.02
AUG 18-25	0.10	21.3	4.42	0.295	0.037	0.124	0.034	1.08	0.20	1.68	0.18	<0.02
AUG 25-SEP 01	0.01	--	--	--	--	--	--	--	--	--	--	--
SEP 01-08	0.0	--	--	--	--	--	--	--	--	--	--	--
SEP 08-15	0.0	--	--	--	--	--	--	--	--	--	--	--
SEP 15-22	0.79	5.4	5.22	0.170	0.021	0.084	0.041	0.71	0.09	0.42	0.11	<0.02
SEP 22-29	0.03	--	--	1.090	0.129	0.234	0.144	2.05	0.28	2.66	0.51	0.05
SEP 29-OCT 06	0.0	--	--	--	--	--	--	--	--	--	--	--

MILK RIVER BASIN

482958109475101 NORTHERN MONTANA AGRICULTURAL RESEARCH CENTER NEAR HAVRE, MT (MT98)
(National trends network)

LOCATION.--Lat 48°29'58", long 109°47'51", in NE¼SW¼SW¼ sec.28, T.32 N., R.15 E., Hill County, at Northern Montana Agricultural Research Center Experiment Station, 3/4 mile south of U.S. Highway 87, 5.7 miles southwest of Havre.

PERIOD OF RECORD.--Water years 1986 to current year.

EQUIPMENT.--The sample collector is an Aerochem Metrics Model 301 precipitation collector. An automatic sensor detects occurrences of precipitation, activating a motor which removes a cover from the wetfall collection vessel. When precipitation ceases the cycle is reversed. The sampling vessel is polyethylene and has a collection diameter of 28.6 cm and a capacity of 13 liters. Precipitation is measured using a Belfort Universal rain gage, series 5-780 with a event recorder.*

REMARKS.--Because laboratory quality assurance may not have been completed, data contained in the tables are considered preliminary and are subject to updating.

RAINFALL, ACCUMULATED (INCHES), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00
2	.03	.00	.00	.00	.00	.00	.00	.35	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.25	.03	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03
7	.07	.15	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.02	.00	.00	.05	.00	.00	.00
9	.09	.00	.00	.00	.00	.00	.01	.00	.02	.00	.00	.00
10	.06	.00	.00	.00	.00	.09	.00	.00	.00	.01	.00	.00
11	.00	.10	.00	.00	.00	.01	.03	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.10	.00	.00	.00	.00	.00	.00
14	.00	.20	.00	.04	.00	.00	.00	.00	.00	.00	.37	.00
15	.00	.00	.00	.00	.00	.00	.00	.19	.00	.00	.04	.35
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.07	.15
17	.00	.05	.00	.00	.00	.00	.00	.00	.00	.81	.05	.00
18	.00	.00	.00	.00	.00	.06	.00	.00	.17	.20	.00	.00
19	.00	.00	.00	.01	.00	.22	.00	.00	.27	.00	.00	.00
20	.00	.00	.00	.00	.00	.02	.00	.00	.95	.00	.00	.00
21	.00	.00	.00	.00	.00	.35	.00	.00	.07	.00	.00	.00
22	.00	.00	.00	.00	.10	.55	.00	.00	.01	.09	.00	.00
23	.00	.00	.00	.00	.00	.00	.37	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.06	.00	.00	.13	.00	.00	.54	.00
25	.00	.01	.00	.00	.05	.00	.00	.05	.00	.00	.22	.00
26	.00	.00	.00	.00	.00	.22	.00	.01	.00	.00	.00	.03
27	.00	.00	.00	.00	.00	.00	.00	.18	.00	.00	.00	.27
28	.00	.01	.00	.00	.00	.00	.00	.00	.00	.41	.00	.00
29	.00	.07	.00	.00	---	.00	.00	.00	.00	.05	.00	.00
30	.07	.00	.00	.00	---	.00	.00	.00	.01	.00	.00	.00
31	.20	---	.00	.00	---	.00	---	.20	---	.00	.00	---
TOTAL	.53	.84	.03	.05	.21	1.66	.41	1.11	1.55	1.58	1.29	.83

WTR YR 1987 TOTAL 10.09

*The use of the brand name in this report is for identification purposes only and does not imply endorsement by the U.S. Geological Survey.

CHEMICAL QUALITY OF PRECIPITATION

MILK RIVER BASIN

482958109475101 NORTHERN MONTANA AGRICULTURAL RESEARCH CENTER NEAR HAVRE, MT (MT98)--Continued

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

WEELKY COMPOSITE

DATE	PRECIP-ITATION INCHES (46529)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	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)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS NO3) (71851)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4) (71846)	PHOS-PHATE, DIS-SOLVED (MG/L AS PO4) (00653)
SEP 23 1986-OCT 01	2.55	2.3	5.85	0.017	0.005	0.009	<0.003	0.12	<0.03	0.17	0.06	<0.01
OCT 01-07	0.04	--	--	--	--	--	--	--	--	--	--	--
OCT 07-14	0.22	6.8	5.24	0.218	0.038	0.097	0.048	0.68	0.06	0.77	0.24	<0.01
OCT 14-21	0.0	--	--	--	--	--	--	--	--	--	--	--
OCT 21-28	0.0	--	--	--	--	--	--	--	--	--	--	--
OCT 28-NOV 11	0.72	5.0	5.12	0.141	0.031	0.038	0.020	0.36	<0.03	0.57	<0.02	<0.01
NOV 11-18	0.30	7.2	4.52	0.063	0.008	0.124	<0.003	0.28	0.13	0.75	0.06	<0.01
NOV 18-25	0.01	--	--	--	--	--	--	--	--	--	--	--
NOV 25-DEC 02	0.08	6.4	5.26	0.210	0.036	0.874	0.034	0.59	0.14	0.83	0.22	<0.01
DEC 02-09	0.03	--	--	--	--	--	--	--	--	--	--	--
DEC 09-16	0.0	--	--	--	--	--	--	--	--	--	--	--
DEC 16-23	0.0	--	--	--	--	--	--	--	--	--	--	--
DEC 23-30	0.0	--	--	--	--	--	--	--	--	--	--	--
DEC 30 1986-JAN 06 1987	0.0	--	--	--	--	--	--	--	--	--	--	--
JAN 06-13	0.0	--	--	--	--	--	--	--	--	--	--	--
JAN 13-20	0.05	--	--	--	--	--	--	--	--	--	--	--
JAN 20-FEB 03	0.0	--	--	--	--	--	--	--	--	--	--	--
FEB 03-10	0.0	--	--	--	--	--	--	--	--	--	--	--
FEB 10-17	0.0	--	--	--	--	--	--	--	--	--	--	--
FEB 17-24	0.11	--	--	0.244	0.053	0.352	0.037	0.98	0.21	0.67	0.19	<0.01
FEB 24-MAR 03	0.10	--	--	--	--	--	--	--	--	--	--	--
MAR 03-17	0.24	9.6	5.48	0.173	0.026	0.242	0.019	0.98	0.08	1.05	0.75	<0.01
MAR 17-24	1.2	10.4	4.68	0.044	0.015	0.023	<0.003	0.69	0.09	1.08	0.23	<0.01
MAR 24-31	0.22	11.7	4.93	0.178	0.026	0.034	0.014	1.53	0.07	1.20	0.52	<0.01
MAR 31-APR 07	0.0	--	--	--	--	--	--	--	--	--	--	--

