

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

WATER-SUPPLY PAPER 306

**SURFACE WATER SUPPLY OF THE
UNITED STATES**

1911

PART VI. MISSOURI RIVER BASIN

PREPARED UNDER THE DIRECTION OF M. O. LEIGHTON

BY

**W. A. LAMB, W. B. FREEMAN, AND
RAYMOND RICHARDS**



WASHINGTON
GOVERNMENT PRINTING OFFICE
1914

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

GEORGE OTIS SMITH, DIRECTOR

WATER-SUPPLY PAPER 306

SURFACE WATER SUPPLY OF THE
UNITED STATES

1911

PART VI. MISSOURI RIVER BASIN

PREPARED UNDER THE DIRECTION OF M. O. LEIGHTON

BY

W. A. LAMB, W. B. FREEMAN, AND
RAYMOND RICHARDS



*Water Resources Branch,
Geological Survey,
Box 3106, Capitol Station
Oklahoma City, Okla.*

WASHINGTON
GOVERNMENT PRINTING OFFICE
1914

CONTENTS.

	Page.
Authorization of work.....	9
Publications.....	10
Definition of terms.....	12
Convenient equivalents.....	13
Explanation of data.....	14
Accuracy and reliability of field data and comparative results.....	16
Cooperation and assistance.....	17
Division of work.....	18
Appropriation of water.....	19
Variations in State water laws.....	19
Constitutional provisions.....	19
Colorado.....	19
Wyoming.....	20
Montana.....	21
North Dakota.....	21
South Dakota.....	21
Nebraska.....	21
Administration of water laws.....	21
Colorado.....	21
Wyoming.....	22
Montana.....	22
North Dakota.....	22
Nebraska.....	23
Irrigation districts.....	23
The Carey Act.....	23
Gaging station records.....	25
Missouri River proper.....	25
Red Rock River above Red Rock reservoir, near Monida, Mont.....	25
Red Rock River below Red Rock reservoir, near Monida, Mont.....	26
Red Rock River at Lima, Mont.....	28
Beaverhead River at Barratts, Mont.....	30
Jefferson River near Silverstar, Mont.....	32
Missouri River near Toston, Mont.....	34
Missouri River at Cascade, Mont.....	36
Missouri River at Fort Benton, Mont.....	38
Tributary basins.....	38
Bighole River basin.....	38
Bighole River near Dewey, Mont.....	38
Ruby River basin.....	40
Ruby River near Alder, Mont.....	40
Pipestone Creek basin.....	42
Pipestone Creek near Whitehall, Mont.....	42
Whitetail Creek basin.....	44
Whitetail Creek near Whitehall, Mont.....	44
Little Whitetail Creek near Whitehall, Mont.....	45
Gallatin River basin.....	46
West Gallatin River near Salesville, Mont.....	46
Deep Creek basin.....	48
Deep Creek near Townsend, Mont.....	48

Gaging station records—Continued.

Tributary basins—Continued.

	Page.
Prickly Pear Creek basin.....	50
Prickly Pear Creek near Clancy, Mont.....	50
Prickly Pear Creek at East Helena, Mont.....	51
Lump Gulch Creek near Clancy, Mont.....	53
Tenmile Creek near Helena, Mont.....	55
Sevenmile Creek at Birdseye, Mont.....	58
Little Prickly Pear Creek basin.....	60
Little Prickly Pear Creek near Marysville, Mont.....	60
Little Prickly Pear Creek near Canyon Creek, Mont.....	62
Deadman Creek near Marysville, Mont.....	64
Lost Horse Creek near Marysville, Mont.....	65
Marsh Creek near Marysville, Mont.....	66
Dearborn River basin.....	67
Dearborn River near Clemons, Mont.....	67
Falls Creek near Clemons, Mont.....	70
Sun River basin.....	71
North Fork of Sun River near Augusta, Mont.....	71
Sun River at Sun River, Mont.....	74
Willow Creek near Augusta, Mont.....	75
South Fork of Sun River at Augusta, Mont.....	77
Ford Creek near Augusta, Mont.....	79
Smith Creek near Augusta, Mont.....	81
Marias River basin.....	83
Marias River near Shelby, Mont.....	83
Two Medicine River at Family, Mont.....	85
Badger Creek near Family, Mont.....	87
Cutbank Creek at Cutbank, Mont.....	89
Birch Creek near Dupuyer, Mont.....	91
Dupuyer Creek at Dupuyer, Mont.....	93
Dry Fork of Marias River near Valier, Mont.....	95
Teton River at Strabane, Mont.....	97
Deep Creek near Choteau, Mont.....	100
Musselshell River basin.....	102
North Fork of Musselshell River near Delpine, Mont.....	102
North Fork of Musselshell River near Martinsdale, Mont.....	104
Musselshell River at Harlowton, Mont.....	106
Checkerboard Creek near Delpine, Mont.....	108
South Fork of Musselshell River near Martinsdale, Mont.....	110
American Fork near Harlowton, Mont.....	112
Lebo Creek near Harlowton, Mont.....	114
Flatwillow Creek near Flatwillow, Mont.....	116
Milk River basin.....	117
South Fork of Milk River near Browning, Mont.....	117
Milk River at Havre, Mont.....	120
Milk River at Malta, Mont.....	122
Milk River near Hinsdale, Mont.....	124
North Fork of Milk River, Browning, Mont.....	126
North Fork of Milk River near Chinook, Mont.....	127
Beaver Creek near Saco, Mont.....	129
Beaver Creek overflow near Bowdoin, Mont.....	131
Porcupine Creek at Nashua, Mont.....	132
Private canals in Milk River valley.....	134
General features.....	134
Paradise Valley canal near Chinook, Mont.....	134

Gaging station records—Continued.

Tributary basins—Continued.

Milk River basin—Continued.

	Page.
Private canals in Milk River valley—Continued.	
Cook canal near Chinook, Mont.....	136
Matheson canal near Chinook, Mont.....	137
Harlem canal near Zurich, Mont.....	138
Agency ditch near Harlem, Mont.....	140
Fort Belknap canal near Chinook, Mont.....	141
Little Porcupine Creek basin.....	143
Little Porcupine Creek near Frazer, Mont.....	143
Wolf Creek basin.....	144
Wolf Creek at Wolf Point, Mont.....	144
Poplar Creek basin.....	146
Poplar Creek near Poplar, Mont.....	146
Big Muddy Creek, near Culbertson, Mont.....	148
Yellowstone River basin.....	150
Yellowstone River at Corwin Springs, Mont.....	150
Yellowstone River at Huntley, Mont.....	152
Yellowstone River at Lower Yellowstone dam, at Intake, Mont. .	154
North Fork of Big Timber Creek near Big Timber, Mont.....	157
South Fork of Big Timber Creek near Big Timber, Mont.....	159
Boulder River near Contact, Mont.....	161
West Fork of Boulder River at McLeod, Mont.....	163
Sweetgrass Creek above Melville, Mont.....	165
Sweetgrass Creek below Melville, Mont.....	166
Stillwater River near Nye, Mont.....	168
Stillwater River near Absarokee, Mont.....	168
Woodbine Creek near Nye, Mont.....	170
Rosebud Creek at Absarokee, Mont.....	170
Clark Fork at Fromberg, Mont.....	172
Pryor Creek near Pryor, Mont.....	174
Pryor Creek near Coburn, Mont.....	174
Pryor Creek at Huntley, Mont.....	175
Wind River at Dubois, Wyo.....	177
Wind River at Riverton, Wyo.....	178
Bighorn River at Thermopolis, Wyo.....	180
Bighorn River near Hardin, Mont.....	182
Warm Springs Creek near Dubois, Wyo.....	184
Horse Creek at Dubois, Wyo.....	185
Little Wind River above Arapahoe, Wyo.....	187
Little Wind River below Arapahoe, Wyo.....	189
Popo Agie River near Lander, Wyo.....	190
Little Popo Agie River at Hudson, Wyo.....	191
Owl Creek near Thermopolis, Wyo.....	192
No Wood River at Bonanza, Wyo.....	195
Tensleep Creek near Tensleep, Wyo.....	197
Paint Rock Creek near Hyattville, Wyo.....	199
Paint Rock Creek near Bonanza, Wyo.....	199
Greybull River near Meeteetse, Wyo.....	201
Wood River near Meeteetse, Wyo.....	204
Little Bighorn River, near Wyola, Mont.....	206
Little Bighorn River near Crow Agency, Mont.....	207
Shoshone River at Corbett Dam, Wyo.....	207
Soap Creek near St. Xavier, Mont.....	210

Gaging station records—Continued.

Tributary basins—Continued.

Yellowstone River basin—Continued.

	Page.
Rottengrass Creek near St. Xavier, Mont.....	210
Lodgegrass Creek near Lodgegrass, Mont.....	211
Tongue River basin.....	211
Tongue River near Dayton, Wyo.....	211
Tongue River at Carneyville, Wyo.....	212
Goose Creek at Sheridan, Wyo.....	213
Little Goose Creek at Sheridan, Wyo.....	215
Powder River basin.....	217
South Fork of Powder River near Kaycee, Wyo.....	217
Middle Fork of Powder River at Kaycee, Wyo.....	217
North Fork of Powder River near Kaycee, Wyo.....	219
Clear Creek near Buffalo, Wyo.....	220
Clear Creek at Buffalo, Wyo.....	221
Piney Creek at Kearney, Wyo.....	222
Little Missouri River basin.....	224
Little Missouri River near Alzada, Mont.....	224
Knife River basin.....	224
Knife River near Broncho, N. Dak.....	224
Heart River basin.....	227
Heart River near Richardton, N. Dak.....	227
Cannonball River basin.....	228
Cannonball River near Stevenson, N. Dak.....	228
Grand River basin.....	230
North Branch of Grand River at Haley, N. Dak.....	230
Grand River near Wakpala, S. Dak.....	230
White River basin.....	231
White River near Interior, S. Dak.....	231
White River at Westover, S. Dak.....	232
Niobrara River basin.....	232
Niobrara River at Niobrara, Nebr.....	232
Big Sioux River basin.....	233
Rock River at Luverne, Minn.....	233
Platte River basin.....	235
North Platte River at Saratoga, Wyo.....	235
North Platte River at Pathfinder, Wyo.....	237
North Platte River and Interstate canal at Whalen, Wyo.....	240
North Platte River near Mitchell, Nebr.....	243
North Platte River at North Platte, Nebr.....	245
Platte River near Columbus, Nebr.....	247
Platte River near Leshara, Nebr.....	248
Big Creek near Downingtown, Wyo.....	250
Mullen Creek near French, Wyo.....	250
French Creek near French, Wyo.....	251
Brush Creek near Saratoga, Wyo.....	253
Encampment River at Encampment, Wyo.....	254
Cow Creek near Saratoga, Wyo.....	256
Spring Creek near Saratoga, Wyo.....	258
Jack Creek near Saratoga, Wyo.....	260
Pass Creek near Walcott, Wyo.....	262
Medicine Bow River near Medicine Bow, Wyo.....	263
Rock Creek near Arlington, Wyo.....	264
Rock Creek near Rock River, Wyo.....	266

Gaging station records—Continued.

Tributary basins—Continued.

Platte River basin—Continued.

Page.

Boxelder Creek near Careyhurst, Wyo.....	268
Laramie River at Glendevey, Colo.....	269
Laramie River near Jelm, Wyo.....	271
Laramie River at Woods Landing, Wyo.....	274
Laramie River at Two Rivers, Wyo.....	276
Little Laramie River near Filmore, Wyo.....	277
Little Laramie River at Two Rivers, Wyo.....	278
North Laramie River at Uva, Wyo.....	279
Chugwater Creek at Chugwater, Wyo.....	280
Horse Creek near Little Horse Creek, Wyo.....	281
Horse Creek near Lagrange, Wyo.....	282
Middle Fork of South Platte River at Fairplay, Colo.....	283
South Fork of South Platte River at Lake George, Colo.....	284
South Fork of South Platte River at South Platte, Colo.....	285
South Platte River at South Platte, Colo.....	288
South Platte River at Denver, Colo.....	292
South Platte River near Kersey, Colo.....	294
South Platte River at Julesburg, Colo.....	297
Tarryall Creek near Como, Colo.....	299
Tarryall Creek near Jefferson, Colo.....	300
Tarryall Creek near Hayman, Colo.....	301
Jefferson Creek at Jefferson, Colo.....	303
Michigan Creek near Jefferson, Colo.....	304
North Fork of South Platte River at Grant, Colo.....	305
North Fork of South Platte River at Cassells, Colo.....	306
Geneva Creek above Jackwhacker Creek, near Grant, Colo.....	309
Geneva Creek at Old Geneva smelter, near Grant, Colo.....	309
Geneva Creek at Sullivan's ranch, near Grant, Colo.....	310
Geneva Creek at Grant, Colo.....	312
Smelter Creek near Grant, Colo.....	313
Duck Lake Creek near Grant, Colo.....	313
Scott Gomer Creek near Grant, Colo.....	314
Clear Creek at Idaho Springs, Colo.....	316
Clear Creek at Forkscreek, Colo.....	318
St. Vrain Creek at Lyons, Colo.....	319
Boulder Creek at Orodell, Colo.....	321
South Boulder Creek near Rollinsville, Colo.....	324
South Boulder Creek at Eldorado Springs, Colo.....	326
Big Thompson Creek near Arkins, Colo.....	327
Cache la Poudre River near Elkhorn, Colo.....	329
Cache la Poudre River near Fort Collins, Colo.....	332
Cache la Poudre River at mouth of canyon near Fort Collins, Colo.....	334
Loup River at Columbus, Nebr.....	336
Elkhorn River at Waterloo, Nebr.....	338
Kansas River basin.....	339
Republican River at Bostwick, Nebr.....	339
Big Blue River at Beatrice, Nebr.....	342
Little Blue River near Fairbury, Nebr.....	344

Miscellaneous measurements.....	346
Index.....	351

ILLUSTRATIONS.

	Page.
PLATE I. Map of United States showing mean annual precipitation.....	14
II. Map of United States showing mean annual run-off.....	14
III. Typical gaging stations: <i>A</i> , Cable station with automatic gage; <i>B</i> , Station for bridge measurements.....	16
IV. Small Price current meters.....	17

SURFACE WATER SUPPLY OF THE MISSOURI RIVER BASIN, 1911.

By W. A. LAMB, W. B. FREEMAN, and RAYMOND RICHARDS.

AUTHORITY FOR THE WORK.

This volume is Part VI of a series of 12 reports presenting results of measurements of flow made on certain streams in the United States during the calendar year 1911. The reports are listed in the following table:

Papers on surface water supply of the United States, 1911.