CHEMICAL QUALITY OF PRECIPITATION

MILK RIVER BASIN

482958109475101 NORTHERN MONTANA AGRICULTURAL RESEARCH CENTER NEAR HAVRE, MT (MT98)--Continued

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

WEELKY COMPOSITE

DATE	PRECIP-ITATION INCHES (46529)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	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)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS NO3) (71851)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4) (71846)	PHOS-PHATE, DIS-SOLVED (MG/L AS PO4) (00653)
APR 07-21	0.04	36.0	7.08	4.240	0.618	0.774	0.489	2.67	0.80	2.79	0.30	<0.01
APR 21-28	0.37	6.2	5.71	0.205	0.037	0.070	0.023	0.74	0.07	0.80	0.41	<0.01
APR 28-MAY 05	0.35	3.6	5.31	0.055	0.009	0.021	0.003	0.18	0.04	0.21	0.14	<0.01
MAY 05-12	0.0	--	--	--	--	--	--	--	--	--	--	--
MAY 12-19	0.19	8.5	5.30	0.485	0.094	0.112	0.098	0.56	0.09	0.73	0.24	<0.01
MAY 19-26	0.18	13.7	4.85	0.340	0.066	0.085	0.080	1.26	0.13	1.35	0.03	<0.01
MAY 26-JUN 02	0.39	3.9	4.48	0.041	0.009	0.022	0.004	0.33	<0.03	0.42	0.17	<0.01
JUN 02-09	0.05	21.5	4.48	0.371	0.069	0.393	0.073	1.97	0.15	1.43	0.51	<0.01
JUN 09-16	0.02	--	--	0.205	0.029	0.256	0.028	0.80	0.19	1.04	0.18	0.25
JUN 1987 16-23	1.47	5.6	5.18	0.092	0.014	0.038	0.014	0.44	0.07	0.81	0.20	<0.02
JUN 23-30	0.0	--	--	--	--	--	--	--	--	--	--	--
JUN 30-JUL 07	0.02	--	--	--	--	--	--	--	--	--	--	--
JUL 07-14	0.01	--	--	--	--	--	--	--	--	--	--	--
JUL 14-21	1.01	4.6	5.26	0.132	0.019	0.044	0.016	0.39	0.06	0.42	0.08	<0.02
JUL 21-28	0.09	7.2	--	0.107	0.034	0.093	0.008	0.41	0.08	0.38	0.09	0.03
JUL 28-AUG 04	0.46	13.5	--	0.231	0.034	0.097	0.047	1.09	0.10	1.38	0.20	<0.02
AUG 04-11	0.0	--	--	--	--	--	--	--	--	--	--	--
AUG 11-18	0.53	7.2	--	0.091	0.015	0.028	0.024	0.63	0.05	0.62	0.08	<0.02
AUG 18-25	0.57	12.0	--	0.071	0.017	0.030	0.011	0.50	0.06	0.64	0.13	<0.02
AUG 25-SEP 01	0.19	13.7	--	0.108	0.027	0.182	0.019	1.53	0.07	0.99	0.25	<0.02
SEP 01-08	0.03	--	--	0.274	0.057	0.240	0.051	1.30	0.14	0.90	0.10	<0.02
SEP 08-15	0.0	--	--	--	--	--	--	--	--	--	--	--
SEP 15-22	0.50	5.5	5.02	0.101	0.022	0.047	0.020	0.45	0.06	0.36	0.10	<0.02
SEP 22-29	0.30	15.8	4.58	0.102	0.020	0.047	0.031	1.29	0.06	0.48	0.19	<0.02
SEP 29-OCT 06	0.0	--	--	--	--	--	--	--	--	--	--	--

Page
Absarokee, Stillwater River near.....261,413
Access to Watstore data..... 29
Accuracy of the records..... 24
Ackley Lake near Hobson.....351,354
Acre-foot (acre-ft, AC-FT), definition of..... 29
Albion, Hawks Nest Creek tributary, near..... 373
Alder, Ruby River above reservoir, near.....53,390
Ruby River below reservoir, near.....54,390
Ruby River Reservoir near..... 354
Sweetwater Creek near..... 358
Algae, definition of..... 29
Alkali Coulee tributary near Virgelle..... 361
Alkali Creek tributary near Sidney..... 372
Allen Creek near Park City..... 368
Altawan Reservoir near Govenlock, Saskatchewan.... 154
Andresen Coulee near Custer..... 368
Angela, North Sunday Creek tributary No. 2, near.. 370
Annual maximum discharge at crest-stage partial-record stations..... 358
Antelope, Big Muddy Creek near..... 239
Antelope Creek at mouth near West Yellowstone..... 374
Antelope Creek tributary No. 2 near Harlowton..... 362
Aquifer, definition of..... 29
Armells Creek, tributary near Colstrip..... 369
Arrangement of records..... 25
Artesian, definition of..... 29
Ashland, Brian Creek near..... 370
Stebbins Creek at mouth, near..... 370
Augusta, Black Rock Creek, near..... 360
Gibson Reservoir near.....349,354
Nilan Reservoir near.....350,354
Pishkun Reservoir near.....350,354
Willow Creek Reservoir near.....350,354
Avalanche Gulch at forest service boundary, near Winston.....383,401

Babb, Dry Fork Milk River, near..... 364
St. Mary Canal at St. Mary Crossing, near..... 45
St. Mary River near..... 43
South Fork Milk River near.....128,407
Bacteria, definition of..... 29
Fecal coliform, definition of..... 29
Fecal streptococcal, definition of..... 29
Non-ideal colony count..... 29
Badger Creek (tributary to Little Powder River) at Biddle..... 371
Badger Creek (tributary to Two Medicine River) below Four Horns Canal, near Browning.....100,404
Bair Coulee near Mosby..... 363
Bair Reservoir near Delpine.....352,354
Baker, Pennel Creek near..... 371
Barretts, Beaverhead River at.....51,389
Basin, Cataract Creek, near..... 359
Basin Creek tributary near Volborg..... 370
Battle Creek, at international boundary..... 164
near Chinook.....167,409
Battle Creek basin, schematic diagram of..... 155
Battle Creek (town of), Saskatchewan, Middle Creek Reservoir near..... 154
Baylor, Porcupine Creek, Middle Fork, near.....400,415
Porcupine Creek, West Fork, near.....400,415
Bear Creek at mouth, near Grant.....374,389
near Wise River.....377,392
Bear Creek (tributary to Box Elder Creek), South Fork, tributary near Roy..... 363
Beaver Creek (tributary to Madison River) near mouth, near West Yellowstone.....379,395
Beaver Creek at international boundary..... 236
Beaver Creek (tributary to Little Missouri River) near Trotters, ND..... 356
Beaver Creek (tributary to Milk River) at reservation boundary, near Rocky Boy.....384,408
below Guston Coulee, near Saco.....200,414
near Zortman.....195,414
tributary near Zortman..... 365
tributary No. 2 near Malta..... 366
Beaverhead River, at Barretts.....51,389
at Dillon..... 375
near Twin Bridges.....52,390
Beaverhead River basin, discharge measurements at miscellaneous sites..... 374
supplemental water-quality data for gaging stations and miscellaneous sites..... 387
Bed material, definition of..... 29
Belanger Creek diversion canal near Vidora, Saskatchewan..... 181
Belfry, Clarks Fork Yellowstone River near.....262,263
Jack Creek tributary, near..... 368
Belgrade, Hyalite Creek at county road, near.....382,399
Belt Creek basin, crest-stage partial-record stations in..... 360
Biddle, Badger Creek at..... 371
Big Coulee (tributary to Musselshell River) near Martinsdale..... 362
Big Coulee (tributary to Musselshell River) tributary near Cushman..... 363
Big Dry Creek near Van Norman.....123,406
Big Dry Creek basin, crest-stage partial record stations in..... 364
gaging stations in..... 123
Big Hole River, near Melrose..... 55
near Twin Bridges.....378,393
North Fork, near Wisdom.....376,391
Big Hole River basin, crest-stage partial-record stations in..... 358
gaging stations records in..... 55
Big Muddy Creek, near Antelope..... 239
near mouth, near Culbertson..... 246
Big Muddy Creek basin, crest-stage partial-record stations in..... 367
discharge measurements at miscellaneous sites in 386
gaging station records in..... 239
Big Muddy Creek diversion canal, near Medicine Lake..... 242
Big Rock Coulee near Santa Rita.....383,404
Big Sandy Creek, at reservation boundary, near Rocky Boy..... 135
near Havre..... 139
Big Sheep Creek below Muddy Creek, near Dell.....374,358
Big Timber, Boulder River at.....258,412
Big Warm Creek near Zortman.....199,411
Bighorn Lake near St. Xavier..... 281
Bighorn, Bighorn River above Tullock Creek, near.301,416
Bighorn River at..... 302
Bighorn River, above Tullock Creek, near Bighorn.301,416
at Bighorn..... 302
at Kane, WY..... 276
near Hardin.....283,386
near St. Xavier.....282,414
Billings, West Wets Creek, near..... 368
Yellowstone River at..... 269
Birney, Canyon Creek, near..... 369
Hanging Woman Creek, below Horse Creek, near.... 315
Hanging Woman Creek near..... 317
Tongue River at Birney Day School bridge, near.. 321
Black Canyon Creek at forest service boundary, near Grant..... 375
Black Rock Creek near Augusta..... 360
Blacktail Creek near Dupuyer.....383,404
near Heart Butte..... 360
Blacktail Deer Creek near Dillon.....376,390
East Fork at mouth, near Dell.....375,390
West Fork at mouth, near Dell.....375,389
Blood Creek tributary near Valentine..... 363
Bloody Dick Creek above Magpie Gulch, near Grant.375,389
Bloomfield, Thirteenmile Creek tributary, near.... 372
Bottom material, see bed material..... 29
Boulder River (tributary to Jefferson River), near Boulder.....58,393
near Cardwell..... 378
South, near Cardwell..... 378
Boulder River (tributary to Yellowstone River), at Big Timber.....258,412
Box Elder, Boxelder Creek at.....384,408
Camp Creek near..... 383
Duck Creek near.....396,407
Sage Creek near..... 384
Boxelder Creek (tributary to Big Sandy Creek) near Rocky Boy.....137,407
Boxelder Creek (tributary to Poplar River) at Box Elder.....384,408
Boyd, Cooney Reservoir near..... 354
Red Lodge Creek above Cooney Reservoir, near...265,413
Red Lodge Creek below Cooney Reservoir, near...267,414
Willow Creek near.....266,413
Bozeman, Bozeman Creek near..... 399
Bridger Creek near.....73,399
Hyalite Creek at Hyalite Ranger Station, near...74,399
Sourdough Creek near..... 382
Middle Creek Reservoir near.....348,354
Bredette, Poplar River above West Fork..... 231
West Fork Poplar River near.....232,385
Brian Creek near Ashland..... 370
Broadus, Powder River at..... 332
Brockway, East Fork Duck Creek, near..... 366
Browning, Badger Creek below Four Horns Canal near.....100,404
Four Horns Canal near..... 403
North Fork Milk River above St. Mary Canal near.....130,407
Powell Coulee, near..... 361
Two Medicine Canal near..... 403