Part. ^a	No.	Title.
I	301	North Atlantic coast.
II	302	South Atlantic coast and eastern Gulf of Mexico.
III	303	Ohio River basin.
IV	304	St. Lawrence River basin.
V	305	Upper Mississippi River and Hudson Bay basins.
VI	306	Missouri River basin.
VII	307	Lower Mississippi River basin.
VIII	308	Western Gulf of Mexico.
IX	309	Colorado River basin.
X	310	Great Basin.
XI	311	Pacific coast in California.
XII	312	North Pacific coast.

^a For the purpose of uniformity in the presentation of reports, a general plan has been agreed upon by the United States Reclamation Service, the United States Forest Service, the United States Weather Bureau, and the United States Geological Survey, according to which the area of the United States has been divided into 12 parts, whose boundaries coincide with natural drainage lines indicated by the parts of the report.

The data presented in these reports were collected by the United States Geological Survey under authority implied in the organic law (20 Stat. L., p. 394), which contains the following paragraph:

Provided, That this officer [the Director] shall have the direction of the geological survey and the classification of public lands and examination of the geological structure, mineral resources, and products of the national domain.

The work was begun in 1888 in connection with special studies of water supply for irrigation.

Since the fiscal year ending June 30, 1895, successive sundry civil bills passed by Congress have carried the following item and appropriations:

For gaging the streams and determining the water supply of the United States and for the investigation of underground currents and artesian wells and for the preparation of reports upon the best methods of utilizing the water resources.

Annual appropriations for the fiscal year ending June 30—

1895.....	\$12,500
1896.....	20,000
1897 to 1900, inclusive.....	50,000
1901 to 1902, inclusive.....	100,000
1903 to 1906, inclusive.....	200,000
1907.....	150,000
1908 to 1910, inclusive.....	100,000
1911 to 1913, inclusive.....	150,000

In the execution of the work many private and State organizations have cooperated. Acknowledgments for such cooperation are made on pages 13-14, and also in connection with the description of each station affected by the cooperative work.

PUBLICATIONS.

Measurements of stream flow have been made at nearly 2,000 points in the United States, and also at many points in small areas in Seward Peninsula and the Yukon-Tanana region, Alaska, and in the Hawaiian Islands. During 1911 gaging stations were maintained by the Survey and the cooperating organizations at about 1,500 points in the United States, and many discharge measurements were made at other points. In connection with this work data were also collected in regard to precipitation, evaporation, storage reservoirs, river profiles, and water power in many sections of the country, and will be made available in the regular surface water supply papers from time to time. A complete list of the gaging stations maintained by the Survey to and including 1910, and a list of the papers relating to the water supply of the country, have been published by the Survey as Water-Supply Paper 280. An index to the reports containing stream-flow measurements prior to 1904 has been published as Water-Supply Paper 119.

For each calendar year there has been prepared a report embodying the stream-flow data collected during that year, which has been published either as a part of the Annual Report of the Director, as a bulletin, or as a water-supply paper, as shown by the following table:

Stream-flow data in reports of the United States Geological Survey.

[A=Annual Report; B=Bulletin; WS=Water-Supply Paper.]

Report.	Character of data.	Year.
10th A, pt. 2.....	Descriptive information only.....	
11th A, pt. 2.....	Monthly discharge.....	1884 to Sept., 1890.
12th A, pt. 2.....	.....do.....	1884 to June 30, 1891.
13th A, pt. 3.....	Mean discharge in second-feet.....	1884 to Dec. 31, 1892.
14th A, pt. 2.....	Monthly discharge (long-time records, 1871 to 1893).....	1888 to Dec. 31, 1893.
B 131.....	Descriptions, measurements, gage heights, and rating.....	1893 and 1894.
16th A, pt. 2.....	Descriptive information only.....	
B 140.....	Descriptions, measurements, gage heights, ratings, and monthly discharge (also many data covering earlier years).....	1895.
WS 11.....	Gage heights (also gage heights for earlier years).....	1896.
18th A, pt. 4.....	Descriptions, measurements, ratings, and monthly discharge (also similar data for some earlier years).....	1895 and 1896.
WS 15.....	Descriptions, measurements, and gage heights, eastern United States, eastern Mississippi River, and Missouri River above junction with Kansas.....	1897.
WS 16.....	Descriptions, measurements, and gage heights, western Mississippi River below junction of Missouri and Platte, and western United States.....	1897.
19th A, pt. 4.....	Descriptions, measurements, ratings, and monthly discharge (also some long-time records).....	1897.
WS 27.....	Measurements, ratings, and gage heights, eastern United States, eastern Mississippi River, and Missouri River.....	1898.

Stream-flow data in reports of the United States Geological Survey—Continued.

Report.	Character of data.	Year.
WS 28.....	Measurements, ratings, and gage heights, Arkansas River and western United States.	1898.
20th A, pt. 4.....	Monthly discharge (also for many earlier years).....	1898.
WS 35 to 39.....	Descriptions, measurements, gage heights, and ratings.....	1899.
21st A, pt. 4.....	Monthly discharge.....	1899.
WS 47 to 52.....	Descriptions, measurements, gage heights, and ratings.....	1900.
22d A, pt. 4.....	Monthly discharge.....	1900.
WS 65, 66.....	Descriptions, measurements, gage heights, and ratings.....	1901.
WS 75.....	Monthly discharge.....	1901.
WS 82 to 85.....	Complete data.....	1902.
WS 97 to 100.....	do.....	1903.
WS 124 to 135.....	do.....	1904.
WS 165 to 178.....	do.....	1905.
WS 201 to 214.....	Complete data, except descriptions.....	1906.
WS 241 to 252.....	Complete data.....	1907-8.
WS 261 to 272.....	do.....	1909.
WS 281 to 292.....	do.....	1910.
WS 301 to 312.....	do.....	1911.

NOTE.—No data regarding stream flow are given in the 15th and 17th annual reports.

The table which follows gives, by years and drainage basins, the numbers of the papers on surface water supply published from 1899 to 1911. The data for any particular station will be found in the reports covering the years during which the station was maintained. For example, data for Machias River at Whitneyville, Me., 1903 to 1911, are published in Water-Supply Papers 97, 124, 165, 201, 241, 261, 281, and 301, which contain records for the New England streams from 1903 to 1911.

Numbers of water-supply papers containing results of stream measurements, 1899-1911.

	1899 ^a	1900 ^b	1901	1902	1903	1904
North Atlantic Coast (St. John River to York River).....	35	47, c 48	65, 75	82	97	d 124, e 125, f 126
South Atlantic Coast and Eastern Gulf of Mexico (James River to the Mississippi).....	g 35, 36	48	65, 75	g 82, 83	g 97, 98	f 126, 127
Ohio River Basin.....	36	48, h 49	65, 75	83	98	128
St. Lawrence River and Great Lakes.....	36	49	65, 75	i 82, 83	97	129
Hudson Bay and Upper Mississippi River.....	36	49	j 65, 66, 75	j 83, 85	j 98, 99, 100	j 128, 130
Missouri River.....	k 36, 37	49, l 50	66, 75	84	99	130, m 131
Lower Mississippi River.....	37	50	j 65, 66, 75	j 83, 84	j 98, 99	j 128, 131
Western Gulf of Mexico.....	37	50	66, 75	84	99	132
Colorado River.....	n 37, 38	50	66, 75	85	100	133
Great Basin.....	38, o 39	51	66, 75	85	100	133, p 134
Pacific Coast in California.....	38, q 39	51	66, 75	85	100	134
North Pacific Coast.....	38	51	66, 75	85	100	135

^a Rating tables and index to Water-Supply Papers 35-39 continued in Water-Supply Paper 39.

^b Rating tables and index to Water-Supply Papers 47-52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52.

^c Wissahickon and Schuylkill rivers to James River.

^d New England rivers only.

^e Hudson River to Delaware River, inclusive.

^f Susquehanna River to Yackin River, inclusive.

^g James River only.

^h Scioto River.

ⁱ Lake Ontario and tributaries to St. Lawrence River proper.

^j Tributaries of Mississippi from east.

^k Gallatin River.

^l Loup and Platte rivers near Columbus, Nebr., and all tributaries below junction with Platte.

^m Platte and Kansas rivers.

ⁿ Green and Gunnison rivers and Grand River above junction with Gunnison.

^o Mohave River only.

^p Great Basin in California, excepting Truckee and Carson drainage basins.

^q Kings and Kern rivers and south Pacific coast drainage basins.

Numbers of water-supply papers containing results of stream measurements, 1899-1911—Continued.

	1905	1906	1907-8	1909	1910	1911
North Atlantic coast (St. John River to York River).....	^a 165, ^b 166, ^c 167	^a 201, ^b 202, ^c 203	241	261	281	301
South Atlantic Coast and Eastern Gulf of Mexico (James River to the Mississippi).....	^c 167, 168	^c 203, 204	242	262	282	302
Ohio River Basin.....	169	205	243	263	283	303
St. Lawrence River and Great Lakes.....	170	206	244	264	284	304
Hudson Bay and upper Mississippi River.....	171	207	245	265	285	305
Missouri River.....	172	208	246	266	286	306
Lower Mississippi River.....	^d 169, 173	^d 203, 209	247	267	287	307
Western Gulf of Mexico.....	174	210	248	268	288	308
Colorado River.....	175, ^e 177	211	249	269	289	309
Great Basin.....	176, ^f 177	212, ^f 213	250, ^f 251	270, ^f 271	290	310
Pacific coast in California.....	177	213	251	271	291	311
North Pacific coast.....	^g 177, 178	214	252	272	292	312

^a New England rivers only.

^b Hudson river to Delaware River, inclusive.

^c Susquehanna River to Yadkin River, inclusive.

^d Tributaries of Mississippi from east.

^e Below junction with Gila.

^f Great Basin in California, excepting Truckee and Carson drainage basins.

^g Rogue, Umpqua, and Siletz rivers only.

DEFINITION OF TERMS.

The volume of water flowing in a stream—the “run-off” or “discharge”—is expressed in various terms, each of which has become associated with a certain class of work. These terms may be divided into two groups—(1) those which represent a rate of flow, as second-feet, gallons per minute, miner’s inches, and discharge in second-feet per square mile, and (2) those which represent the actual quantity of water, as run-off in depth in inches and acre-feet. The units used in this series of reports are second-feet, second-feet per square mile, run-off depth in inches and acre-feet. They may be defined as follows:

“Second-foot” is an abbreviation for cubic foot per second and is the unit for the rate of discharge of water flowing in a stream 1 foot wide, 1 foot deep, at a rate of 1 foot per second. It is generally used as a fundamental unit from which others are computed by the use of the factors given in the following table of equivalents.

“Second-feet per square mile” is the average number of cubic feet of water flowing per second from each square mile of area drained, on the assumption that the run-off is distributed uniformly both as regards time and area.

“Run-off, depth in inches,” is the depth to which the drainage area would be covered if all the water flowing from it in a given period were conserved and uniformly distributed on the surface. It is used for comparing run-off with rainfall, which is usually expressed in depth in inches.

An “acre-foot” is equivalent to 43,560 cubic feet and is the quantity required to cover an acre to the depth of 1 foot. The term is commonly used in connection with storage for irrigation work.

CONVENIENT EQUIVALENTS.

The following is a list of convenient equivalents for use in hydraulic computations:

Table for converting discharge in second-feet per square mile into run-off in depth in inches over the area.

Discharge in second-feet per square mile.	Run-off in inches.				
	1 day.	28 days.	29 days.	30 days.	31 days.
1.....	0.03719	1.041	1.079	1.116	1.153
2.....	.07438	2.083	2.157	2.231	2.306
3.....	.11157	3.124	3.236	3.347	3.459
4.....	.14876	4.165	4.314	4.463	4.612
5.....	.18595	5.207	5.393	5.578	5.764
6.....	.22314	6.248	6.471	6.694	6.917
7.....	.26033	7.289	7.550	7.810	8.070
8.....	.29752	8.331	8.628	8.926	9.223
9.....	.33471	9.372	9.707	10.041	10.376

NOTE.—For partial month multiply the values for one day by the number of days.

Table for converting discharge in second-feet into run-off in acre-feet.

Discharge in second-feet.	Run-off in acre-feet.				
	1 day.	28 days.	29 days.	30 days.	31 days.
1.....	1.983	55.54	57.52	59.50	61.49
2.....	3.967	111.1	115.0	119.0	123.0
3.....	5.950	166.6	172.6	178.5	184.5
4.....	7.934	222.1	230.1	238.0	246.0
5.....	9.917	277.7	287.6	297.5	307.4
6.....	11.90	333.2	345.1	357.0	368.9
7.....	13.88	388.8	402.6	416.5	430.4
8.....	15.87	444.3	460.2	476.0	491.9
9.....	17.85	499.8	517.7	535.5	553.4

NOTE.—For partial month multiply the values for one day by the number of days.

1 second-foot equals 40 California miner's inches (law of March 23, 1901).

1 second-foot equals 38.4 Colorado miner's inches.

1 second-foot equals 40 Arizona miner's inches.

1 second-foot equals 7.48 United States gallons per second; equals 448.8 gallons per minute; equals 646,317 gallons for one day.

1 second-foot for one year covers 1 square mile 1.131 feet or 13.572 inches deep.

1 second-foot for one year equals 31,536,000 cubic feet.

1 second-foot equals about 1 acre-inch per hour.

1 second-foot for one day equals 86,400 cubic feet.

1,000,000,000 (1 United States billion) cubic feet equals 11,570 second-feet for 1 day.

1,000,000,000 cubic feet equals 414 second-feet for one 28-day month.

1,000,000,000 cubic feet equals 399 second-feet for one 29-day month.

1,000,000,000 cubic feet equals 386 second-feet for one 30-day month.

1,000,000,000 cubic feet equals 373 second-feet for one 31-day month.

100 California miner's inches equals 18.7 United States gallons per second.

100 California miner's inches for one day equals 4.96 acre-feet.

100 Colorado miner's inches equals 2.60 second-feet.

100 Colorado miner's inches equals 19.5 United States gallons per second.

100 Colorado miner's inches for one day equals 5.17 acre-feet.

- 100 United States gallons per minute equals 0.223 second-foot.
 100 United States gallons per minute for one day equals 0.442 acre-foot.
 1,000,000 United States gallons per day equals 1.55 second-feet.
 1,000,000 United States gallons equals 3.07 acre-feet.
 1,000,000 cubic feet equals 22.95 acre-feet.
 1 acre-foot equals 325,850 gallons.
 1 inch deep on 1 square mile equals 2,323,200 cubic feet.
 1 inch deep on 1 square mile equals 0.0737 second-foot per year.
 1 foot equals 0.3048 meter.
 1 mile equals 1.60935 kilometers.
 1 mile equals 5,280 feet.
 1 acre equals 0.4047 hectare.
 1 acre equals 43,560 square feet.
 1 acre equals 209 feet square, nearly.
 1 square mile equals 2.59 square kilometers.
 1 cubic foot equals 0.0283 cubic meter.
 1 cubic foot of water weighs 62.5 pounds.
 1 cubic meter per minute equals 0.5886 second-foot.
 1 horsepower equals 550 foot-pounds per second.
 1 horsepower equals 76.0 kilogram-meters per second.
 1 horsepower equals 746 watts.
 1 horsepower equals 1 second-foot falling 8.80 feet.
 1½ horsepower equals about 1 kilowatt.

To calculate water power quickly: $\frac{\text{Sec.-ft.} \times \text{fall in feet}}{11} = \text{net horsepower on water wheel realizing 80 per cent of theoretical power.}$

EXPLANATION OF DATA.

For each regular current-meter gaging station the following data, so far as available, are given: Description of the station, list of discharge measurements, table of daily gage heights, table of daily discharge, table of monthly and yearly discharges and run-off. For stations located at weirs or dams the gage-height table is omitted.

In addition to statements regarding the location and installation of current-meter stations, the descriptions give information in regard to any conditions which may affect the constancy of the relation of gage height to discharge, covering such points as ice, logging, shifting channels, and backwater; also information regarding diversions which decrease the total flow at the measuring section. Statements are also made regarding the accuracy and reliability of the data.

The table of daily gage heights records the daily fluctuations of the surface of the river as found from the mean of the gage readings taken each day, usually in the morning and in the evening. The gage height given in the table represents the elevation of the surface of the water above the zero of the gage. All gage heights affected by the presence of ice in the streams or by backwater from obstructions are published as recorded, with suitable footnotes. The rating table is not applicable for such periods unless the proper corrections to the gage heights are known and applied. Attention is called to the fact



CONTINUED AND PRINTED BY THE U.S. GEOLOGICAL SURVEY

MAP OF UNITED STATES, SHOWING MEAN ANNUAL PRECIPITATION
Blue lines and figures indicate average annual precipitation in depth in inches

Prepared by Henry Gannett
mainly from data of the
United States Geological Survey
and United States Weather Bureau



MAP OF UNITED STATES, SHOWING MEAN ANNUAL RUN-OFF

Blue lines and figures indicate average annual run-off in depth in inches

that the zero of the gage is placed at an arbitrary datum and has no relation to zero flow or the bottom of the river. In general, the zero is located somewhat below the lowest known flow, so that negative readings shall not occur.

The discharge measurements and gage heights are the base data from which rating tables, daily discharge tables, and monthly discharge tables are computed.

The rating table gives, either directly or by interpolation, the discharge in second-feet corresponding to every stage of the river recorded during the period for which it is applicable. It is not published in this report, but can be determined from the tables of daily gage heights and daily discharge as follows:

First plot the discharge measurements for the current and earlier years on cross-section paper, with gage heights in feet as ordinates and discharge in second-feet as abscissas. Then tabulate a number of gage heights taken from the daily gage-height table for the complete range of stage given and the corresponding discharges for the days selected from the daily discharge table and plot the values on cross-section paper. The last points plotted will define the rating curve used and will lie among the plotted discharge measurements. After drawing the rating curve, a table can be developed by scaling off the discharge in second-feet for each tenth foot of gage height. These values should be so adjusted that the first differences shall always be increasing or constant, except for known backwater periods.

The table of daily discharge gives the discharge in second-feet corresponding to the observed gage heights as determined from the rating tables.

In the table of monthly discharge the column headed "Maximum" gives the mean flow, as determined from the rating table, for the day when the mean gage height was highest. As the gage height is the mean for the day, it does not indicate correctly the stage when the water surface was at crest height, and the corresponding discharge was consequently larger than given in the maximum column. Likewise, in the column of "Minimum" the quantity given is the mean flow for the day when the mean gage height was lowest. The column headed "Mean" is the average flow in cubic feet for each second during the month. On this the computations for the remaining columns, which are defined on page 12, are based.

The field methods used in the collection of the data presented in this series of reports are described in the introductory sections of Water-Supply Papers 261 to 272, inclusive, "Surface water supply of the United States, 1909." Plates I and II show the average precipitation and run-off in the United States as determined from the measurements of stream flow made by the Geological Survey and

records of rainfall collected by the Weather Bureau; Plate III shows typical gaging stations; Plate IV shows current meters ¹ used in the work.

ACCURACY AND RELIABILITY OF FIELD DATA AND COMPARATIVE RESULTS.

The accuracy of stream-flow data depends primarily on the natural conditions at the gaging station and on the methods and care with which the data are collected. Errors of the first group depend on the degree of permanency of channel and of permanency of the relation between discharge and stage.

Errors of the second class are due, first, to errors in observation of stage; second, to errors in measurements of flow; and, third, to errors due to misinterpretation of stage and flow data.

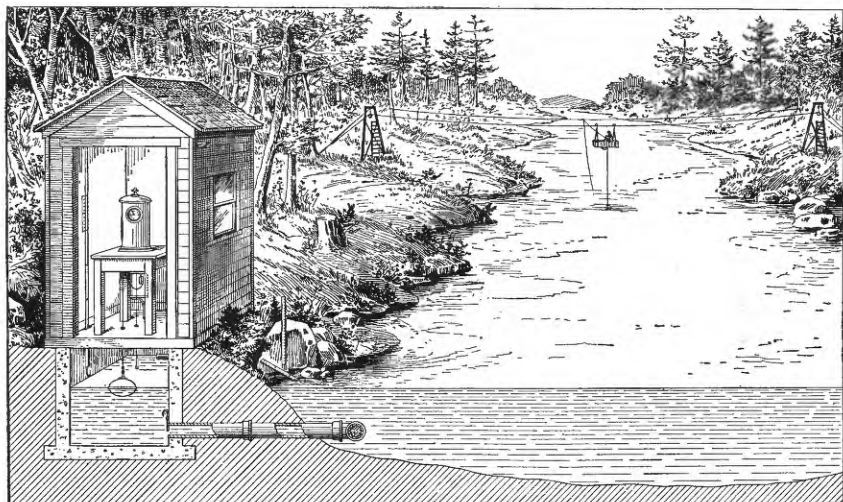
In order to give engineers and others information regarding the probable accuracy of the computed results, footnotes are added to the daily discharge tables, stating the probable accuracy of the rating tables used, and an accuracy column is inserted in the monthly discharge table. For the rating tables "well defined" indicates, in general, that the rating is probably accurate within 5 per cent; "fairly well defined," within 10 per cent; "poorly defined" or "approximate" within 15 to 25 per cent. These notes are very general and are based on the plotting of the individual measurements with reference to the mean rating curve.

The accuracy column in the monthly discharge table does not apply to the maximum or minimum nor to any individual day, but to the monthly mean. It is based on the accuracy of the rating, the probable reliability of the observer, and knowledge of local conditions. In this column A indicates that the mean monthly flow is probably accurate within 5 per cent; B, within 10 per cent; C, within 15 per cent; D, within 25 per cent. Special conditions are covered by footnotes.

Even though the monthly means for any station may represent with a high degree of accuracy the quantity of water flowing past the gage, the figures showing discharge per square mile and depth of run-off in inches may be subject to gross errors which result from including in the measured drainage area large noncontributing districts or omitting estimates of water diverted for irrigation or other use, and they should therefore be considered as only approximate, particularly for periods of irrigation or of low water. For these errors it is as a rule not feasible to make adequate correction.

In general the base data collected each year by the Survey engineers are published not only to comply with the law but to afford

¹ See Hoyt, J. C., and others, Use and care of current meter as practiced by the United States Geological Survey: Trans. Am. Soc. Civil Eng., vol. 66, 1910, p. 70.

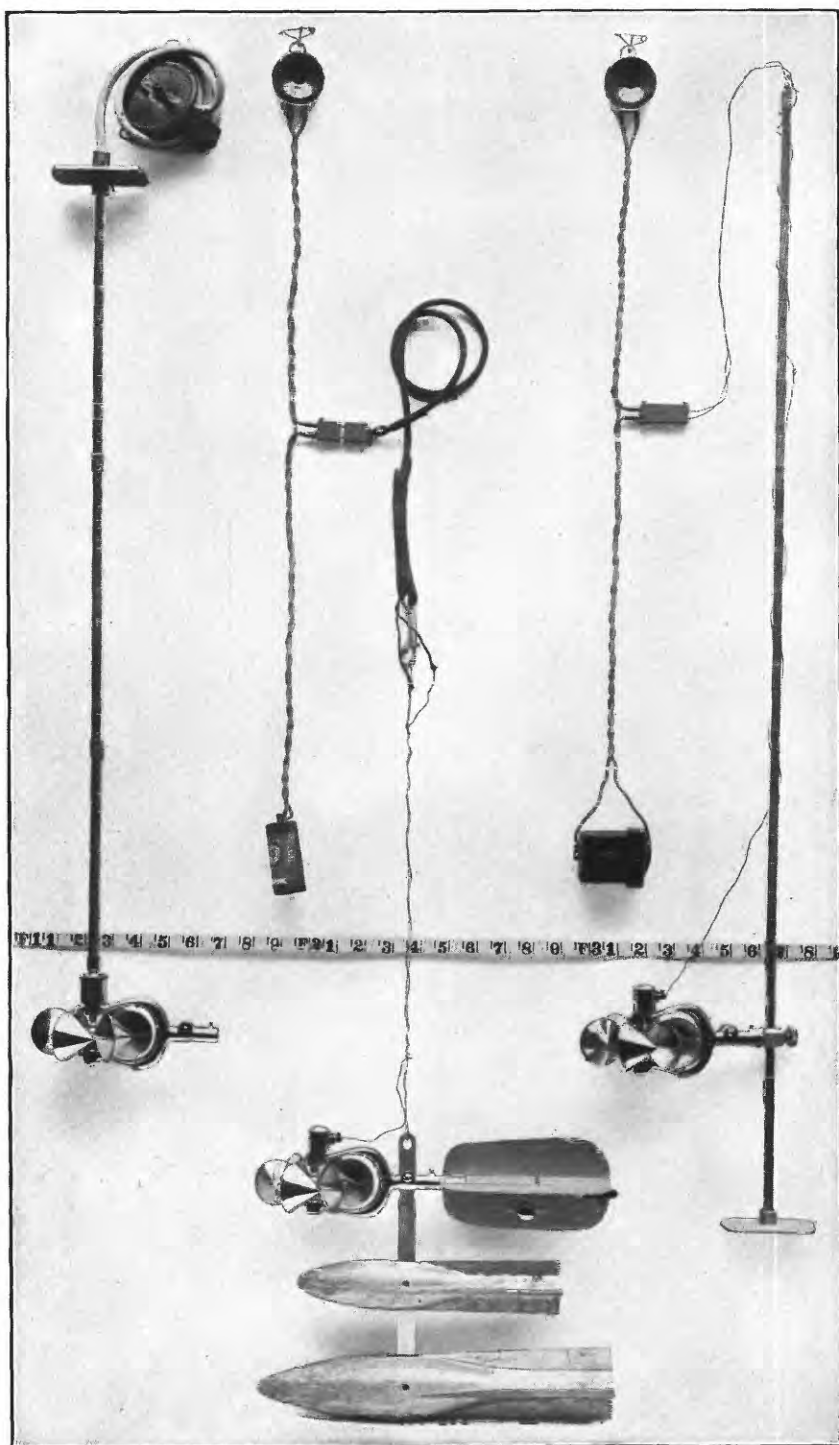


A. CABLE STATION WITH AUTOMATIC GAGE.



B. FOR BRIDGE MEASUREMENT.

TYPICAL GAGING STATIONS.



SMALL PRICE CURRENT METERS.

any engineer the means of examining and adjusting to his own needs the results of the computations. The table of monthly discharge is so arranged as to give only a general idea of the flow at the station and should not be used for other than preliminary estimates. The determinations of daily discharge allow more detailed studies of the variation in flow by which the period of deficiency may be determined.

It should be borne in mind that the observations in each succeeding year may be expected to throw new light on data already collected and published, and the engineer who makes use of the figures presented in these papers should verify all ratings and make such adjustments for earlier years as may seem necessary.

COOPERATION AND ASSISTANCE.

MONTANA.

Much of the work in Montana has been carried on under cooperative agreement with the United States Reclamation Service, the work being done by the Geological Survey and the expense borne by the Reclamation Service.

The State of Montana also cooperated in the work, authority having been granted by the State legislature in 1911, which passed a bill appropriating \$3,000 for 1911 and \$3,000 for 1912, to be expended on the work of gaging streams, in accordance with paragraph 3, section 2244, of the Revised Codes of 1907 of the State of Montana, which reads as follows:

The State engineer shall become conversant with the waterways of the State and the needs of the State as to irrigation matters; shall make, or cause to be made, measurements and calculations of the ordinary and flood discharge of streams, cooperating in this work as much as possible with the United States Geological Survey and the Montana Experiment Station; such measurements to be made on streams in order of their importance, provided that measurements already made, if deemed reliable, may be adopted.

Much of this fund has been expended on work in connection with Carey projects.

A number of stations in the western part of Montana were maintained in cooperation with the Forest Service.

Acknowledgments are due to the several Carey Land Act companies for salaries of gage observers paid during the year; to the United Missouri River Power Co., for records on Missouri River; to the Glass-Lindsay Land Co., for gage observers' salaries at several stations; and to George E. Baker, for gage heights and discharge measurements on Pipestone and Whitehall creeks.

COLORADO.

The work in Colorado was carried on in cooperation as follows:

The United States Forest Service furnished the services of a hydrographer for measuring the streams on the national forests and also furnished the gage heights.

Mr. C. W. Comstock, State engineer, cooperated in maintaining a number of stations in the South Platte basin and furnished the completed records for a number of other stations.

Mr. George B. McFadden, of Denver, furnished the field data for two stations on the Cache la Poudre.

WYOMING.

The work in Wyoming was carried on in cooperation as follows:

Mr. A. J. Parshall, State engineer, paid half the field expense of maintaining most of the Wyoming stations and also paid the gage observers. He also arranged for cooperation with a number of individuals interested in the different records.

The United States Forest Service furnished the services of a hydrographer during the latter part of the year for measuring the streams on the national forests and also furnished the gage heights.

The United States Reclamation Service furnished the completed records on the North Platte at Pathfinder and Whalen and gage heights and gate openings on the Shoshone at Corbett dam.

NEBRASKA.

The work in Nebraska was carried on in cooperation with Mr. D. D. Price, State engineer, who furnished all the field data.

Acknowledgments are also due to the United States Weather Bureau and all other companies and persons who have rendered assistance and furnished records.