Page

Browning, Two Medicine River below South Fork, near....99,403
Bruce Coulee tributary near Choteau.... 361
Bull Creek (tributary to Warm Springs Creek) tributary near Hilger.... 361
Burgess Junction, WY, Dry Fork below Lick Creek, near.... 285
Burgess Junction, WY, Little Bighorn River below Dayton Gulch, near.... 284
Butte Creek tributary near Four Buttes.... 367
Butts Coulee near Melstone.... 363

Cabin Creek, East tributary, near Hardin.... 369
Cabin Creek (tributary to Deep Creek) near Townsend.... 359
Cabin Creek (tributary to Madison River) near West Yellowstone....359,379,395
Cameron, Indian Creek at forest service boundary, near....380,396
  Madison River at Kirby Ranch, near....68,396
  Ruby Creek at mouth, near....380,396
  Standard Creek below Wolverine Creek, near....380,396
  Squaw Creek at mouth, near....380,396
  West Fork Madison River, near....380,396
Camp Creek at Melrose....378,393
Camp Crook, SD, Little Missouri River at.... 355
Canyon Creek at forest service boundary, near Divide....377,393
Canyon Creek (tributary to Tongue River) near Birney.... 369
Canyon Ferry Lake near Helena.... 81
Cardwell, Boulder River near.... 378
  Boulder River, South, near.... 378
Cat Creek, Gorman Coulee tributary, near.... 363
Cataract Creek near Basin.... 359
Cfs-day, definition of.... 30
Chemical quality of precipitation.... 418
Cherry Creek near Norris....380,397
  tributary near Terry.... 371
Chester, Fey Coulee tributary, near.... 361
  Lake Elwell near.... 104
  Marias River near....105,405
Chinook, Battle Creek near....167,409
  Clear Creek near....145,408
Chlorophyll, definition of.... 29
Choteau, Bruce Coulee tributary, near.... 361
Circle, Redwater River at....219,411
Clancy, Prickly Pear Creek near....84,401
Clark Canyon near Dillon.... 358
Clark Canyon Reservoir near Grant.... 50
Clarks Fork Yellowstone River, at Edgar....264,413
  near Belfry.... 262
Classification of records.... 25
  near Belfry.... 403
Clear Creek near Chinook....145,408
Cleveland, Peoples Creek near....384,409
Coal Creek near Mill Iron.... 373
Coffee Creek, Wolf Creek tributary, near.... 362
Cohagen, Thompason Creek tributary, near.... 364
Coliform, fecal bacteria, definition of.... 29
Color unit, definition of.... 29
Colstrip, Armells Creek tributary, near.... 369
  Rosebud Creek near....306,416
  Sarpy Creek tributary, near.... 369
Confederate Gulch below Jimmy's Gulch, near Winston....382,401
Consul, Saskatchewan, Cypress Lake near.... 191
  McKinnon Ditch near.... 162
  Nashlyn Canal near.... 163
  Richardson Ditch near.... 161
  Vidora Ditch near.... 160
Contents, definition of.... 30
Control, definition of.... 30
Control structure, definition of.... 30
Cooney Reservoir near Boyd....353,374
Cooperation.... 1
Corral Creek near West Yellowstone....374,387
Corwin Springs, Yellowstone River at.... 250
Cottonwood Creek near Dagmar....244,412
Cougar Creek near mouth, near West Yellowstone...379,394
Cow Creek tributary, (tributary to Redwater River) near Vida.... 367
Cow Creek (tributary to Otter Creek) near Fort Howes Ranger Station, near Otter.... 370
Craig, Wegner Creek at.... 360
Crest-stage partial-record stations, discharge at.... 358
Crooked Creek (tributary to Yellowstone River) tributary near Shepherd.... 368
Crow Creek near Radersburg....382,400
Cubic feet per second per square mile ($ft^3/s/mi^2$), definition of.... 30
Cubic foot per second, (FT^3/s, ft^3/s), definition of.... 30
Cubic-foot-per-second day (cfs-day).... 30
Culbertson, Big Muddy Creek near mouth, near.... 246
  Missouri River near....248,412
Custer, Andresen Coulee near.... 368
  tributary No. 5, near.... 367
Cushman, Big Coulee Creek tributary, near.... 363
Cut Bank, Cut Bank Creek at.... 111
  Spring Creek near....383,404
  Two Medicine River near....383,404
Cut Bank Creek at Cut Bank.... 101
Cut Coulee near Mizpah.... 371
Cypress Lake east outflow canal near Vidora, Saskatchewan.... 182
  near Consul, Saskatchewan.... 191
  west inflow canal drain near Oxarat, Saskatchewan.... 158
  west inflow canal near West Plains, Saskatchewan.... 157
  west outflow canal near West Plains, Saskatchewan.... 159

Dagmar, Cottonwood Creek near....244,412
  Lake Creek near....243,411
  Sand Creek near....245,412
Data collection and computation.... 22,28
Data presentation.... 23,27
Dayton, WY, East Pass Creek near.... 291
Deadman Creek at mouth, near Lima....374,388
Deadman's Basin Reservoir near Shawmut....352,354
Decker, Tongue River at mouth of Post Creek, near. 417
  Tongue River at State line, near.... 308
  Tongue River at Tongue River Dam, near....311,386
  Tongue River Reservoir near....353,354
Deep Creek at mouth, near Wise River....377,392
Deep Creek (tributary to Yellowstone River) below North Fork, near Townsend....382,400
  near Kinsey.... 371
  near Powderville.... 371
  North Fork Deep Creek below, near Townsend....382,400
Deer Creek (tributary to Pumpkin Creek) tributary near Volborg.... 370
Definition of terms.... 29
Dell, Big Sheep Creek below Muddy Creek near....374,358
  East Fork Blacktail Deer Creek at mouth, near..375,390
  West Fork Blacktail Deer Creek at mouth, near..375,389
Delpine, Bair Reservoir near....352,354
Descriptor values for weather conditions.... 28
Dillon, Beaverhead River at.... 375
  Blacktail Deer Creek at.... 376
  Clark Canyon near.... 358
Discharge, definition of.... 30
  instantaneous, definition of.... 30
  mean, definition of.... 30
Discharge at partial-record stations and miscellaneous sites.... 358
Discharge measurements made at miscellaneous sites during water year 1986.... 374
Disjardin Coulee near Malta.... 365
Dissolved, definition of.... 30
Dissolved-solids concentration, definition of.... 30
Divide, Canyon Creek at forest service boundary, near....377,393
  Divide Creek at....377,392
  Moose Creek near....377,393
  North Fork Divide Creek at forest service boundary, near....377,392
  Kuhr Coulee tributary near....179,410
  Milk River near....180,410
  Peoples Creek near.... 177
  White Bear Creek below Fifteenmile Creek near..384,409
  Willow Coulee near....176,410
Downstream order system.... 21
Drainage area, definition of.... 30
Drainage basin, definition of.... 30
Dry Creek at forest service boundary, near Toston....382,400
Dry Fork below Lick Creek, near Burgess Junction, WY.... 285
Dry Fork Milk River near Babb.... 364
Duck Creek above Canyon Creek, near West Yellowstone.... 319
Duck Creek (tributary to Madison River, above Cougar Creek, near West Yellowstone.... 394
  above Mill Gulch, near Townsend....382,401
Duck Creek near Box Elder....383,407
Duck Creek (tributary to Redwater River) East Fork near Brockway.... 366
Dupuyer, Blacktail Creek near....382,404
  Swift Reservoir near....350,354
Dutton, Teton River near....106,405
Duval Creek near Landusky.... 362

East Cabin Creek tributary, near Hardin.... 369
East Gallatin River near mouth, near Manhattan...382,400

Page

East Glacier, Lower Two Medicine Lake near.....350,354
East Helena, Mitchell Gulch, near..... 360
East Pass Creek near Dayton, WY..... 291
East Poplar River at international boundary..... 224
Eastend, Saskatchewan, Eastend Canal at..... 183
  Eastend Reservoir at..... 191
  Frenchman River below Eastend Reservoir, near..... 184
Edgar, Clarks Fork Yellowstone River at.....264,413
Elkhorn Creek above Fuller Ranch ditch, near Parkman, WY..... 286
Elwell, Lake, near Chester..... 104
Ennis, Jack Creek near.....80,397,380
  Moore Spring Creek, near.....380,397
  Odell Creek, near mouth, near.....380,396
Ennis Lake near McAllister.....348,354
Epsie, Sixteenmile Creek tributary, near..... 370
Explanation of the records..... 20
  records of ground-water levels..... 28
  records of stage and water discharge..... 22
  records of surface-water quality..... 25