DIVISION OF WORK.

The work in the upper Missouri River basin was under the direction of W. A. Lamb, district engineer, assisted by Raymond Richards, assistant engineer, John C. Beebe and Benjamin E. Jones, junior engineers, and C. S. Heidel, State hydrographer.

The work in North Dakota was carried on by E. F. Chandler, assistant engineer, assisted by Gorie Monley and George Ebner.

The field data for the Missouri River drainage area in Colorado and the North Platte and upper Bighorn basins in Wyoming were collected under the direction of W. B. Freeman, district engineer, assisted by G. A. Gray, E. O. Christiansen, G. H. Russell, and R. H. Fletcher, junior engineers, and O. M. Wimmer and H. B. Waha, Forest Service hydrographers.

The field data in Nebraska were collected under the direction of D. D. Price, State engineer, assisted by A. A. Dobson and A. B. Price.

The rating curves and special estimates were made and the completed data prepared for publication by Raymond Richards. Computations have been made by H. J. Dean, A. H. Tuttle, and M. I. Walters. The report has been edited by Mrs. B. D. Wood.

APPROPRIATION OF WATER.

VARIATIONS IN STATE WATER LAWS.

The water laws of the Western States differ so widely in their provisions that such terms as "water filing," "appropriation," and "water right" have no general application or meaning. The rights to water in these States rest in general, first, on the Constitution and statutes of the United States; second, on the respective State constitutions and the State statutes that have been enacted in accordance therewith; third, on the decisions of Federal and State courts in the interpretation of these various provisions of law and in their application to specific conditions; and, fourth, on the requirements of the State engineers and other officials charged with the administration of the State water laws.

In addition, the right to convey water across public lands must be acquired in accordance with the provisions of the acts of Congress and the regulations of the Secretary of the Interior and the Secretary of Agriculture pursuant thereto.

In this report each description of a gaging station in Colorado gives the number of second-feet of adjudicated diversions from the stream and its tributaries, to indicate as nearly as possible the extent to which appropriations have been recognized by the State courts. It does not follow, however, that this amount of water is actually diverted, as many of the older decrees called for amounts greatly in excess of those actually used; on the other hand, no account has been taken of filings which have not yet been perfected and adjudicated. It is impossible from the State records to reach any conclusion as to the validity of these filings or as to the probability of their final perfection.

CONSTITUTIONAL PROVISIONS.

COLORADO.

In common with most of the other Western States, Colorado has discarded the common-law doctrine of riparian rights and has established a system based upon prior appropriation. The following are extracts from the State constitution relative to the use of water for irrigation:

ARTICLE XVI.

IRRIGATION.

SEC. 5. The water of every natural stream not heretofore appropriated within the State of Colorado is hereby declared to be the property of the public; and the same is dedicated to the use of the people of the State, subject to appropriation as hereinafter provided.

SEC. 6. The right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied. Priority of appropriation shall give the better right as between those using the water for the same purpose; but when the waters of any natural stream are not sufficient for the service of all those desiring the use of the

same, those using the water for domestic purposes shall have the preference over those claiming for any other purpose, and those using the water for agricultural purposes shall have preference over those using the same for manufacturing purposes.

SEC. 7. All persons and corporations shall have the right of way across public, private, and corporate lands for the construction of ditches, canals, and flumes for the purpose of conveying water for domestic purposes, for the irrigation of agricultural lands, and for mining and manufacturing purposes, and for drainage, upon payment of just compensation.

SEC. 8. The general assembly shall provide by law that the board of county commissioners, in their respective counties, shall have power, when application is made to them by either party interested, to establish reasonable maximum rates to be charged for the use of water, whether furnished by individuals or corporations.

WYOMING.

In Wyoming, as in Colorado, the courts reject riparian rights and the principal of prior appropriation is established in the State. The provisions of the State constitution regarding the appropriation and use of water are as follows:

ARTICLE I.

SEC. 31. Water being essential to industrial prosperity, of limited amount, and easy of diversion from its natural channels, its control must be in the State, which, in providing for its use, shall equally guard all the varied interests involved.

ARTICLE VIII.

IRRIGATION AND WATER RIGHTS.

SEC. 1. The water of all natural streams, springs, lakes, or other collection of still water within the boundaries of the State, are hereby declared to be the property of the State.

SEC. 2. There shall be constituted a board of control, to be composed of the State engineer and superintendents of the water divisions, which shall under such regulations as may be prescribed by law, have the supervision of the waters of the State and of their appropriation, distribution, and diversion and of the various officers connected therewith. Its decisions to be subject to review by the courts of the State.

SEC. 3. Priority of appropriation for beneficial uses shall give the better right. No appropriation shall be denied except when such denial is demanded by the public interests.

SEC. 4. The legislature shall by law divide the State into four (4) water divisions and provide for the appointment of superintendents thereof.

SEC. 5. There shall be a State engineer who shall be appointed by the governor of the State and confirmed by the senate; he shall hold his office for the term of six (6) years or until his successor shall have been appointed and shall have qualified. He shall be president of the board of control and shall have general supervision of the waters of the State and of the officers connected with its distribution. No person shall be appointed to this position who has not such theoretical knowledge and such practical experience and skill as shall fit him for the position.

ARTICLE XIII.

SEC. 5. Municipal corporations shall have the same right as individuals to acquire rights by prior appropriation and otherwise to the use of water for domestic and municipal purposes, and the legislature shall provide by law for the exercise upon the part of incorporated cities, towns, and villages of the right of eminent domain for the purpose of acquiring from prior appropriators upon the payment of just compensation, such water as may be necessary for the well being thereof and for domestic uses.

MONTANA.

The following provision in the Montana State constitution relates to the use of the water in the State:

[Art. 2, sec. 15.] The use of all water now appropriated, or that may hereafter be appropriated for sale, rental, distribution, or other beneficial use, and the right of way over the lands of others for all ditches, drains, flumes, canals, and aqueducts, necessarily used in connection therewith, as well as the sites for reservoirs necessary for collecting and storing the same, shall be held to be a public use.

NORTH DAKOTA.

The sole provision of the State constitution of North Dakota relative to the use of water is the following:

[Art. 17, sec. 210.] All flowing streams and natural water courses shall forever remain the property of the State for mining, irrigating, and manufacturing purposes.

SOUTH DAKOTA.

This State has no constitutional provisions relative to the use of water.

NEBRASKA.

The State constitution of Nebraska makes no provision for the use of water in the State.

ADMINISTRATION OF WATER LAWS.

COLORADO.

Appropriation of water in Colorado may be divided into two general classes: The direct appropriation, where the water is used as delivered from the head gates of the canal, and the appropriation for storage, where water from the river is not used at the time of diversion but is stored in reservoirs for future use. Appropriations of the second class are usually valid only during periods of high water when there is an excess of water over the needs of the direct appropriators. In the construction of reservoirs it is necessary to obtain approval of plans by the proper county commissioners, in addition to obtaining that of the State engineer, for all dams exceeding 10 feet in height. The entire construction of the reservoir is under the supervision of the State engineer, who has authority to require material used and work of construction to be done to his satisfaction. In case of failure of a reservoir the owners are liable for all ensuing damages.

The control of water by the State is vested in the State engineer, whose duty it is to supervise the diversion of water by the various appropriators in accordance with the decrees of the State courts. The State is divided into five irrigation divisions, each in charge of a division engineer, who is under the direction of the State engineer. Each irrigation division is divided into a number of water districts, of which there are 70 for the entire State. For each water district

there is appointed a water commissioner, whose duty it is, under the supervision of the division engineer, to divide the water in the natural streams among the several ditches taking water from the same, according to the rights of each. Whenever there is a scarcity of water he is empowered to shut down the head gates of those ditches whose priorities are of too recent date to entitle them to divert water. In the discharge of this duty he has the power of a constable.

WYOMING.

The constitution of the State of Wyoming creates the office of State engineer and divides the State into four principal water divisions, each under the control of a division superintendent. The State engineer and the division superintendents form a board of control having supervision of the appropriation and distribution of the water, subject to court review.

Rights to the use of water are begun by filing an application in the office of the State engineer. This application must be prepared in accordance with the State law and the requirements of the State engineer. When the application is in proper form a permit to divert the water and construct the works is issued.

The distribution of the water in accordance with the respective rights of permittees is supervised by water commissioners, one having jurisdiction in each of a large number of water districts, into which the four principal divisions are divided. The acts of the commissioners of any district are subject to review by the higher administrative officials, and eventually by the courts.

MONTANA.

An appropriation of water in Montana is begun by the posting of a notice at the proposed point of diversion, a copy of which notice is filed with the county clerk and recorder of the county in which the water is to be diverted. There is no limitation as to the amount of water upon which any person may file, and many streams have single filings upon them for more than their entire flow. Eventually, however, each appropriator can acquire the right to use only such water as he has put to beneficial use. Questions arising as to the rights of appropriators are determined by court proceedings. The State engineer has no functions relative to the diversion or distribution of water, but the State courts may appoint commissioners to enforce decrees.

Under this system examination of a stream and a search of the decrees are required to determine the title to its waters.

NORTH DAKOTA.

General supervision of matters relating to the use of water is vested in the State engineer, who is particularly charged with the custody

of records and the survey of streams. The State is divided into four water divisions, each in charge of a commissioner, and each division may be further subdivided into districts, each having a water master. The water commissioners, together with the State engineer, constitute a board empowered to make general rules for the control of water.

Appropriations made prior to the present water law are adjudicated by the courts, one copy of the decree being filed in the office of the State engineer. Applications to appropriate water are filed with the State engineer, the procedure therefor being similar to that in Wyoming.

NEBRASKA.

Control of water for irrigation is vested in the State board of irrigation, highways, and drainage, which consists of the governor, attorney general, and commissioner of public lands. The State engineer is appointed by the board, and acts as its secretary. The State is divided into two water divisions, each in charge of a superintendent. Within these divisions water districts, in charge of water commissioners, may be created as needed. The water commissioners control the distribution of water to the respective appropriators.

Applications to appropriate water for irrigation are made to the State board in accordance with the regulations. Upon approval the applicant may construct the necessary works. A certificate is finally issued by the State board and recorded with the county clerk.

Storage reservoirs are subject to special provisions of law, and dams over 10 feet high must be authorized by the board.

IRRIGATION DISTRICTS.

With the growth of irrigation in Colorado it has become necessary to enact laws creating irrigation districts whereby the owners of adjacent lands may organize for the purpose of jointly conveying water to irrigate these lands. When a majority of landowners in a district desire to irrigate their lands, they may petition the county commissioners of the county in which the greatest acreage of land is located to organize an irrigation district. An election is then held by the commissioners at which all the landowners in the proposed district are entitled to vote on the question of organization. If the result of the election favors it, the irrigation district is organized and a board of three directors elected. This board is empowered to enter into contracts for completing the necessary structures to irrigate the lands, and to acquire rights of way, water rights, etc. Similar statutes have been enacted in Wyoming, Montana, and Nebraska.

THE CAREY ACT.

The act of August 18, 1894 (28 Stat., 372, 422), commonly known as the Carey Act, and amendments thereto, the purpose of which is to aid the public-land States in the reclamation of the desert lands

therein and in the settlement, cultivation, and sale of such lands in small tracts to actual settlers, authorize—

(a) The temporary withdrawal of public lands from settlement or entry pending investigation and survey preliminary to the filing of an application for segregation, such withdrawn lands to be restored to settlement and entry at the end of one year from the date of withdrawal in case application for segregation is not theretofore made.

(b) The segregation of public lands by the Secretary of the Interior, contracts between the United States and any beneficiary State, and the reclamation of such lands by beneficiary States within 10 years from the approval of the State's application (subject to an extension of five years).

(c) The patenting to any beneficiary State of any tract of reclaimed land when satisfactory proof is made that an ample supply of water to reclaim it is actually furnished.

The usual procedure under the Carey Act is about as follows:

A corporation or individual applies to the State for the withdrawal of certain public lands proposed for irrigation. The State thereupon submits to the Interior Department an application for their withdrawal. On the approval of this application the State is allowed one year in which to investigate the project and prepare satisfactory plans for reclamation. The proposing company conducts the investigation and, if a project that is considered feasible is developed, makes application to the State for the segregation of the irrigable lands and offers to contract with the State for their reclamation. The State thereupon applies to the Interior Department for the segregation of the lands under the terms of the Carey Act and its amendments. If the plan of irrigation is found to be feasible, the irrigation company responsible, and the available water supply adequate, the lands are segregated and the contract for their reclamation is entered into between the United States and the State. When the irrigation works are completed to the satisfaction of the Government, patent is issued to the State or to its assigns. The State receives payment for the lands from the settler, and the irrigation company, either directly or through the State, receives payment from each settler for his proportionate share of the irrigation works and water rights involved.

The Tenth General Assembly of Colorado, by an act approved March 15, 1895, accepted the conditions and grants of land to the State under the provisions of the Carey Act. The subsequent State laws stipulate that the selection, management, and disposal of such lands shall be vested in the State board of land commissioners. Before a project is approved the engineering features must be passed upon by the State engineer. Similar statutes have been enacted by Wyoming and Montana.

GAGING STATION RECORDS.

MISSOURI RIVER PROPER.

RED ROCK RIVER ABOVE RED ROCK RESERVOIR, NEAR MONIDA, MONT.

Location.—At wagon bridge on Lyon's ranch, 18 miles east of Monida, and about 12 miles above the dam of the Red Rock Reservoir & Irrigation Co.**Records available.**—Four miscellaneous measurements in 1910; May to October, 1911.**Drainage area.**—Not measured.**Gage.**—Staff gage nailed to piling on downstream side of bridge.**Channel.**—Very liable to change. The stream is very sluggish, sediment is apt to accumulate, and weeds grow on the bed.**Discharge measurements.**—Made from the downstream side of bridge at high water; by wading above the bridge at low water.**Winter flow.**—May be affected by ice from November till the ice breaks up in the spring.**Artificial control.**—Little or none above the station.**Accuracy.**—Fair. The shifting channel affects the results.*Discharge measurements of Red Rock River above Red Rock reservoir, near Monida, Mont., in 1910-11.*

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
1910.		<i>Feet.</i>	<i>Sec.-ft.</i>	1911.		<i>Feet.</i>	<i>Sec.-ft.</i>
July 6	Lamb and Wade.....	2.50	38	Apr. 24	C. S. Heidel.....	4.78	445
19	C. S. Heidel.....	2.52	38	July 11	.....do.....	3.31	139
30	.....do.....	2.42	34	Sept. 20	.....do.....	3.10	89

Daily gage height, in feet, of Red Rock River above Red Rock reservoir, near Monida, Mont., for 1911.