Fallon, Spring Creek tributary near..... 372
Favot Coulee tributary near Ledger..... 361
Fecal coliform, definition of..... 29
Fecal streptococcal bacteria, definition of..... 29
Fey Coulee tributary near Chester..... 361
Fifteenmile Creek tributary near Harlem..... 170
  tributary near Zurich..... 365
Firehole River near West Yellowstone..... 61
First Hay Creek near Sidney..... 373
Fish Creek (tributary to Jefferson River) near Silver Star..... 360
Fishel Creek near Musselshell..... 363
Fishtrap Creek at mouth, near Wise River.....377,392
Flatwillow, Little Wall Creek tributary, near..... 363
Forsyth, Short Creek, near..... 369
  Yellowstone River at.....304,416
Fort Benton, Missouri River at.....98,403
  Ninemile Coulee, near..... 360
Fort Logan, Smith River near.....87,402
Fort Peck, Willow Creek tributary, near..... 366
Fort Peck Dam, Missouri River below..... 125
Fort Peck Lake at Fort Peck..... 124
Four Buttes, Butte Creek tributary, near..... 367
Four Horns Canal near Browning..... 403
Four Horns Lake near Heart Butte.....351,354
Fox Creek tributary near Lambert..... 373
Frances, Lake, at Valier.....351,354
Frenchman River, at international boundary..... 189
  below Eastend Reservoir, near Eastend, Saskatchewan..... 184
Frenchman River, below Newton Lake, near Val Marie, Saskatchewan..... 188
Frenchman River basin, Saskatchewan, reservoirs in..... 191
  schematic diagram of..... 155
Fresno Reservoir near Havre.....352,354
Frying Pan Creek below Forks, near Grant.....375,389

Gaff Ditch near Merryflat, Saskatchewan..... 156
Gage height (G.H.), definition of..... 30
Gaging station, definition of..... 30
Gallatin Gateway, Gallatin River near.....72,399
  Hellroaring Creek at mouth, near.....381,374,398
  Logger Creek, near..... 359
  Middle Fork of West Fork Gallatin River, near..381,398
  Porcupine Creek at mouth, near.....381,398
  South Fork Spanish Creek at forest service boundary, near.....381,399
  South Fork of West Fork Gallatin River near mouth, near.....381,399
  Spanish Creek at mouth, near.....381,399
  Squaw Creek near.....381,398
  West Fork Gallatin River at mouth, near.....381,398
Gallatin River at Logan.....75,400
  East, near mouth, near Manhattan..... 400
  near Gallatin Gateway.....72,399
  West Fork at mouth, near Gallatin Gateway.....381,398
  West Fork, Middle Fork of, near Gallatin Gateway.....381,398
  South Fork of, near mouth, near Gallatin Gateway.....381,398
Gallatin River basin, crest-stage partial-record stations in..... 381
  gaging stations records in..... 72
Gardiner, La Duke Hot Springs near..... 386
Gardner River near Mammoth, Yellowstone National Park.....249,412
General hydrologic setting..... 2
Gibbon River near West Yellowstone..... 64

Page

Gibson Reservoir near Augusta.....349,354
Glasgow, Milk River tributary No. 3, near..... 366
  Willow Creek near..... 211
Glendive, Griffith Creek tributary, near..... 372
  Yellowstone River tributary No. 6, near..... 372
Gorman Coulee tributary near Cat Creek..... 363
Govenlock, Saskatchewan, Altawan Reservoir near... 154
  Middle Creek above Lodge Creek, near..... 151
  Middle Creek below Middle Creek Reservoir, near. 149
  Middle Creek near..... 150
  Spangler Ditch near..... 147
Grant, Bear Creek at mouth, near.....375,389
  Black Canyon Creek at forest boundary, near....375,388
  Bloody Dick Creek above Magpie Gulch, near.....375,389
  Clark Canyon Reservoir near..... 50
  Frying Pan Creek below Forks, near.....375,389
  Horse Prairie Creek, near.....375,389
  Medicine Lodge Creek below Schwartz Creek, near.....375,389
Grayling, Madison River below Hebgen Lake, near...78,395
  Taylor Creek near.....381,397
Grayling Creek near mouth, near West Yellowstone.379,395
Great Falls, Missouri River near.....97,403
Griffith Creek tributary near Glendive..... 372
Ground-water levels, hydrologic conditions of..... 8
  records of..... 28

Halfbreed Creek near Klein.....115,406
Hammond, Wolf Creek near.....175,373
Hanging Woman Creek below Horse Creek, near Birney.....315,386
  near Birney..... 317
Hardin, Bighorn River near.....283,386
  East Cabin Creek tributary, near..... 369
  Little Bighorn River near..... 298
Hardness, definition of..... 30
Harlem, Fifteenmile Creek tributary near..... 170
  Milk River near.....169,409
  Milk River "A" Canal near..... 168
  Threemile Creek near..... 384
Harlowton, Antelope Creek tributary No. 2, near... 362
  Musselshell River at.....113,406
  Sadie Creek near..... 362
Harrison, Willow Creek near.....59,394
  Willow Creek Reservoir near.....347,354
Hathaway, Snell Creek near..... 369
Hauser Lake near Helena.....349,354
Havre, Big Sandy Creek near..... 139
  Fresno Reservoir near.....352,354
  Little Box Elder Creek at mouth, near..... 144
  Milk River at.....143,408
  South Fork Spring Coulee, near..... 365
Hawks Nest Creek tributary near Albion..... 373
Hays, Little Peoples Creek above Duck Creek, near.....385,410
  above St. Paul Mission, near.....324,410
  at.....384,410
  at Highway 376, near.....385,410
  below..... 385
  below Lodge Pole Road, near.....385,410
  near..... 172
  Peoples Creek near.....171,409
Heart Butte, Blacktail Creek, near..... 360
  Four Horns Lake, near.....350,354
Hebgen Lake near West Yellowstone.....347,354
Helena, Canyon Ferry Lake near..... 81
  Hauser Lake, near.....349,354
  Helena Valley Reservoir, near.....348,354
  Lake Helena, near.....348,354
  Missouri River below Canyon Ferry Dam near..... 82
Helena Valley Reservoir near Helena.....348,354
Hellroaring Creek at mouth, near Gallatin Gateway.....374,381,398
  near West Yellowstone..... 387
Hells Canyon Creek at mouth near Twin Bridges....378,393
Hilger, Bull Creek tributary, near..... 361
Hobson, Ackley Lake near.....351,354
Hogeland, Murphy Coulee, tributary near..... 365
Holter Lake near Wolf Creek.....349,354
Home Creek near Sumatra..... 363
Homestead, Lost Creek tributary, near..... 367
Horse Creek (tributary to Redwater River) tributary near Richey..... 367
Horse Creek, South Fork, tributary near Wibaux.... 372
Horse Prairie Creek, near Grant.....375,389
Hot River at Mammoth..... 386
Hot Springs Creek near Norris.....380,397
Huff Lake near Val Marie, Saskatchewan..... 191
Huff Lake gravity canal, near Val Marie, Saskatchewan..... 186
Huff Lake pumping canal, near Val Marie, Saskatchewan..... 185

Page

Hump Creek near Reed Point..... 368
Huntley, Pryor Creek near.....275,414
Hyalite Creek at county road, near Belgrade.....382,399
at Hyalite Ranger Station, near Bozeman.....74,399
Hydrologic activity -- water year 1987..... 3
Hydrologic bench-mark network, definition of..... 20,30
Hydrologic unit, definition of..... 30

Identifying estimated daily discharge..... 24
Indian Creek, at forest service boundary, near Cameron.....380,396
Instantaneous discharge, definition of..... 30
Introduction..... 1
Ismay, O'Fallon Creek near.....341,417

Jack Creek (tributary to Madison River) near Ennis.....380,397
Jack Creek (tributary to Tongue River) near Volborg..... 370
Jack Creek tributary (tributary to Clarks Fork Yellowstone River) near Belfry..... 368
Jefferson River near Three Forks.....60,394
tributary No. 2 near Whitehall..... 359
Jerry Creek, at forest service boundary, near Wise River.....377,392
Joplin, Sage Creek tributary No. 2, near..... 365
Jordan, Russian Coulee, near..... 364
Second Creek tributary No. 2, near..... 364
Judith Gap, East Fork Roberts Creek tributary, near..... 362
Judith River basin, crest-stage partial-record stations in..... 361

Kane, WY, Bighorn River at..... 276
Shoshone River at..... 280
Kinsey, Deep Creek near..... 371
Tree Creek near..... 371
Kirby, Rosebud Creek at reservation boundary, near.....305,416
Rosebud Creek near..... 369
South Fork Leaf Rock Creek near..... 369
Klein, Halfbreed Creek near.....115,406
Krug Creek tributary No. 2, near Wibaux..... 372
Kuhr Coulee tributary near Dodson.....179,410

Laboratory measurements..... 26
La Duke Hot Springs near Gardiner..... 386
LaGrange Creek near Volborg..... 370
Lake Creek near Dagmar.....243,411
Lakes and Reservoirs:.
Ackley Lake near Hobson.....351,354
Altawan Reservoir near Govenlock, Saskatchewan.. 154
Bair Reservoir near Delpine.....352,354
Bighorn Lake near St. Xavier..... 281
Canyon Ferry Lake near Helena..... 81
Clark Canyon Reservoir near Grant..... 50
Cooney Reservoir near Boyd..... 353
Cypress Lake near Consul, Saskatchewan.....182,191
Deadman's Basin Reservoir near Shawmut.....352,354
Eastend Reservoir at Eastend, Saskatchewan..... 191
Elwell, Lake, near Chester..... 104
Ennis Lake near McAllister.....348,354
Fort Peck Lake at Fort Peck..... 124
Four Horns Lake near Heart Butte.....351,354
Frances, Lake, near Valier.....351,354
Fresno Reservoir near Havre.....352,354
Gibson Reservoir near Augusta.....349,354
Hauser Lake near Helena.....349,354
Hebgen Lake near West Yellowstone.....347,354
Helena, Lake, near Helena.....348,354
Helena Valley Reservoir near Helena.....348,354
Holter Lake near Wolf Creek.....349,354
Huff Lake near Val Marie, Saskatchewan..... 191
Lima Reservoir near Monida.....347,354
Lower Two Medicine Lake near East Glacier.....350,354
Martinsdale Reservoir near Martinsdale.....352,354
Middle Creek Reservoir, near Battle Creek, Saskatchewan..... 154
near Bozeman.....348,354
Mystic Lake near Roscoe.....353,354
Nelson Reservoir near Saco.....353,354
Newton Lake near Val Marie, Saskatchewan..... 191
Nilan Reservoir near Augusta.....350,354
Pishkun Reservoir near Augusta.....350,354
Ruby River Reservoir near Alder.....347,354
Sherburne, Lake, at Sherburne..... 41
Smith River Reservoir near White Sulphur Springs.....349,354
Swift Reservoir near Dupuyer.....351,354
Tongue River Reservoir near Decker.....353,354
Willow Creek Reservoir near Augusta..... 350
near Harrison.....347,354
Lakeview, Long Creek near.....374,388

Page

Lamarche Creek at mouth, near Wise River.....377,392
Lambert, Fox Creek tributary near..... 373
Lame Jones Creek tributary near Willard..... 371
Land-surface datum (lsd), definition of..... 30
Landusky, Duval Creek, near..... 362
Missouri River near..... 108
Latitude and longitude system..... 21
Leaf Rock Creek, South Fork, near Kirby..... 369
Ledger, Favot Coulee, near..... 361
Less than (<), definition of..... 30
Lewistown, Mill Creek near..... 361
Lima, Deadman Creek at mouth, near.....374,388
Odell Creek near.....374,388
Reservoir, near Monida.....347,354
Lindsay, Timber Fork Creek tributary, near..... 372
Little Bighorn River, at State line, near Wyola..288,415
below Pass Creek, near Wyola.....294,415
below Dayton Gulch near Burgess Junction, WY.... 284
near Hardin..... 298
West Fork, near Parkman, WY..... 286
Little Box Elder Creek at mouth, near Havre..... 144
Little Missouri River at Camp Crook, SD..... 355
tributary near Albion..... 373
Little Missouri River basin, crest-stage partial-record stations in..... 373
gaging station records in..... 355
Little Otter Creek near Raynesford..... 359
Little Peoples Creek, above Duck Creek, near Hays.....385,410
above St. Paul Mission, near Hays.....384,410
at Hays.....384,410
at Highway 376, near Hays.....385,410
below Hays.....385,410
below Lodge Pole Road, near Hays.....385,410
near Hays..... 172
Little Powder River above Dry Creek, near Weston, WY..... 335
Little Sandy Creek tributary near Virgelle..... 361
Little Wall Creek tributary near Flatwillow..... 363
Little Warm Creek at reservation boundary, near Zortman..... 196
tributary near Lodge Pole..... 198
Living Springs, Swimming Woman Creek, near..... 362
Livingston, Shields River near.....257,412
Yellowstone River near..... 253
Lloyd, Peoples Creek tributary, near..... 365
Locate, Powder River near..... 337
Locate Creek, tributary near Locate..... 371
Lodge Creek below McRae Creek, at international boundary..... 152
Lodge Creek basin, Saskatchewan, reservoirs in.... 154
schematic diagram of..... 146
Lodge Grass, Long Otter Creek near..... 368
Owl Creek near.....295,415
Lodge Grass Creek above Willow Creek diversion, near Wyola.....297,415
at State line, near Wyola..... 296
Lodge Pole, Little Warm Creek tributary, near..... 198
Lodge Pole Creek above..... 385
at..... 175
below..... 410
Logan, Gallatin River at.....75,400
Logger Creek near Gallatin Gateway..... 359
Lone Man Coulee near Valier..... 361
Long Creek near Lakeview.....347,388
Long Otter Creek near Lodge Grass..... 368
Lost Creek (tributary to Sixteenmile Creek) near Ringling..... 359
Lost Creek tributary (tributary to Big Muddy Creek) near Homestead..... 367
Lovell, WY, Shoshone River near..... 278
Lower Two Medicine Lake near East Glacier.....350,354
Lush Coulee near Whitewater..... 365
Lustre, East Fork Wolf Creek, near..... 366
Lyons Creek at international boundary.....166,409

McAllister, Ennis Lake near.....61,348,354
Madison River below Ennis Lake, near..... 69
North Meadow Creek, at forest service boundary, near.....380,397
McBeath Residence near Clancy..... 418
McGuire Creek tributary near Van Norman..... 364
McKinnon Ditch near Consul, Saskatchewan..... 162
Madison River, above Hebgen Lake, near West Yellowstone.....378,394
at Kirby Ranch, near Cameron.....68,396
at Three Forks..... 381
below Ennis Lake, near McAllister..... 69
below Hebgen Lake, near Grayling.....67,395
near West Yellowstone.....73,394
South Fork, above Denny Creek, near.....379,394
below Denny Creek, near.....379,394
West Fork, near Cameron.....380,396

Page

Madison River basin, crest-stage partial-record stations in..... 359
Madison River basin, gaging stations records in... 61
Malta, Beaver Creek tributary No. 2, near..... 366
Disjardin Coulee, near..... 365
Mammoth, Gardner River near.....249,412
Hot River at..... 386
Mammoth, Mammoth Hot Springs at..... 386
Manhattan, East Gallatin River near mouth, near..382,400
Many Glacier, Swiftcurrent Creek at..... 40
Maps of Montana..... 36
Marias River, near Chester.....105,405
near Shelby.....103,405
Marias River basin, crest-stage partial-record stations in..... 360
discharge measurements at miscellaneous sites in..... 385
gaging-station records in..... 99
Marsh, Yellowstone River tributary No. 5, near.... 372
Martinsdale, Big Coulee, near..... 362
Reservoir, near Martinsdale.....352,354
Mean concentration, definition of..... 32
Mean discharge, definition of..... 30
Measuring point (MP), definition of..... 30
Medicine Lake, Big Muddy Creek diversion canal near.....242,416
Medicine Lodge Creek below Schwartz Creek, near Grant.....375,389
Melstone, Butts Coulee, near..... 363
Melrose, Big Hole River near..... 55
Camp Creek at mouth, at.....378,393
Trapper Creek at forest service boundary, near.378,393
Merryflat, Saskatchewan, Gaff Ditch near..... 156
Micrograms, per gram (µg/g), definition of..... 31
per liter (UG/L, µg/L), definition of..... 31
Microsiemens, per centimeter at 25°C (US/CM)..... 31
Middle Creek above Lodge Creek, near Govenlock, Saskatchewan..... 151
below Middle Creek Reservoir, near Govenlock, Saskatchewan..... 149
near Govenlock, Saskatchewan..... 150
near Saskatchewan boundary..... 148
Middle Creek Reservoir (Gallatin River basin) near Bozeman.....348,354
Middle Creek Reservoir (Lodge Creek Basin) near Battle Creek, Saskatchewan..... 154
Miles City, Pumpkin Creek, near..... 386
Reservation Creek, near..... 369
Tongue River at..... 323
Yellowstone River at.....326,417
Milk River, Alberta, Milk River at..... 132
Verdigris Coulee near the mouth, near..... 133
Milk River, at eastern crossing of international boundary.....134,407
at Havre.....143,408
at Juneberg Bridge, near Saco..... 192
at Milk River, Alberta..... 132
at Nashua..... 212
at Tampico.....210,411
at western crossing of international boundary... 129
near Dodson.....180,410
near Harlem.....169,409
near Vandalia.....209,411
North Fork, above St. Mary Canal, near Browning.....130,407
South Fork, near Babb.....128,407
tributary No. 3 near Glasgow..... 366
Milk River "A" Canal near Harlem..... 168
Milk River basin, crest-stage partial-record stations in..... 364
discharge measurements at miscellaneous sites in..... 383
gaging-station records in..... 128
schematic diagram of..... 44
Mill Creek, at forest service boundary, near Sheridan.....376,390
at Sheridan.....376,390
near Lewistown..... 361
Mill Iron, Coal Creek near..... 373
Milligrams per liter (MG/L, mg/L), definition of.. 31
Mills Creek near Rapelje..... 368
Miscellaneous sites, discharge measurement at..... 374
water-quality records at..... 387
Missouri River, at Fort Benton.....98,403
at Toston..... 76
at Virgelle.....107,405
below Canyon Ferry Dam, near Helena..... 82
below Fort Peck Dam..... 125
below Holter Dam, near Wolf Creek.....86,402
near Culbertson.....248,412
near Great Falls.....97,402
near Landusky..... 108