[Mark Lyons, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		4.4	4.2	3.0	2.9	3.45	3.5
2.		4.8	4.0	3.05	2.85	3.4	3.5
3.		4.9	3.5	3.1	3.0	3.4	
4.		4.9	3.6	3.1	3.05	3.4	3.5
5.		4.9	3.6	3.2	3.05		
6.		4.8	3.5	3.2	3.1	3.4	
7.	5.5	4.8	3.5	3.1		3.45	
8.	5.4	4.7	3.4	3.0		3.45	
9.	5.3	4.8	3.3	3.1		3.4	
10.	5.2	4.7	3.3	3.0			
11.	5.0	4.8	3.3	3.0		3.3	
12.	5.2	4.8	3.3	3.0	3.2		
13.	5.2	4.8	3.3	3.1	3.2		
14.	5.1	4.7	3.25	3.0	3.1	3.5	
15.	5.0	4.7	3.2	3.0	3.1	3.5	
16.	4.9	4.6	3.2	3.0	3.1	3.45	
17.	4.8	4.6	3.2	3.1	3.1	3.4	
18.	4.5	4.45	3.2	3.0	3.1	3.4	
19.	4.3	4.35	3.1	2.9	3.1	3.4	
20.	4.3	4.3	3.05	2.9	3.1	3.4	
21.	4.3	4.25	3.0	2.85	3.1	3.4	
22.	4.3	4.2	3.0	2.85	3.1	3.4	
23.	4.45	4.1	3.0	2.8	3.1	3.4	
24.	4.6	4.0	3.0	2.8	3.1		
25.	4.6	3.9	3.05	2.85	3.2	3.5	
26.	4.9	3.7	3.2	2.8	3.2		
27.	4.8	3.65	3.1	2.85	3.2	3.5	
28.	4.5	3.8	3.1	2.9	3.1	3.7	
29.	4.5	3.8	3.0	2.9	3.1	3.7	
30.	4.4	4.1	3.0	2.85	3.1		
31.	4.3		3.0	2.85			

NOTE.—Ice present after Oct. 23.

Daily discharge, in second-feet, of Red Rock River above Red Rock reservoir, near Monida, Mont., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.
1.....	500	345	295	85	75	148
2.....	500	445	255	90	70	140
3.....	550	470	155	95	85	140
4.....	550	470	175	95	90	140
5.....	600	470	175	110	90	140
6.....	600	445	155	110	95	140
7.....	650	445	155	95	98	148
8.....	620	420	140	85	100	148
9.....	590	445	125	95	102	140
10.....	560	420	125	85	105	132
11.....	500	445	125	85	108	125
12.....	560	445	125	85	110	135
13.....	560	445	125	95	110	145
14.....	530	420	118	85	95	155
15.....	500	420	110	85	95	155
16.....	470	395	110	85	95	148
17.....	445	395	110	95	95	140
18.....	370	358	110	85	95	140
19.....	320	332	95	75	95	140
20.....	320	320	90	75	95	140
21.....	320	308	85	70	95	140
22.....	320	295	85	70	95	140
23.....	358	275	85	65	95	140
24.....	395	255	85	65	95	130
25.....	395	235	90	70	110	130
26.....	470	195	110	65	110	130
27.....	445	185	95	70	110	130
28.....	370	215	95	75	95	130
29.....	370	215	85	75	95	130
30.....	345	275	85	70	95	130
31.....	320	.....	85	70	.....	130

NOTE.—Daily discharge determined from a fairly well-defined discharge rating curve. Discharge interpolated for days for which gage heights are missing.

Monthly discharge of Red Rock River above Red Rock reservoir, near Monida, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	650	320	465	28,600	B.
June.....	470	185	360	21,400	B.
July.....	295	85	124	7,620	B.
August.....	110	65	82.6	5,080	B.
September.....	110	70	96.6	5,750	B.
October.....	155	125	139	8,550	B.
The period .....	.....	.....	.....	77,000	.....

RED ROCK RIVER BELOW RED ROCK RESERVOIR, NEAR MONIDA, MONT.

Location.—Just below the reservoir of the Red Rock Reservoir & Irrigation Co., 8 miles northeast of Monida and 15 miles east of Lima.

Records available.—July 22, 1911, to November 30, 1911. Miscellaneous measurements were made at this point on Red Rock River during the summer of 1910.

Drainage area.—About 560 square miles.

Gages.—A temporary staff gage about 300 yards downstream from the dam and a float gage in a concrete well on the right bank, at a 40-foot weir, about halfway between the dam and the staff gage. The 1911 records are referred to the staff gage.

Channel.—Probably permanent; bed of stream composed of coarse gravel, pebbles, and bowlders; current strong.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Regulation.—The dam is used to store flood waters which are released during the latter part of the irrigation season.

Accuracy.—Both staff gage and weir readings should be reliable.

Discharge measurements of Red Rock River below Red Rock reservoir, near Monida, Mont., 1910-11.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
1910.		<i>Feet.</i>	<i>Sec.-ft.</i>	1911.		<i>Feet.</i>	<i>Sec.-ft.</i>
July 7 ^a	Lamb and Wade.....	2.20	36	July 11	C. S. Heidel.....	3.10	188
7 ^a	.....do.....	2.10	29	12	.....do.....	b 3.03	152
7 ^a	.....do.....	2.49	65	Sept. 20	.....do.....	c 2.74	102
7 ^a	.....do.....	2.85	127				
7 ^a	.....do.....	1.80	13.1				
19	C. S. Heidel.....	2.43	65				
30	.....do.....	2.35	58				

^a Measurement made 1,000 feet below dam. ^b Weir gage read 1.04 feet. ^c Weir gage read .81 feet.

Daily gage height, in feet, and discharge, in second-feet, of Red Rock River below Red Rock reservoir, near Monida, Mont., for 1911.

[P. V. Maxwell, observer.]

Day.	July.		Aug.		Sept.		Oct.		Nov.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....			2.62	86	2.50	69	2.72	101	2.90	135
2.....			2.61	84	2.50	69	2.72	101	3.05	165
3.....			2.60	83	2.50	69	2.71	100	3.15	188
4.....			2.60	83	2.50	69	2.71	100	3.25	212
5.....			2.66	92	2.60	83	2.71	100	3.30	225
6.....			2.68	95	2.60	83	2.71	100	3.35	238
7.....			2.68	95	2.67	94	2.71	100	3.35	238
8.....			2.71	100	2.74	105	2.71	100	3.40	250
9.....			2.74	105	2.74	105	2.71	100	3.50	280
10.....			2.74	105	2.74	105	2.71	100	3.50	280
11.....			2.73	103	2.74	105	2.72	101	3.50	280
12.....			2.68	95	2.72	101	2.71	100	3.50	280
13.....			2.62	86	2.72	101	2.71	100	3.50	280
14.....			2.54	75	2.72	101	2.71	100	3.50	280
15.....			2.46	64	2.72	101	.....	140	3.15	188
16.....			2.46	64	2.72	101	.....	180	2.84	123
17.....			2.45	63	2.72	101	.....	220	2.84	123
18.....			2.45	63	2.72	101	.....	260	2.84	123
19.....			2.46	64	2.72	101	.....	300	2.84	123
20.....			2.47	65	2.72	101	.....	340	2.84	123
21.....			2.50	69	2.72	101	.....	380	2.84	123
22.....			2.50	69	2.72	101	3.90	415	2.84	123
23.....	2.68	95	2.50	69	2.72	101	3.95	432	2.84	123
24.....	2.67	94	2.50	69	2.72	101	4.00	450	2.84	123
25.....	2.67	94	2.50	69	2.72	101	3.95	432	2.84	123
26.....	2.67	94	2.50	69	2.72	101	3.90	415	2.84	123
27.....	2.63	88	2.50	69	2.72	101	3.90	415	2.84	123
28.....	2.63	88	2.50	69	2.72	101	3.40	250	2.84	123
29.....	2.63	88	2.50	69	2.72	101	2.89	133	2.84	123
30.....	2.63	88	2.50	69	2.72	101	2.84	123	2.84	123
31.....	2.63	88	2.50	69	.....	.....	2.80	115	.....	.....

NOTE.—Gage heights refer to staff gage. Discharge determined from a very well-defined rating curve. Discharge interpolated Oct. 15 to 21.

Monthly discharge of Red Rock River below Red Rock reservoir, near Monida, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
July 23-31	95	88	90.8	1,620	A.
August	105	63	78.4	4,820	A.
September	105	69	95.8	5,700	A.
October	450	100	207	12,700	A.
November	280	123	179	10,700	A.

RED ROCK RIVER AT LIMA, MONT.

Location.—Near the Glead ranch, 1 mile east of Lima, Mont. Principal tributaries below the station, Sheep and Sage creeks.

Records available.—August 14, 1907, to September 30, 1911.

Drainage area.—Not measured.

Gage.—Chain; installed October 27, 1908, at a point just above the cable and 300 feet farther downstream than the old staff gage which it replaced; datum of chain gage not the same as that of the staff gage.

Channel.—Probably permanent.

Discharge measurements.—At ordinary and high-water stages made from a cable below the gage; at extremely low stages measurements made by wading just below the cable section.

Winter flow.—River generally remains open the entire year, as a large spring discharges into the stream just above the gage.

Diversions.—Three ditches, each carrying approximately 900 miner's inches, take water from Red Rock above the station. The flow of water above the station is all appropriated, but the rights are unadjudicated.

Storage.—The dam of the reservoir storing the water of the Red Rock has been completed, but no canals have been built. The dam is of earth with concrete core, is 50 feet high, and will impound 90,000 acre-feet; its top elevation is 6,700 feet; the dam is 16 miles above Lima, Mont., and 27 miles below lower Red Rock Lake.

Accuracy.—In general, the results obtained at this station should be good.

Discharge measurements of Red Rock River at Lima, Mont., 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 25	C. S. Heidel	0.55	18
July 13	.....do.....	1.88	191
Sept. 22	.....do.....	1.52	122

Daily gage height, in feet, of Red Rock River at Lima, Mont., for 1911.

[Alice Gleed, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	0.55	1.00	0.50	0.55	2.15	3.05	2.10	1.15	1.30
2.....	.55	1.60	.50	.55	2.25	2.80	2.10	1.15	1.35
3.....	.50	1.10	.50	.55	2.25	2.80	2.10	1.15	1.30
4.....	.50	1.60	.50	.55	2.25	2.80	2.00	1.15	1.35
5.....	.45	1.05	.45	.50	2.30	2.80	1.90	1.15	1.25
6.....	.50	1.10	.50	.55	2.30	2.75	1.90	1.15	1.35
7.....	.50	1.20	.50	.55	2.60	2.80	1.95	1.15	1.30
8.....	.50	.70	.55	1.05	2.95	2.80	1.95	1.15	1.35
9.....	.55	.60	.50	1.10	2.85	2.85	2.00	1.20	1.30
10.....	.50	.55	.45	.75	2.85	2.85	2.05	1.20	1.40
11.....	.50	.60	.50	.65	2.85	2.85	2.00	1.20	1.40
12.....	.50	.60	.50	.65	2.90	2.75	2.05	1.20	1.45
13.....	.50	.60	.50	.65	2.90	2.65	2.05	1.20	1.45
14.....	.50	.60	.50	.65	2.90	2.65	2.00	1.20	1.55
15.....	.45	.50	.45	.60	2.95	2.70	2.05	1.10	1.60
16.....	.55	.55	.50	.60	2.95	2.70	2.05	1.10	1.65
17.....	.55	.55	.55	.60	2.95	2.70	1.40	1.05	1.70
18.....	.50	.55	.55	.60	2.95	2.75	1.40	1.05	1.75
19.....	.50	.55	.55	.65	2.95	2.80	1.30	1.05	1.70
20.....	.45	.50	.50	.55	2.95	2.80	1.30	1.05	1.70
21.....	.50	.55	.55	.60	2.90	2.85	1.30	1.05	1.70
22.....	.50	.55	.55	.70	2.95	2.90	1.30	1.05	1.75
23.....	.50	.55	.55	.65	2.95	2.85	1.15	1.05	1.50
24.....	.50	.55	.55	.65	2.90	2.85	1.20	1.05	1.55
25.....	.45	.50	.50	.50	2.95	2.85	1.20	1.05	1.40
26.....	.50	.50	.55	1.30	2.85	2.00	1.20	1.05	1.50
27.....	.50	.50	.55	1.40	2.85	2.00	1.05	1.25	1.30
28.....	.50	.50	.55	1.50	2.95	2.05	1.20	1.35	1.35
29.....	.50	.55	.55	1.60	3.05	2.05	1.20	1.30	1.30
30.....	.45	.50	.50	1.90	3.1	2.15	1.20	1.30	1.30
31.....	.50	.55	.55	-----	3.05	-----	1.15	1.30	-----

NOTE.—Ice present Feb. 1 to 8.

Daily discharge, in second-feet, of Red Rock River at Lima, Mont., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	18	17	16	18	250	510	237	66	85
2.....	18	17	16	18	276	432	237	66	92
3.....	16	18	16	18	276	432	237	66	85
4.....	16	18	16	18	276	432	213	66	92
5.....	14	19	14	16	289	432	191	66	78
6.....	16	19	16	18	289	417	191	66	92
7.....	16	20	16	18	372	432	202	66	85
8.....	16	20	18	54	478	432	202	66	92
9.....	18	21	16	60	448	448	213	72	85
10.....	16	18	14	30	448	448	225	72	99
11.....	16	21	16	24	448	448	213	72	99
12.....	16	21	16	24	463	417	225	72	106
13.....	16	21	16	24	463	387	225	72	106
14.....	16	21	16	24	463	387	213	72	122
15.....	14	16	14	21	478	402	225	60	131
16.....	18	18	16	21	478	402	225	60	140
17.....	18	18	18	21	478	402	99	54	150
18.....	16	18	18	21	478	417	99	54	160
19.....	16	18	18	24	478	432	85	54	150
20.....	14	16	16	18	478	432	85	54	150
21.....	16	18	18	21	463	448	85	54	150
22.....	16	18	18	26	478	463	85	54	160
23.....	16	18	18	24	478	448	66	54	114
24.....	16	18	18	21	463	448	72	54	122
25.....	14	16	16	16	478	448	72	54	99
26.....	16	16	18	85	448	213	72	54	114
27.....	16	16	18	99	448	213	54	78	85
28.....	16	16	18	114	478	225	72	92	92
29.....	16	-----	18	131	510	225	72	85	85
30.....	14	-----	16	191	525	250	72	85	85
31.....	16	-----	18	-----	510	-----	66	85	-----

Monthly discharge of Red Rock River at Lima, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January	18	14	16	984	B.
February	21	16	18.2	1,010	B.
March	18	14	16.6	1,020	B.
April	191	16	40.6	2,420	B.
May	525	250	432	26,600	B.
June	510	213	397	23,600	B.
July	237	54	149	9,160	B.
August	92	54	66	4,060	B.
September	160	78	110	6,550	B.
The period				75,400	

BEAVERHEAD RIVER AT BARRATTS, MONT.