Page

near Ulm.....88,402
near Wolf Point.....225,411
tributary No. 5 at Culbertson..... 361
tributary No. 6 near Wolf Point..... 366
Missouri River basin, crest-stage partial-record stations in..... 358
discharge at partial-record stations and miscellaneous sites..... 358
gaging-station records in..... 49
measurements at miscellaneous sites..... 387
Mitchell Gulch near East Helena..... 360
Mizpah, Cut Coulee, near..... 371
Monida, Lima Reservoir near.....347,354
Red Rock River below Lima reservoir, near.....49,404
Moore Spring Creek, near Ennis.....380,397
Moose Creek near Divide.....377,393
Moorhead, Powder River at..... 327
Mosby, Bair Coulee, near..... 363
Musselshell River at..... 118
Muddy Creek (tributary to Sun River), at Vaughn...91,402
Big Sheep Creek below, near Dell..... 388
near Vaughn.....90,402
Murphy Coulee tributary near Hogeland..... 365
Musselshell, Fishell Creek, near..... 363
Musselshell River, at Harlowton.....113,406
at Mosby..... 118
at Musselshell.....117,406
near Roundup.....116,406
near Shawmut.....114,406
Musselshell River basin, crest-stage partial-record stations in..... 362
gaging station records in..... 113
Mystic Lake near Roscoe..... 353

Nashlyn Canal near Consul, Saskatchewan..... 163
Nashua, Milk River at..... 212
Porcupine Creek at..... 215
NASQAN (National stream-quality accounting network), definition of..... 31
National Geodetic Vertical Datum of 1929 (NGVD), definition of..... 31
National Stream-Quality Accounting Network (NASQAN), definition of..... 20,31
National Trends Network..... 20,31
Neihart, Sheep Creek near..... 360
Nelson Reservoir near Saco..... 353
Newton Lake near Val Marie, Saskatchewan..... 191
Newton Lake Main Canal, near Val Marie, Saskatchewan..... 187
NGVD (National Geodetic Vertical Datum of 1929), definition of..... 31
Nilan Reservoir near Augusta.....350,354
Ninemile Coulee near Fort Benton..... 360
Non-ideal colony count, definition of..... 29
Norris, Cherry Creek near.....380,397
Hot Springs Creek near.....380,397
North Divide Creek at forest service boundary, near Divide..... 392
North Meadow Creek at forest service boundary, near McAllister.....380,397
North Milk River near international boundary..... 131
North Sunday Creek tributary No. 2 near Angela.... 370
Northern Montana Agricultural Research Center near Havre..... 421
Numbering system for wells and miscellaneous sites..... 21
Nye, Stillwater River above Nye Creek, near.....259,413

Odell Creek, near mouth, near Ennis.....380,396
near Lima.....374,388
O'Fallon Creek near Ismay.....341,417
On-site measurement and sample collection..... 26
Opheim, Snow Coulee at..... 366
South Creek tributary near..... 204
South Creek tributary No. 2 near..... 205
Organism, definition of..... 31
Organism count/volume, definition of..... 31
Total organism count, definition of..... 31
Other records available..... 24
Otter, Cow Creek near Fort Howes Ranger station, near..... 370
Owl Creek near Lodge Grass.....295,415
Oxarat, Saskatchewan, Cypress Lake west inflow canal drain, near..... 158

Parameter code, definition of..... 31
Park City, Allen Creek near..... 368
Parkman, WY, Elkhorn Creek above Fuller Ranch ditch, near..... 286
Little Bighorn River, West Fork, near..... 287
Red Canyon Creek near..... 289
Twin Creek near..... 292

Page

Parkman, WY, West Pass Creek near..... 290
Partial-record station, definition of..... 31
Partial-record stations..... 358
  annual maximum discharge at..... 358
Particle size, definition of..... 31
Particle-size classification, definition of..... 31
Pass Creek near Wyola.....293,415
Pennel Creek near Baker..... 371
Peoples Creek, near Cleveland.....384,409
  near Dodson..... 177
  near Hays.....171,409
  tributary near Lloyd..... 365
Percent composition, definition of..... 31
Pesticides, definition of..... 31
pH, definition of..... 32
Picocurie, definition of..... 32
Pintlar Creek near mouth, near Wisdom.....377,391
Pishkun Reservoir near Augusta.....350,354
Plentywood, Spring Creek, near..... 367
Pony, North Willow Creek below Pony Creek, at....378,394
  South Willow Creek below Camp Creek, near.....378,393
Poplar, Poplar River near.....233,385
Poplar River, above West Fork, near Bredette..... 231
  at international boundary..... 220
  near Bredette..... 385
  near Poplar..... 233
  East Fork, near Scobey.....228,385
  West Fork, near Bredette..... 232
Poplar River basin, crest-stage partial-record
    station in..... 367
  discharge measurement at miscellaneous sites in
    in..... 385
  gaging-station records in..... 220
Porcupine Creek at mouth, near Gallatin Gateway..381,398
  at Nashua..... 215
Powder River, at Broadus..... 332
  at Moorhead..... 327
  near Locate..... 337
Powderville, Deep Creek near..... 371
Powell Coulee near Browning..... 361
Precipitation and temperature..... 3
Prickly Pear Creek near Clancy.....84,401
Prickly Pear Creek basin, gaging station
    records in..... 84
Pryor Creek above Pryor.....273,386
  at Pryor.....274,414
  near Huntley.....275,414
Publications..... 26,28
Publications on techniques of water-resources
    investigations..... 34
Pumpkin Creek, near Miles City..... 386

Quality of streamflow..... 7
Quartz Hill Gulch near Wise River..... 358

Radersburg, Crow Creek near.....382,400
Radiochemical program, definition of..... 20,32
Rapelje, Mills Creek at..... 368
Raynesford, Little Otter Creek near..... 360
Records, explanation of..... 20
  ground-water levels..... 28
    data collection and computation..... 28
    publications..... 28
  stage and water discharge..... 22
    accuracy of the records..... 24
    data collection and computation..... 22
    data presentation..... 23
    identifying estimated daily discharge..... 24
    other records available..... 24
    publications..... 25
  surface-water quality..... 25
    arrangement of records..... 25
    classification of records..... 25
    data presentation..... 27
    laboratory measurements..... 26
    on-site measurements and sample collection.... 26
    publications..... 28
    remarks codes..... 28
    sediment..... 26
    water temperature..... 26
Recoverable from bottom material, definition of... 32
Rectangular-grid system..... 21
Red Canyon Creek near mouth, near West
    Yellowstone.....379,395
Red Canyon Creek near Parkman, WY..... 289
Red Lodge Creek, above Cooney Reservoir, near
    Boyd.....265,413
  below Cooney Reservoir, near Boyd.....267,414
Red Rock River above upper Red Rock Lake near
    West Yellowstone.....374,387
Red Rock River, below Lima Reservoir, near
    Monida.....49,388

Page

Redwater River at Circle.....219,411
Redwater River basin, crest-stage partial-record
    stations in..... 366
  gaging station records in..... 219
Reed Point, Hump Creek near..... 368
Remark codes..... 29
Reservation Creek near Miles City..... 369
Reserve, Wolf Creek near.....386,417
Reservoirs, See Lakes and Reservoirs.....
Return period, definition of..... 32
Richardson Ditch near Consul, Saskatchewan..... 161
Richey, Horse Creek tributary, near..... 367
  West Fork Sullivan Creek, near..... 367
Rimini, Tenmile Creek near.....85,401
Ringling, Lost Creek near..... 359
Roberts, Clear Creek at mouth, near..... 420
Roberts Creek, East Fork, tributary near
    Judith Gap..... 362
Rock Creek (tributary to Clarks Fork Yellowstone
    River) at Rockvale.....268,414
Rock Creek (tributary to Milk River) below Horse
    Creek near international boundary..... 201
  below McEachern Creek, near international
    boundary.....207,411
Rockvale, Rock Creek at.....268,414
Rocky Boy, Beaver Creek at reservation boundary,
    near.....384,408
  Big Sandy Creek at reservation boundary, near..135,396
  Boxelder Creek near.....137,407
Rocky Creek near Bozeman..... 359
Roscoe, Mystic Lake near..... 353
  West Rosebud Creek at Pine Grove campground,
    near..... 418
  West Rosebud Creek near.....260,413
Rosebud, Rosebud Creek at mouth near..... 307
Rosebud Creek (tributary to Yellowstone River)
    at mouth, near Rosebud.....307,416
  at reservation boundary, near Kirby.....305,416
  near Colstrip.....306,416
  near Kirby..... 369
Roundup, Musselshell River near.....116,406
Roy, South Fork Bear Creek tributary, near..... 363
Ruby Creek at mouth, near Cameron.....300,396
Ruby River, above reservoir, near Alder.....53,390
  below reservoir, near Alder.....54,390
  near Twin Bridges..... 376
  Reservoir near Alder.....341,354
Ruby River basin, crest-stage partial-record
    stations in..... 358
  gaging-station records in..... 53
Runoff in inches (IN., in.), definition of..... 32
Russian Coulee near Jordan..... 364

Saco, Beaver Creek, below Guston Coulee, near..... 200
  Milk River at Juneberg Bridge, near..... 192
  Nelson Reservoir near..... 353
Sadie Creek near Harlowton (formerly Spring
    Creek tributary near Harlowton)..... 362
Sage Creek (tributary to Big Sandy Creek)
    near Box Elder..... 384
  near Whitlash.....138,408
  tributary No. 2 near Joplin..... 365
St. Mary Canal, at St. Mary Crossing, near Babb... 45
St. Mary River, at international boundary..... 46
  near Babb.....43,387
St. Mary and upper Milk River basins, schematic
    diagram of..... 44
St. Xavier, Bighorn Lake near..... 281
  Bighorn River near.....282,414
Sand Creek near Dagmar.....245,412
Santa Rita, Big Rock Coulee near.....383,404
SAR, definition of..... 32
Sarpy Creek, tributary near Colstrip..... 369
Saskatchewan River basin, gaging-stations
    records in..... 40
  reservoir in..... 41
Scobey, East Fork Poplar River near.....228,385
Second Creek tributary No. 2 near Jordan..... 364
Sediment..... 26
  definition of..... 32
  mean concentration, definition of..... 32
  suspended sediment, definition of..... 32
  suspended-sediment concentration, definition of. 32
  suspended-sediment discharge, definition of..... 32
  suspended sediment load, definition of..... 32
Shawmut, Deadman's Basin Reservoir near.....352,354
  Musselshell River near.....114,406
Sheep Creek near Neihart..... 359
Shelby, Marias River near.....103,405
  Crooked Creek tributary, near..... 368
Shepherd, Twelvemile Creek, near..... 368
Sherburne, Lake Sherburne at..... 41

Page
Sherburne, Swiftcurrent Creek at.....42,387
Sheridan, Mill Creek at.....376,390
Mill Creek at forest service boundary, near....376,390
Wisconsin Creek near forest service boundary, near.....376,391
Shields River, near Livingston.....257,412
Short Creek near Forsyth..... 369
Shoshone River at Kane, WY..... 280
near Lovell, WY..... 278
Sidney, Alkalai Creek tributary, near..... 372
First Hay Creek, near..... 373
Yellowstone River near..... 342
Simpson, Spring Coulee tributary, near..... 365
Silver Star, Fish Creek near..... 360
Sixmile Creek tributary near Epsie..... 370
Sixteenmile Creek at mouth, near Toston.....382,400
Smith River near Fort Logan.....87,402
Reservoir near White Sulphur Springs.....349,354
Smith River basin, crest-stage partial-record stations in..... 360
gaging-station records in..... 87
Snell Creek near Hathaway..... 369
Snow Coulee at Opheim..... 366
Soda Creek tributary near Webster..... 373
Sodium-adsorption-ratio (SAR), definition of..... 32
Solute, definition of..... 32
Sourdough Creek near Bozeman..... 382
South Creek, tributary near Opheim..... 204
tributary No. 2, near Opheim..... 205
tributary No. 3, near international boundary.... 206
Spangler Ditch near Govenlock, Saskatchewan..... 147
Spanish Creek at mouth, near Gallatin Gateway....381,399
South Fork, at forest service boundary, near Gallatin Gateway.....381,399
Special networks and programs..... 20
Specific conductance, definition of..... 32
Spring Coulee (tributary to Big Sandy Creek), South Fork, near Havre..... 365
tributary near Simpson..... 365
Spring Creek (tributary to Box Elder Creek) near Plentywood..... 367
Spring Creek (tributary to Cut Bank Creek), near Cut Bank.....383,404
Spring Creek (tributary to Little Dry Creek) tributary near Van Norman..... 364
Spring Creek tributary (tributary to Cabin Creek) near Fallon..... 372
Squaw Creek at mouth, near Cameron.....380,396
near Gallatin Gateway.....381,398
Stage and water-discharge records, explanation of..... 22
Stage-discharge relation, definition of..... 32
Standard Creek below Wolverine Creek, near Cameron.....380,396
Starbuck Coulee near international boundary..... 208
Station identification numbers..... 20

Station records, surface water and water quality.. 41
Stebbins Creek at mouth, near Ashland..... 370
Steel Creek above Francis Creek, near Wisdom.....376,391
Swamp Creek near mouth, near Wisdom.....376,391
Stillwater River, above Nye Creek, near Nye.....259,413
Streamflow, definition of..... 32
Streamflow, hydrologic conditions of..... 4
quality of..... 7
Sullivan Creek (tributary to Redwater River), West Fork, near Richey..... 367
Sumatra, Home Creek near..... 363
Summary of hydrologic conditions--water year 1987..... 3
Sun River near Vaughn..... 92
Sun River basin, gaging station records in..... 90
schematic diagram of..... 89
Sunburst, Van Cleeve Coulee tributary, near..... 364
Surface area, definition of..... 32
Surface-water quality records, explanation of..... 25
Surficial bed material, definition of..... 32
Suspended, definition of..... 32
Suspended, total, definition of..... 33
determination of..... 33
Suspended, recoverable, definition of..... 33
determination of..... 33
Suspended sediment, definition of..... 32
Suspended-sediment concentration, definition of... 32
Suspended-sediment discharge, definition of..... 32
Suspended-sediment load, definition of..... 32
Sweetwater Creek near Alder..... 358
Swift Reservoir near Dupuyer.....351,354
Swiftcurrent Creek, at Many Glacier.....40,387
at Sherburne.....42,387
Swimming Woman Creek tributary near Living Springs..... 362

Page
Taffy Creek tributary near Winifred..... 362
Tampico, Milk River at.....210,411
Taylor Creek near Grayling.....381,397
Tenmile Creek near Rimini.....85,401
Terms, definition of..... 29
Terry, Cherry Creek near..... 371
Terry Coulee near Van Norman..... 364
Teton River near Dutton.....106,405
Thermograph, definition of..... 33
Thirteenmile Creek tributary near Bloomfield..... 372
Thompson Creek tributary near Cohagen..... 364
Three Forks, Jefferson River near.....60,394
Madison River at..... 381
Threemile Creek near Harlem..... 384
Timber Creek tributary near Van Norman (see Terry Coulee)..... 364
Timber Fork Creek tributary near Lindsay..... 372
Time-weighted average, definition of..... 33
Tom Creek near West Yellowstone.....374,388
Tongue River, at Birney Day School Bridge, near Birney..... 321
at Miles City..... 323
at mouth of Post Creek, near Decker..... 417
at State line near Decker..... 308
at Tongue River Dam, near Decker.....311,386
Tongue River Reservoir near Decker..... 353
Tons per acre-foot, definition of..... 33
Tons per day, definition of..... 33
Toston, Dry Creek at forest service boundary, near.....382,400
Missouri River at..... 76
Sixteenmile Creek, at mouth, near.....382,400
Total, definition of..... 33
Total, recoverable, definition of..... 33
Total, suspended, definition of..... 33
Total coliform bacteria, definition of..... 30
Total discharge, definition of..... 33
Total in bottom material, definition of..... 33
Total load, definition of..... 33
Townsend, Cabin Creek near..... 359
Deep Creek below North Fork Deep Creek, near...382,400
Duck Creek above Mill Gulch, near.....382 401
Trapper Creek at forest service boundary, near Melrose.....378,393
at mouth, near West Yellowstone.....379,395
Tree Creek near Kinsey..... 371
Trotters, ND, Beaver Creek near..... 356
Tule Creek tributary near Wolf Point..... 366
Turbidity, definition of..... 33
Twelvemile Creek near Shepherd..... 368
Twin Bridges, Beaverhead River near.....52,390
Big Hole River near.....378,393
Hells Canyon Creek at mouth, near.....378,393
Ruby River near..... 393
Twin Creek near Parkman, WY..... 292
Two Medicine Canal near Browning..... 403

Two Medicine River below South Fork, near Browning.....99,403
near Cut Bank.....383,404

Ulm, Missouri River near.....88,402
Unger Coulee near Vandalia..... 366

Val Marie, Frenchman River below Newton Lake, near..... 188
Huff Lake near..... 191
Huff Lake gravity canal near..... 186
Huff Lake pumping canal near..... 185
Newton Lake near..... 191
Newton Lake Main Canal near..... 187
Valentine, Blood Creek tributary, near..... 363
Valier, Lake Frances near.....351,354
Lone Man Coulee, near..... 361
Van Cleeve Coulee tributary near Sunburst..... 364
Van Norman, Big Dry Creek near.....123,406
McGuire Creek tributary, near..... 364
Spring Creek tributary, near..... 364
Terry Coulee, near..... 364
Vandalia, Milk River near.....209,411
Unger Coulee, near..... 366
Vaughn, Muddy Creek at.....91,402
Muddy Creek near.....90,402
Sun River near..... 92
Verdigris Coulee near the mouth, near Milk River, Alberta..... 133
Vida, Cow Creek tributary near..... 367
Wolf Creek tributary, near..... 367
Vidora, Saskatchewan, Belanger Creek diversion canal near..... 181
Cypress Lake east outflow canal near..... 182