Location.—One mile above Barratts and 2 miles southwest of Dillon, Mont., in the SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 20, T. 8 S., R. 9 W.

Records available.—August 12, 1907, to December 31, 1911.

Drainage area.—Not measured.

Gage.—A standard chain gage was installed on the downstream side of the bridge June 22, 1908, to replace the ordinary staff gage which had previously been used; datum of chain gage the same as that of the staff gage.

Channel.—Should not shift; rocky at the measuring section.

Discharge measurements.—Made from downstream side of the bridge.

Winter flow.—Stream remains open during the winter months.

Diversions.—Innumerable diversions are made above the station. Deceased water rights, aggregating 85,866 inches of water, are filed on from Lima on Red Rock River to a point 10 miles above Twin Bridges. The three largest canals diverted below the station are Canyon Creek canal, appropriating 6,000 inches; Union canal, appropriating 4,000 inches; and Beaverhead canal, diverted just north of Dillon, appropriating 5,000 inches. The Union Electric Co., of Dillon, has a canal with a carrying capacity of 6,000 inches.

Beaverhead River is called Red Rock River from its source in Red Rock Lakes to the post office of Red Rock, below which it is called the Beaverhead. The principal tributaries to the Beaverhead above the station are Grasshopper Creek, 12 miles south of Dillon; Horse Prairie Creek, 20 miles south; and Rattlesnake and Blacktail Deer creeks. Irrigation has probably been practiced in Beaverhead Valley longer than in any other valley in Montana, ditches constructed in the early seventies being still in operation.

Discharge measurements of Beaverhead River at Barratts, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 22	C. S. Heidel	1.26	416
July 10	.....do	1.02	291
Sept. 19	.....do .....	.78	214

Daily gage height, in feet, of Beaverhead River at Barratts for 1911.

[W. A. Meeds, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		1.60	1.20	1.50	1.90	0.78	0.69	0.85	1.60
2.		1.55	1.20	1.90	1.90	.81	.67	.92	1.50
3.		1.45	1.20	2.00	1.60	.94	.70	.91	1.50
4.		1.30	1.20	1.90	1.40	1.10	.80	.84	1.50
5.		1.20	1.15	1.95	1.25	1.05	.81	.88	1.60
6.		1.05	1.15	2.00	1.20	1.05	.90	.90	1.70
7.		1.05	1.20	1.90	1.10	.98	.86	.91	1.70
8.		1.00	1.25	2.20	1.05	.88	.90	.90	1.70
9.		1.05	1.25	2.20	1.05	.87	.85	.98	1.60
10.		1.20	1.10	2.20	1.05	.87	.85	1.05	1.70
11.		1.10	1.10	1.85	.97	.86	.75	1.25	1.70
12.	0.86	1.05	1.00	1.95	.87	.86	.80	1.25	1.60
13.	.88	.88	1.00	1.90	.85	.82	.90	1.30	1.60
14.	.88	.86	1.05	2.10	.79	.80	.90	1.30	1.70
15.	.88	.91	1.20	2.20	.85	.80	.80	1.30	.....
16.	.87	.96	1.40	2.20	.79	.76	.80	1.25	.....
17.	.96	1.00	1.40	2.10	.83	.77	.80	1.25	.....
18.	1.05	.96	1.30	1.95	.82	.77	.75	1.25	.....
19.	1.10	1.05	1.20	1.95	.79	.78	.80	1.30	.....
20.	1.15	1.10	1.20	2.50	.77	.75	.81	1.35	.....
21.	1.30	1.15	1.10	2.70	.77	.76	.80	1.40	.....
22.	1.30	1.20	1.15	2.40	.77	.75	.75	1.50	.....
23.	1.30	1.20	1.20	1.90	.82	.74	.80	1.65	.....
24.	1.45	1.20	1.45	1.65	.81	.74	.84	1.75	.....
25.	1.35	1.15	1.60	1.55	.78	.71	.81	1.85	.....
26.	1.15	1.20	1.80	1.35	.79	.71	.80	1.90	.....
27.	1.10	1.30	1.85	1.30	.79	.71	.80	1.90	.....
28.	1.05	1.45	1.80	1.40	.79	.67	.84	1.75	.....
29.	1.10	1.40	1.65	1.45	.79	.66	.85	1.60	.....
30.	1.30	1.30	1.50	1.75	.81	.66	.85	1.50	.....
31.	1.45	.....	1.45	.....	.79	.67	.....	1.50	.....

Daily discharge, in second-feet, of Beaverhead River at Barratts for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.	200	595	385	540	770	213	182	238	595
2.	204	568	385	770	770	224	174	263	540
3.	208	512	385	835	595	271	185	259	540
4.	212	435	385	770	485	340	220	234	540
5.	216	385	362	802	410	318	224	248	595
6.	220	318	362	835	385	318	255	255	650
7.	224	318	385	770	340	287	241	259	650
8.	228	295	410	965	318	248	255	275	650
9.	232	318	410	965	318	245	238	287	595
10.	235	385	340	965	318	245	238	318	650
11.	238	340	340	740	283	241	202	410	650
12.	241	318	295	802	245	241	220	410	595
13.	248	248	295	770	238	227	255	435	595
14.	248	241	318	900	216	220	255	435	650
15.	248	259	385	965	238	220	220	435	630
16.	244	279	485	965	216	206	220	410	610
17.	279	295	485	900	230	210	220	410	440
18.	318	279	435	802	227	210	202	410	433
19.	340	318	385	802	216	213	220	435	426
20.	362	340	385	1,170	210	202	224	460	419
21.	435	362	340	1,310	210	206	220	485	412
22.	435	385	362	1,100	210	202	202	540	405
23.	435	385	385	770	227	199	220	623	398
24.	512	385	512	622	224	199	234	680	391
25.	460	362	595	568	213	188	224	740	384
26.	362	385	710	460	216	188	220	770	377
27.	340	435	740	435	216	188	220	770	370
28.	318	512	710	485	216	174	234	680	363
29.	340	485	622	512	216	171	238	595	356
30.	435	435	540	680	224	171	238	540	350
31.	512	.....	512	.....	216	174	.....	540	.....

NOTE.—Daily discharge determined from a well-defined rating curve. Discharge estimated Mar. 1 to 11 and Nov. 15 to 30.

Monthly discharge of Beaverhead River at Barratts, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			a 250	15,400	D.
February.....			a 200	11,100	D.
March.....			300	18,400	C.
April.....	512	200	373	22,200	B.
May.....	595	241	440	27,100	B.
June.....	740	295	799	47,500	B.
July.....	1,310	435	304	18,700	B.
August.....	770	210	224	13,800	B.
September.....	340	171	223	13,300	B.
October.....	255	174	447	27,500	B.
November.....	770	234	509	30,300	C.
December.....	650	350	a 350	21,500	D.
The year.....	1,310		368	267,000	

a Estimated.

JEFFERSON RIVER NEAR SILVERSTAR, MONT.

Location.—In sec. 23, T. 2 S., R. 6 W., at the big highway bridge on the road from Silverstar to Iron Rod, a station on a branch of the Northern Pacific Railway. The principal tributaries below the station are Pipestone and Whitetail creeks and Boulder River.

Records available.—August 11 to December 31, 1910; May 1 to October 31, 1911.

Drainage area.—Not measured.

Gage.—Standard staff gage fastened to pier on downstream side.

Channel.—Gravel.

Discharge measurements.—Made from the lower side of highway bridge.

Winter flow.—Ice present.

Diversions.—Irrigation is carried on extensively from the headwaters of this stream to its mouth.

Discharge measurements of Jefferson River near Silverstar, Mont., 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 26	C. S. Heidel.....	3.53	2,560
June 14	.....do.....	6.20	8,710
July 7	.....do.....	2.94	1,510
Sept. 14	.....do.....	2.60	920

Daily gage height, in feet, of Jefferson River near Silverstar, Mont., for 1911.

[C. A. Barkell, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		3.60	3.75	-----	2.20	2.30	2.55	3.20
2.....		3.50	3.90	4.0	2.10	2.30	2.60	3.20
3.....		3.45	4.7	3.90	1.95	2.30	2.60	3.15
4.....		3.50	5.0	3.70	2.00	2.30	2.55	3.10
5.....		3.55	5.3	3.50	2.10	2.35	2.55	3.15
6.....		3.60	5.8	3.45	2.30	2.51	2.50	3.15
7.....		3.70	5.8	3.30	2.20	2.55	2.50	3.20
8.....		3.75	5.9	3.30	2.20	2.60	2.55	3.20
9.....		3.80	6.1	3.25	2.25	2.70	2.60	-----
10.....		3.80	6.2	3.15	2.30	2.70	2.65	-----

Daily gage height, in feet, of Jefferson River near Silverstar, Mont., for 1911—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
11.....		3.75	6.2	3.10	2.30	2.65	2.70	.....
12.....		3.60	6.2	3.00	2.35	2.60	2.70	.....
13.....		3.60	6.2	3.00	2.40	2.55	2.75	.....
14.....		3.65	6.2	2.90	2.40	2.40	2.80	.....
15.....		3.80	6.3	2.80	2.35	2.40	2.80	.....
16.....		3.90	6.4	2.75	2.30	2.32	2.85	.....
17.....		3.90	6.3	2.75	2.30	2.30	2.90	.....
18.....		3.90	6.2	2.75	2.30	2.30	2.90	.....
19.....		4.0	6.0	2.70	2.25	2.32	2.95	.....
20.....		3.90	6.0	2.70	2.20	2.35	3.00	.....
21.....		3.80	5.9	2.65	2.20	2.40	3.00	.....
22.....		3.70	5.6	2.65	2.20	2.40	3.05	.....
23.....		3.70	5.4	2.60	2.15	2.35	3.00	.....
24.....		3.60	5.2	2.50	2.10	2.40	3.00	.....
25.....		3.60	5.0	2.45	2.10	2.40	3.00	.....
26.....		3.65	4.9	2.40	2.10	2.45	3.00	.....
27.....	3.60	3.70	4.6	2.40	2.15	2.50	3.00	.....
28.....	3.70	3.70	4.5	2.20	2.20	2.50	3.10	.....
29.....	3.80	3.70	4.2	2.20	2.20	2.50	3.20	.....
30.....	3.80	3.70	4.1	2.20	2.25	2.50	3.20	.....
31.....		3.60		2.20	2.30		3.25	.....

NOTE.—Gage heights distorted by ice after Oct. 27.

Daily discharge, in second-feet, of Jefferson River near Silverstar, Mont., for 1911.

[C. A. Barkell, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		2,500	2,790	3,400	620	710	955
2.....		2,320	3,090	3,300	540	710	1,010
3.....		2,240	4,870	3,090	440	710	1,010
4.....		2,320	5,600	2,690	470	710	955
5.....		2,410	6,360	2,320	540	755	955
6.....		2,500	7,660	2,240	710	911	900
7.....		2,690	7,660	1,980	620	955	900
8.....		2,790	7,930	1,980	620	1,010	955
9.....		2,890	8,470	1,900	665	1,120	1,010
10.....		2,890	8,740	1,740	710	1,120	1,060
11.....		2,790	8,740	1,660	710	1,060	1,120
12.....		2,500	8,740	1,510	755	1,010	1,120
13.....		2,500	8,740	1,510	800	955	1,180
14.....		2,600	8,740	1,370	800	800	1,240
15.....		2,890	9,010	1,240	755	800	1,240
16.....		3,090	9,280	1,180	710	728	1,300
17.....		3,090	9,010	1,180	710	710	1,370
18.....		3,090	8,740	1,180	710	710	1,370
19.....		3,300	8,200	1,120	665	728	1,440
20.....		3,090	8,200	1,120	620	755	1,510
21.....		2,890	7,930	1,060	620	800	1,510
22.....		2,690	7,140	1,060	620	800	1,580
23.....		2,890	6,620	1,010	580	755	1,510
24.....		2,500	6,100	900	540	800	1,510
25.....		2,500	5,600	850	540	800	1,510
26.....		2,600	5,350	800	540	850	1,510
27.....	2,500	2,890	4,630	800	580	900	1,510
28.....	2,690	2,690	4,400	620	620	900	1,500
29.....	2,890	2,690	3,730	620	620	900	1,500
30.....	2,890	2,690	3,510	620	665	900	1,500
31.....		2,500		620	710		1,500

Monthly discharge of Jefferson River near Silverstar, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	3,300	2,240	2,700	166,000	B.
June.....	9,280	2,790	6,850	408,000	B.
July.....	3,400	620	1,510	92,800	B.
August.....	800	440	639	39,300	B.
September.....	1,120	710	846	50,300	B.
October.....	1,580	900	1,270	78,100	B.
The period.....				835,000	

MISSOURI RIVER AT TOSTON, MONT.

Location.—In SW. $\frac{1}{4}$ sec. 23, T. 5 N., R. 2 E., at the highway bridge crossing Missouri River at Toston, Mont.; about 25 miles below the union of Gallatin, Jefferson, and Madison rivers.

Records available.—April 5, 1910, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Standard chain gage attached to downstream side of bridge.

Channel.—Rocky and permanent.

Discharge measurements.—Made from cable just above bridge.

Winter flow.—Affected by ice only in extremely cold weather.

The only important tributary between the gaging station and the headwater forks is Sixteenmile Creek.

Discharge measurements of Missouri River at Toston, Mont., 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 12	B. E. Jones.....	4.05	4,760
June 19	.....do.....	7.85	21,900
July 17	.....do.....	3.82	3,750
Aug. 18	.....do.....	3.48	3,220

Daily gage height, in feet, of Missouri River at Toston, Mont., for 1911.

[W. B. Lorentz, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	3.05	7.7	6.2	3.90	4.4	5.2	5.4	3.20	2.95	3.45	3.65	3.50
2.....	2.75	7.5	6.6	4.1	4.4	5.8	5.4	3.15	2.95	3.45	3.60	3.45
3.....	3.00	7.2	6.5	4.1	4.2	6.6	5.2	3.10	3.00	3.45	3.65	3.40
4.....	3.65	7.2	6.4	4.1	4.2	6.8		3.15	3.10	3.55	3.70	3.50
5.....	3.35	7.6	6.1	4.3	4.3	7.6	5.0	3.20	3.00	3.60	3.70	3.45
6.....	3.25	7.4	5.2	4.3	4.4	7.7	5.0	3.35	2.95	3.55	3.85	3.50
7.....	3.30	7.5	4.6	4.3	4.6	7.8	4.9	3.40	3.15	3.55	3.75	3.50
8.....	3.35	6.6	5.0	4.2	4.8	7.8	4.8	3.40	3.40	3.55	3.65	3.45
9.....	3.35	5.5	4.4	4.1	4.9	8.0	4.7	3.35	3.45	3.55	3.70	3.50
10.....	3.25	5.4	4.0	4.0	5.0	8.0	4.6	3.25	3.45	3.80	3.15	3.45
11.....	3.30	5.0	4.3	4.0	4.9	8.0	4.4	3.35	3.45	3.55	3.00	3.55
12.....	2.90	4.1	4.0	4.05	4.8	8.0	4.1	3.40	3.45	3.55	2.85	3.45
13.....	5.2	4.2	3.85	4.0	4.6	8.2	3.8	3.35	3.40	3.55	3.05	3.45
14.....	8.8	4.2	3.90	3.95	4.6	8.2	3.85	3.60	3.45	3.65	3.80	3.50
15.....	9.0	4.2	3.90	3.80	4.6	8.4	3.80	3.65	3.45	3.80	3.75	3.45
16.....	8.9	4.0	4.0	3.80	4.8	8.4	3.70	3.60	3.45	3.70	3.70	3.45
17.....	8.9	3.95	4.1	3.80	5.0	8.2	3.75	3.60	3.45	3.65	3.65	3.55
18.....	8.8	3.85	3.95	3.85	5.1	8.0	3.65	3.55	3.50	3.65	3.85	3.50
19.....	9.0	4.0	3.90	3.80	5.0	7.8	3.50	3.50	3.45	3.65	4.0	3.30
20.....	8.7	3.80	3.95	3.90	5.0	7.6	3.50	3.15	3.45	3.75	3.90	3.25

Daily gage height, in feet, of Missouri River at Toston, Mont., for 1911—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	8.5	3.80	4.0	3.90	5.0	7.6	3.50	2.95	3.35	3.70	3.75	3.35
22.....	8.5	4.4	4.0	3.95	4.8	7.6	3.45	2.95	3.45	3.65	3.85	3.40
23.....	8.5	5.4	4.1	4.0	4.7	7.3	3.45	2.95	3.45	3.65	3.85	3.45
24.....	8.3	7.4	4.1	4.2	4.8	7.0	3.50	3.05	3.40	3.70	3.80	3.55
25.....	7.8	5.4	4.1	4.2	5.0	6.8	3.35	2.95	3.35	3.80	3.65	3.15
26.....	7.8	7.5	4.1	4.1	5.4	6.2	3.25	3.00	3.45	3.75	3.60	3.05
27.....	7.8	6.4	3.90	4.0	5.4	5.9	3.20	2.95	3.40	3.70	3.55	2.95
28.....	7.6	7.0	3.90	4.2	5.4	5.6	3.20	2.95	3.50	3.60	3.50	2.90
29.....	7.6	-----	3.90	4.5	5.4	5.4	3.15	3.00	3.45	3.65	3.55	2.65
30.....	7.5	-----	3.80	4.5	5.2	5.4	3.05	3.00	3.45	3.70	3.55	6.3
31.....	7.4	-----	3.80	-----	5.3	-----	3.10	3.00	-----	3.65	-----	7.6

NOTE.—Gage heights Jan. 1 to Mar. 12 and Dec. 30 to 31 distorted by ice.

Daily discharge, in second-feet, of Missouri River at Toston, Mont., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2,180	3,860	2,480	4,250	5,940	9,130	9,990	2,360	1,820	2,980	3,520	3,110
2.....	1,570	3,900	2,400	4,890	5,940	11,700	9,990	2,240	1,820	2,980	3,380	2,980
3.....	1,340	3,940	2,710	4,890	5,230	15,400	9,130	2,130	1,920	2,980	3,520	2,850
4.....	1,180	3,670	2,680	4,890	5,230	16,400	8,720	2,240	2,130	3,240	3,660	3,110
5.....	2,840	3,480	2,960	5,580	5,580	20,500	8,300	2,360	1,920	3,380	3,660	2,980
6.....	2,980	3,280	3,360	5,580	5,940	21,100	8,300	2,720	1,820	3,240	4,100	3,110
7.....	2,950	3,220	3,980	5,580	6,690	21,600	7,890	2,850	2,240	3,240	3,800	3,110
8.....	2,740	3,280	4,630	5,230	7,480	21,600	7,480	2,850	2,850	3,240	3,520	2,980
9.....	3,320	3,090	5,240	4,890	7,890	22,700	7,080	2,720	2,980	3,240	3,660	3,110
10.....	2,970	3,260	4,740	4,560	8,300	22,700	6,690	2,480	2,980	3,380	2,240	2,980
11.....	2,400	3,330	4,650	4,560	7,890	22,700	5,940	2,720	2,980	3,240	1,920	3,240
12.....	2,120	3,430	5,560	4,720	7,480	22,700	4,890	2,850	2,980	3,240	1,640	2,980
13.....	1,720	3,280	4,100	4,560	6,690	23,800	3,950	2,720	2,850	3,240	2,020	2,980
14.....	1,620	3,050	4,250	4,400	6,690	23,800	4,100	3,380	2,980	3,520	3,950	3,110
15.....	1,590	3,350	4,250	3,950	6,690	24,900	3,950	3,520	2,980	3,950	3,800	2,980
16.....	1,800	3,210	4,560	3,950	7,480	24,900	3,660	3,380	2,980	3,660	3,660	2,980
17.....	2,170	2,970	4,890	3,950	8,300	23,800	3,800	3,380	2,980	3,520	3,520	3,240
18.....	2,160	2,800	4,400	4,100	8,710	22,700	3,240	3,110	3,110	3,520	4,100	3,110
19.....	2,400	2,890	4,250	3,950	8,300	21,600	3,110	3,110	2,980	3,520	4,560	2,600
20.....	2,820	2,830	4,400	4,250	8,300	20,500	3,110	2,240	2,980	3,800	4,250	2,480
21.....	3,110	2,590	4,560	4,250	8,300	20,500	3,110	1,820	2,720	3,660	3,800	2,720
22.....	3,090	2,470	4,560	4,400	7,480	20,500	2,980	1,820	2,980	3,520	4,100	2,850
23.....	3,060	2,460	4,890	4,560	7,080	18,900	2,980	1,820	2,980	3,520	4,100	2,980
24.....	3,020	2,540	4,890	5,230	7,480	17,400	3,110	2,020	2,850	3,660	3,950	3,240
25.....	2,780	2,640	4,890	5,230	8,300	16,400	2,720	1,820	2,720	3,950	3,520	2,240
26.....	3,270	2,520	4,890	4,890	9,990	13,500	2,480	1,920	2,980	3,800	3,380	2,020
27.....	3,080	2,300	4,250	4,560	9,990	12,200	2,360	1,820	2,850	3,660	3,240	1,820
28.....	3,080	2,410	4,250	5,230	9,990	10,800	2,360	1,820	3,110	3,380	3,110	1,730
29.....	3,040	-----	4,250	6,310	9,990	9,990	2,240	1,920	2,980	3,520	3,240	1,350
30.....	3,300	-----	3,950	6,310	9,130	9,990	2,020	1,920	2,980	3,660	3,240	1,350
31.....	3,390	-----	3,950	-----	9,560	-----	2,130	1,920	-----	3,520	-----	1,350

NOTE.—Daily discharge determined from a well-defined rating curve. Daily discharge Jan. 1 to Mar. 12 is record of flow at Canyon Ferry dam.

Monthly discharge of Missouri River at Toston, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	3,390	1,180	2,550	157,000	C.
February.....	3,940	2,300	3,070	170,000	C.
March.....	5,560	2,400	4,190	258,000	C.
April.....	6,310	3,950	4,790	285,000	B.
May.....	9,990	5,230	7,680	472,000	B.
June.....	24,900	9,130	18,800	1,120,000	B.
July.....	9,990	2,020	4,900	301,000	B.
August.....	3,520	1,820	2,460	151,000	B.
September.....	3,110	1,820	2,710	161,000	B.
October.....	3,950	2,980	3,450	212,000	B.
November.....	4,560	1,640	3,470	206,000	B.
December.....	3,240	1,350	2,700	166,000	B.
The year.....	24,900	1,180	5,060	3,660,000	

MISSOURI RIVER AT CASCADE, MONT.

Location.—At the highway bridge, 100 yards from the Great Northern Railway, on the east side of the town of Cascade, Mont.

Records available.—July 20, 1902, to December 31, 1911.

Drainage area.—18,300 square miles.

Gage.—Standard chain gage attached to the bridge; datum unchanged.

Channel.—Probably permanent except at extreme flood stages.

Discharge measurements.—Made from lower side of bridge.

Winter flow.—Affected by ice.

The most important tributaries between this station and the station at Toston, above, are Dearborn River, Little Prickly Pear Creek, and Prickly Pear Creek. Although irrigation is extensively practiced in the Missouri River valley, the water is taken from the tributary streams, the Missouri itself because of its high banks and great variation in flow and difficulty of diversion being little used.

Discharge measurements of Missouri River at Cascade, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 2	C. S. Heidel.....	Ice.	3,020	June 22	B. E. Jones.....	9.88	23,000
Apr. 10	J. C. Beebe.....	5.40	6,440	July 12	.....do.....	5.90	7,660
10	.....do.....	5.35	6,320	Aug. 16	J. C. Beebe.....	4.53	3,980
May 23	B. E. Jones.....	5.98	8,710	Sept. 23	R. Richards.....	4.54	3,950
24	.....do.....	6.48	10,100	Oct. 14	W. A. Lamb.....	4.80	4,420

Daily gage height, in feet, of Missouri River at Cascade, Mont., for 1911.

[W. W. Doan, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		5.5	5.7	7.1	7.0	3.8	3.95	4.45	4.9	4.6
2		5.5	5.7	7.0	7.0	3.8	3.85	4.6	4.9	4.6
3		5.6	5.7	7.3	7.0	3.95	3.8	4.6	4.8	4.5
4		5.6	5.8	8.0	7.1	4.2	3.9	4.6	4.9	4.45
5		5.5	5.4	8.4	7.1	4.2	4.15	4.6	4.8	4.45
6		5.6	5.4	8.9	7.0	4.15	4.3	4.6	4.8	4.35
7		5.7	5.1	9.3	6.8	4.2	4.1	4.8	4.8	4.35
8		5.5	5.4	9.7	6.6	4.35	4.0	4.8	4.8	4.35
9		5.5	5.8	10.0	6.3	4.25	3.75	4.8	4.8	4.35
10		5.5	6.6	10.0	6.2	4.5	3.8	4.6	5.0	4.45
11		5.4	6.7	10.1	6.0	4.5	3.85	4.8	6.8	4.45
12		5.4	6.7	10.1	5.8	4.4	3.95	4.8	7.2	4.45
13		5.3	6.1	10.3	5.6	4.4	3.8	4.8	6.2	4.6
14		5.3	6.1	10.3	5.8	4.25	4.15	4.8	5.4	5.0
15		5.3	6.2	10.4	4.8	4.6	3.9	4.8	5.7	4.7
16		5.3	6.2	10.7	4.5	4.6	3.8	4.8	5.6	4.6
17		5.0	5.6	10.9	4.35	4.25	4.3	4.9	5.8	4.6
18	5.6	5.0	4.7	10.7	4.45	4.5	4.35	4.8	6.0	4.6
19	5.5	5.3	3.4	10.6	4.4	4.6	4.5	4.9	6.2	4.7
20	5.4	5.1	3.1	10.2	4.5	4.5	4.45	4.9	6.6	4.6
21	5.4	5.3	3.05	9.9	4.35	4.4	4.45	4.8	8.2	4.3
22	5.3	5.3	4.8	10.1	4.1	4.3	4.4	4.8	6.6	4.4
23	5.4	5.3	6.0	9.7	4.0	4.05	4.4	4.9	5.7	5.0
24	5.4	5.2	6.4	9.4	3.95	3.8	4.35	4.9	5.2	5.6
25	5.3	5.5	6.2	9.2	4.05	3.8	4.35	4.9	5.3	6.2
26	5.3	5.5	6.6	8.9	4.2	3.75	4.25	4.8	5.4	6.7
27	5.3	5.6	7.0	8.3	4.3	3.9	4.15	4.8	5.2	6.3
28	5.4	5.6	7.2	7.9	4.25	4.0	4.35	4.8	5.4	6.4
29	5.4	5.6	7.1	7.5	4.2	3.95	4.4	4.8	5.2	5.0
30	5.5	5.6	7.2	7.4	3.95	3.9	4.4	4.8	4.8	6.0
31	5.5		7.1		3.95	3.9		4.9		6.4

NOTE.—Gage heights Nov. 10 to 30 and Dec. 23 to 31 distorted by ice. Low readings May 18 to 22 caused by closing of gates at Hauser Lake dam.

Daily discharge, in second-feet, of Missouri River at Cascade, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		6,760	7,400	12,400	11,600	2,260	2,580	3,760	4,650	3,850
2.		6,760	7,400	12,000	11,600	2,260	2,360	4,150	4,650	3,850
3.		7,080	7,400	13,100	11,600	2,580	2,260	4,150	4,380	3,590
4.		7,080	7,730	15,800	12,000	3,140	2,470	4,150	4,650	3,460
5.		6,760	6,450	17,300	12,000	3,140	3,020	4,150	4,380	3,460
6.		7,080	6,450	19,200	11,600	3,020	3,380	4,150	4,380	3,220
7.		7,400	5,560	20,800	10,900	3,140	2,910	4,380	4,380	3,220
8.		6,760	6,450	22,300	10,100	3,500	2,690	4,380	4,380	2,980
9.		6,760	7,730	23,500	9,040	3,260	2,160	4,380	4,380	3,220
10.		6,760	10,500	23,500	8,690	3,890	2,260	3,850	4,350	3,460
11.		6,450	10,900	23,900	8,000	3,890	2,360	4,380	4,320	3,460
12.		6,450	10,900	23,900	7,340	3,630	2,580	4,380	4,290	3,460
13.		6,150	8,740	24,700	6,700	3,630	2,260	4,380	4,260	3,850
14.		6,150	8,740	24,700	7,340	3,260	3,020	4,380	4,230	4,930
15.		6,150	9,080	25,100	4,380	4,150	2,470	4,380	4,200	4,110
16.		6,150	9,080	26,400	3,590	4,150	2,260	4,380	4,170	3,850
17.		5,270	7,080	27,200	3,220	3,260	3,380	4,650	4,140	3,850
18.	7,080	5,270	4,420	26,400	3,460	3,890	3,500	4,380	4,110	3,850
19.	6,760	6,150	1,510	26,000	3,340	4,150	3,890	4,650	4,090	4,110
20.	6,450	5,560	1,040	24,300	3,590	3,890	3,760	4,650	4,070	3,850
21.	6,450	6,150	965	23,100	3,220	3,630	3,760	4,380	4,050	3,100
22.	6,150	6,150	4,700	23,900	2,630	3,380	3,630	4,380	4,030	3,340
23.	6,450	6,150	8,400	22,300	2,410	2,800	3,630	4,650	4,010	3,200
24.	6,450	5,560	9,780	21,100	2,300	2,260	3,500	4,650	3,990	3,100
25.	6,150	6,760	9,080	20,300	2,520	2,260	3,500	4,650	3,970	3,000
26.	6,150	6,760	10,500	19,100	2,860	2,160	3,260	4,380	3,950	2,900
27.	6,150	7,080	12,000	16,700	3,100	2,470	3,020	4,380	3,930	2,800
28.	6,450	7,080	12,800	15,200	3,260	2,690	3,500	4,380	3,910	2,700
29.	6,450	7,080	12,400	13,600	3,140	2,580	3,630	4,380	3,890	2,600
30.	6,760	7,080	12,800	13,200	2,580	2,470	3,630	4,380	3,870	2,500
31.	6,760		12,400		2,580	2,470		4,650		2,400

Note.—Daily discharge determined from rating curves as follows: June 18 to July 27 and Oct. 7 to Dec. 31, fairly well defined between 2,410 and 23,500 second-feet; Mar. 18 to June 17 and July 28 to Oct. 6, fairly well defined between 3,500 and 23,500 second-feet.