Page

Vidora Ditch near Consul, Saskatchewan 160
Virgelle, Alkalai Coulee tributary, near..... 361
  Little Sandy Creek tributary, near..... 361
  Missouri River at.....107,405
Volborg, Basin Creek tributary, near..... 370
  Deer Creek tributary, near..... 370
  Jack Creek near..... 370
  LaGrange Creek near..... 370

Water-supply papers, definition of..... 33
Water temperature..... 26
Water year, definition of..... 33
Watkins Creek at mouth, near West Yellowstone....379,395
WDR (Water data report), definition of..... 33
Webster, Soda Creek tributary near..... 373
Wegner Creek at Craig..... 360
Weighted average, definition of..... 33
West Pass Creek near Parkman, WY..... 290
West Plains, Saskatchewan, Cypress Lake
    west inflow canal near..... 157
  Cypress Lake west outflow canal near..... 159
West Rosebud Creek near Roscoe..... 260
West Wets Creek near Billings..... 368
West Yellowstone, Antelope Creek at mouth, near..374,387
  Beaver Creek near mouth, near.....379,395
  Cabin Creek near.....379,395
  Corral Creek near.....374,387
  Cougar Creek near mouth, near.....379,394
  Duck Creek above Canyon Creek, near..... 379
  Duck Creek above Cougar Creek, near..... 394
  Firehole River near..... 61
  Gibbon River near..... 64
  Grayling Creek near mouth, near.....379,395
  Hebgen Lake near.....347,354,378
  Hellroaring Creek near..... 387
  Madison River near.....378,394
  Red Canyon Creek near mouth, near.....379,395
  Red Rock River above upper Red Rock Lake,
      near.....374,387
  South Fork Madison River, above Denny Creek,
      near..... 379
    below Denney Creek, near.....379,394
  Tom Creek near.....374,388
  Trapper Creek at mouth, near..... 395
    near mouth, near..... 379
  Watkins Creek at mouth, near.....379,395
Weston, WY, Little Powder River above Dry Creek,
    near..... 335
White Bear Creek below Fifteenmile Creek,
    near Dodson.....384,409
White Sulphur Springs, Smith River Reservoir
    near.....349,354
Whitehall, Jefferson River tributary No. 2, near.. 359
Whitewater, Lush Coulee near..... 365
Whitlash, Sage Creek near.....138,408
Wibaux, Krug Creek tributary No. 2, near..... 372
  South Fork Horse Creek tributary, near..... 372
Willard, Lame Jones Creek, near..... 371
Willow Coulee near Dodson.....176,410
Willow Creek (tributary to Jefferson River)
    near Harrison.....59,394
Willow Creek, North, below Pony Creek at Pony....378,394
  South, below Camp Creek, near Pony.....378,393
Willow Creek (tributary to Milk River) near
    Glasgow..... 211
  tributary near Fort Peck..... 366
Willow Creek (tributary to Red Lodge Creek)
    near Boyd.....266,413
Willow Creek Reservoir (Sun River basin)
    near Augusta.....350,354
Willow Creek Reservoir (Willow Creek basin)
    near Harrison.....347,354
Winifred, Taffy Creek tributary, near..... 362

Page

Winston, Avalanche Gulch at forest service
    boundary, near.....382,401
  Confederates Gulch below Jimmys Gulch,
    near.....382,401
Wisconsin Creek near forest service boundary,
    near Sheridan.....376,391
Wisdom, North Fork Big Hole River near mouth,
    near.....376,391
  Pintlar Creek near mouth, near.....377,391
  Steel Creek near mouth above Francis Creek,
    near.....376,391
  Steel Creek near.....376,391
  Swamp Creek near mouth, near.....376,391
  Trail Creek near.....376,391
Wise River, Bear Creek at mouth, near.....377,392
  Deep Creek at mouth, near.....377,392
  Fishtrap Creek at mouth, near.....377,392
  Jerry Creek at forest service boundary, near...377,392
  Lamarche Creek at mouth, near.....377,392
  Quartz Hill Gulch, near..... 358
Wolf Creek, Holter Lake near.....360,354
  Missouri River below Holter Dam, near.....86,402
Wolf Creek (Big Muddy Creek basin)
    near Reserve..... 386
Wolf Creek (Judith River basin) tributary near
    Coffee Creek (town of)..... 362
Wolf Creek (Little Missouri River basin) near
    Hammond.....175,373
Wolf Creek (Redwater River basin) tributary
    near Vida..... 361
Wolf Creek (Wolf Creek basin), East Fork,
    near Lustre..... 366
Wolf Creek (tributary to Missouri River)
    near Wolf Point.....217,411
Wolf Creek basin, crest-stage partial-record
    stations in..... 366
Wolf Point, Missouri River near.....218,411
  tributary No. 6, near..... 365
  Tule Creek tributary, near..... 366
  Wolf Creek near.....217,411
WSP, definition of..... 33
Wyola, Little Bighorn River at State line
    near.....288,415
  Little Bighorn River below Pass Creek, near....294,415
  Lodge Grass Creek above Willow Creek
    diversion, near.....297,415
    at State line, near..... 296
  Pass Creek near.....293,415

Yellowstone National Park:
  Firehole River near West Yellowstone..... 61
  Gardner River near Mammoth..... 249
  Gibbon River near West Yellowstone..... 64
Yellowstone River, at Billings..... 269
  at Corwin Springs..... 250
  at Forsyth.....304,416
  at Miles City.....326,417
  near Livingston..... 253
  near Sidney..... 342
  tributary No. 5 near Marsh..... 372
  tributary No. 6 near Glendive..... 372
Yellowstone River basin, crest-stage partial-
    record stations in..... 368
  discharge measurements at miscellaneous
    sites in..... 386
  gaging station records in..... 249

Zortman, Beaver Creek near..... 195
  tributary, near..... 365
  Big Warm Creek near.....199,411
  Little Warm Creek at reservation boundary,
    near..... 196
Zurich, Fifteenmile Creek tributary, near..... 365

October 1, 1978

FACTORS FOR CONVERTING INCH-POUND UNITS TO INTERNATIONAL SYSTEM UNITS (SI)

The following factors may be used to convert the inch-pound units published herein to the International System of Units (SI).

Multiply inch-pound units	By	To obtain SI units
	Length	
inches (in)	2.54×10^{1}	millimeters (mm)
	2.54×10^{-2}	meters (m)
feet (ft)	3.048×10^{-1}	meters (m)
miles (mi)	1.609×10^{0}	kilometers (km)
	Area	
acres	4.047×10^{3}	square meters (m^2)
	4.047×10^{-1}	square hectometers (hm^2)
	4.047×10^{-3}	square kilometers (km^2)
square miles (mi^2)	2.590×10^{0}	square kilometers (km^2)
	Volume	
gallons (gal)	3.785×10^{0}	liters (L)
	3.785×10^{0}	cubic decimeters (dm^3)
	3.785×10^{-3}	cubic meters (m^3)
million gallons	3.785×10^{3}	cubic meters (m^3)
	3.785×10^{-3}	cubic hectometers (hm^3)
cubic feet (ft^3)	2.832×10^{1}	cubic decimeters (dm^3)
	2.832×10^{-2}	cubic meters (m^3)
cfs-days	2.447×10^{3}	cubic meters (m^3)
	2.447×10^{-3}	cubic hectometers (hm^3)
acre-feet (acre-ft)	1.233×10^{3}	cubic meters (m^3)
	1.233×10^{-3}	cubic hectometers (hm^3)
	1.233×10^{-6}	cubic kilometers (km^3)
	Flow	
cubic feet per second (ft^3/s)	2.832×10^{1}	liters per second (L/s)
	2.832×10^{1}	cubic decimeters per second (dm^3/s)
	2.832×10^{-2}	cubic meters per second (m^3/s)
gallons per minute (gal/min)	6.309×10^{-2}	liters per second (L/s)
	6.309×10^{-2}	cubic decimeters per second (dm^3/s)
	6.309×10^{-5}	cubic meters per second (m^3/s)
million gallons per day	4.381×10^{1}	cubic decimeters per second (dm^3/s)
	4.381×10^{-2}	cubic meters per second (m^3/s)
	Mass	
tons (short)	9.072×10^{-1}	megagrams (Mg) or metric tons

USGS LIBRARY - RESTON
3 1818 00453134 7

INT 413

U.S. DEPARTMENT OF THE INTERIOR
Geological Survey
Federal Office Building, Drawer 10076
Helena, MT 59626

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

SPECIAL 4TH CLASS BOOK RATE