Monthly discharge of Missouri River at Cascade, Mont., for 1911.

[Drainage area, 18,300 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January			3,200	0.175	0.20	197,000	D.
February			3,700	.202	.21	205,000	D.
March	7,080		5,670	.310	.36	349,000	C.
April	7,400	5,270	5,500	.355	.40	387,000	B.
May	12,800	965	8,080	.442	.51	497,000	B.
June	27,200	12,000	20,700	1.13	1.26	1,230,000	B.
July	12,000	2,300	6,150	.336	.39	378,000	B.
August	4,150	2,160	3,140	.172	.20	193,000	B.
September	3,890	2,160	3,020	.165	.18	180,000	B.
October	4,650	3,760	4,370	.239	.28	269,000	B.
November	4,650	3,870	4,200	.230	.26	250,000	C.
December	4,930	2,400	3,400	.186	.21	209,000	C.
The year	27,200	965	6,000	.328	4.46	4,340,000	

^a Estimated from records obtained at Canyon Ferry dam.

NOTE.—Discharge Mar. 1 to 17 estimated at 5,000 second-feet per day.

MISSOURI RIVER AT FORT BENTON, MONT.

Location.—At the public highway bridge at Fort Benton, Mont.

Records available.—July 1, 1902, to April 27, 1910, gage heights recorded by United States Weather Bureau; April 28, 1910, to December 31, 1910, United States Geological Survey records, including partial estimates of run-off for the year 1910.

Drainage area.—112,000 square miles.

Gage.—A Mott gage installed April 11, 1907, on upstream side of bridge; datum unchanged.

Channel.—Probably permanent except in flood.

Discharge measurements.—Made from downstream side of bridge.

Winter flow.—Affected by ice.

Accuracy.—No estimates are made for 1911 as gage heights are in error and are not published.

Discharge measurements of Missouri River at Fort Benton, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 10	W. A. Lamb.....	1.95	7,240	July 9	J. C. Beebe.....	3.38	13,100
10	do.....	1.95	7,170	25	do.....	.93	4,130
May 31	J. C. Beebe.....	3.84	15,000	Aug. 30	R. Richards.....	.77	3,680

TRIBUTARY BASINS.

BIGHOLE RIVER BASIN.

BIGHOLE RIVER NEAR DEWEY, MONT.

Location.—In sec. 36, T. 1 N., R. 11 W., at Young's bridge, 4 miles above Dewey and 11 miles above Divide, Mont.; a few miles below the mouth of Wise River.

Records available.—September 15 to December 31, 1911.

Drainage area.—Not measured.

Gage.—Staff fastened to southeast piling of bridge on downstream side.

Channel.—Rocky and clean; nonshifting.

Discharge measurements.—Made from bridge.

Winter flow.—Affected by ice.

Diversions.—Water is diverted from this stream for irrigation.

Artificial control.—A large hydroelectric power plant is in operation about 8 miles below the station.

Discharge measurements of Bighole River near Dewey, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 21	C. S. Heidel.....	3.96	1,060
July 8	do.....	4.94	2,040
Sept. 18	do.....	2.26	280

Daily gage height, in feet, of Bighole River near Dewey, Mont., for 1911.

[W. T. Neal, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1			4.4	4.9		3.4	2.25	2.3	2.65	2.4
2			4.5	5.6		3.3	2.3	2.3	2.6	2.35
3			4.3	6.5		3.3	2.2	2.4	2.5	2.3
4			4.4	7.0		3.4	2.25	2.5	2.5	2.3
5			4.9	7.4		3.4	2.25	2.5	2.5	2.3
6			5.3	7.6		3.6	2.3	2.5	2.45	2.25
7			4.9	7.8		3.5	2.4	2.5	2.4	2.25
8			5.0	7.6	5.0	3.4	2.4	2.5	2.4	2.2
9			5.2	7.8	4.7	3.4	2.45	2.5	2.4	2.2
10			5.0	7.9	4.6	3.2	2.5	2.55	2.35	2.2
11			4.8	7.8	4.4	3.2	2.45	2.7	2.35	2.2
12	2.2		4.7	7.6	4.3	3.2	2.5	3.0	2.4	2.2
13	2.2		4.6	8.0	4.2	3.2	2.4	3.1	2.4	2.2
14	2.3		4.6		4.1	3.1	2.35	3.1	2.6	2.2
15	2.3		5.1			3.0	2.3	3.1	2.65	2.2
16	2.4		5.4		4.0	3.0	2.2	3.1	2.65	
17	2.4		5.5		4.0	2.95	2.25	3.1	2.7	
18	2.4		5.5		4.0	2.9	2.2	3.1	2.65	
19	2.45		5.3		3.9	2.85	2.2	3.1	2.7	
20	2.5		5.1		3.8	2.8	2.2	3.1	2.7	
21	2.5	4.0	4.7		3.8	2.8	2.2	3.1	2.6	
22	2.6	4.4	4.7		3.8	2.7	2.2	3.1	2.6	
23	2.7	4.4	4.7		3.7	2.6	2.2	3.0	2.6	
24	2.8	4.4	4.8		3.6	2.55	2.2	3.1	2.5	
25	2.8	4.5	4.8		3.6	2.55	2.2	3.0	2.45	
26	2.8	4.7	4.8		3.5	2.45	2.2	2.95	2.4	
27	2.8	5.0	4.7		3.5	2.45	2.2	3.0	2.4	
28	2.8	5.0	4.6		3.4	2.35	2.2	2.9	2.4	
29	2.85	5.0	4.6		3.4	2.4	2.25	2.9	2.4	
30	2.95	5.0	4.6		3.4	2.35	2.25	2.8	2.35	
31	3.2		4.6		3.4	2.25		2.65	2.3	

Daily discharge, in second-feet, of Bighole River near Dewey, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		680	1,440	1,900	4,560	755	265	280	410	315
2		700	1,530	2,740	4,190	705	280	280	390	298
3		725	1,360	4,080	3,820	705	250	315	350	280
4		750	1,440	4,950	3,460	755	265	350	350	280
5		775	1,900	5,670	3,100	755	265	350	350	280
6			800	2,330	6,330	870	280	350	332	265
7			825	1,900	6,390	810	315	350	315	265
8			850	2,000	6,030	755	315	350	315	250
9			875	2,210	6,390	1,720	755	332	350	250
10			900	2,000	6,570	1,620	655	350	370	298
11			925	1,810	6,390	1,440	655	332	430	298
12	250	950	1,720	6,030	1,360	655	350	560	315	250
13	250	975	1,620	6,750	1,280	655	315	605	315	250
14	280	1,000	1,620	7,650	1,200	605	298	605	390	250
15	280	1,020	2,100	8,100	1,160	560	280	605	410	250
16	315	1,050	2,460	8,550	1,130	560	250	605	410	
17	315	1,070	2,600	10,400	1,130	538	265	605	430	
18	315	1,090	2,600	9,780	1,130	515	250	605	410	
19	332	1,100	2,330	9,160	1,060	492	250	605	430	
20	350	1,120	2,100	8,550	1,000	470	250	605	430	
21	350	1,130	1,720	8,200	1,000	470	250	605	390	
22	390	1,440	1,720	7,840	1,000	430	250	605	380	
23	430	1,440	1,720	7,480	935	390	250	560	390	
24	470	1,440	1,810	7,110	870	370	250	605	350	
25	470	1,530	1,810	6,740	870	370	250	560	332	
26	470	1,720	1,810	6,380	810	332	250	538	315	
27	470	2,000	1,720	6,010	810	332	250	560	315	
28	470	2,000	1,620	5,650	755	298	250	515	315	
29	492	2,000	1,620	5,280	755	315	265	515	315	
30	538	2,000	1,620	4,920	755	298	265	470	298	
31	655		1,620		755	265		410	280	

NOTE.—Daily discharge determined from a rating curve that is fairly well defined below 2,600 second-feet. Discharge estimated as follows: June 14, 7,650 second-feet; June 16, 8,550 second-feet; June 17, 10,400 second-feet; June 20, 8,550 second-feet. Discharge interpolated for all other days on which gage heights are missing.

Monthly discharge of Bighole River near Dewey, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			α 300	18,400	
February.....			α 250	13,900	
March.....	655		343	21,100	C.
April.....	2,000	680	1,160	69,000	C.
May.....	2,600	1,360	1,870	115,000	B.
June.....	10,400	1,900	6,590	392,000	C.
July.....	4,560	755	1,640	101,000	C.
August.....	870	265	551	33,900	B.
September.....	350	250	276	16,400	B.
October.....	605	280	488	30,000	B.
November.....	430	280	365	21,700	B.
December.....	315		245	15,100	C.
The year.....	10,400		1,170	848,000	

α Estimated.

NOTE.—Discharge Mar. 1 to 11 estimated at 250 second-feet per day; Dec. 16 to 31, 225 second-feet per day.

RUBY RIVER BASIN.

RUBY RIVER NEAR ALDER, MONT.

Location.—At the private bridge on Lauterbach's ranch, about 8 miles south of Alder, Mont.

Records available.—April 27, 1911, to December 31, 1911.

Drainage area.—About 540 square miles.

Gage.—Vertical staff spiked to bridge pile 4 feet from right bank.

Channel.—Probably permanent, or only slightly shifting. Bed of stream below the gage composed of gravel and pebbles. At the gage the water is deeper and the material of the bed is finer.

Discharge measurements.—At low and ordinary stages made by wading on riffle at control 200 feet below gage; high-stage measurements made from downstream side of bridge.

Winter flow.—Affected by ice.

Discharge measurements of Ruby River near Alder, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 28.....	C. S. Heidel.....	4.18	189
June 12.....	do.....	5.75	711
July 14.....	do.....	4.08	158
Sept. 15.....	do.....	3.89	116

Daily gage height, in feet, of Ruby River near Alder, Mont., for 1911.

[Leo Hadel, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		4.0	5.4	4.7	4.0	3.8	4.0	4.0
2.....		4.1	5.5	4.7	4.1	3.7	4.0	4.0
3.....		4.1	5.6	4.6	4.0	3.7	4.1	4.0
4.....		4.3	6.3	4.6	4.0	3.7	4.0	4.0
5.....		4.5	6.3	4.5	4.1	3.8	4.0	4.0
6.....		5.1	6.2	4.4	4.3	3.8	4.0	4.0
7.....		4.6	-----	4.4	4.3	3.8	4.0	4.0
8.....		4.7	-----	4.4	4.2	3.8	4.0	4.0
9.....		4.5	6.3	4.3	4.2	3.8	4.0	4.0
10.....		4.6	5.8	4.2	4.2	3.8	4.0	4.0
11.....		4.5	6.0	4.2	4.1	3.8	4.0	4.0
12.....		4.6	5.8	4.1	4.1	3.8	4.0	4.0
13.....		4.5	6.1	4.1	4.1	4.0	4.1	4.0
14.....		4.9	6.1	4.1	4.1	4.0	4.0	4.0
15.....		5.2	5.9	4.1	4.1	3.9	4.0	4.0
16.....		5.0	5.7	4.0	4.1	3.9	4.0	4.0
17.....		4.8	5.5	4.0	4.1	3.9	4.0	4.0
18.....		4.6	5.4	4.0	4.0	3.9	4.0	4.0
19.....		4.7	5.3	4.0	4.0	3.9	3.9	4.0
20.....		4.5	5.3	4.0	4.0	3.9	3.9	4.0
21.....		4.5	5.4	4.0	4.0	4.0	4.0	4.0
22.....		4.5	5.1	4.0	3.9	3.9	4.0	3.9
23.....		5.3	4.9	4.0	3.9	3.9	4.0	3.9
24.....		5.6	4.8	4.0	3.9	4.0	4.0	3.9
25.....		5.2	4.7	4.0	3.9	4.0	4.0	3.9
26.....		5.2	4.7	4.0	3.9	4.0	4.0	3.9
27.....		5.4	4.7	4.1	3.8	4.0	4.0	3.9
28.....	4.2	5.4	4.7	4.0	3.8	4.0	4.0	3.9
29.....	4.1	5.3	4.8	4.0	3.8	4.0	3.9	3.9
30.....	4.0	5.0	4.8	4.0	3.8	4.0	3.9	3.9
31.....		5.1	-----	4.0	3.8	-----	3.9	-----

Daily discharge, in second-feet, of Ruby River near Alder, Mont., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		141	579	340	141	95	141	141
2.....		166	615	340	166	76	141	141
3.....		166	652	308	141	76	166	141
4.....		219	920	308	141	76	141	141
5.....		277	920	277	166	95	141	141
6.....		472	880	247	219	95	141	141
7.....		308	895	247	219	95	141	141
8.....		340	910	247	192	95	141	141
9.....		277	920	219	192	95	141	141
10.....		308	726	192	192	95	141	141
11.....		277	802	192	166	95	141	141
12.....		308	726	166	166	95	141	141
13.....		277	840	166	166	141	166	141
14.....		405	840	166	166	141	141	141
15.....		507	764	166	166	117	141	141
16.....		438	689	141	166	117	141	141
17.....		372	615	141	166	117	141	141
18.....		308	579	141	141	117	141	141
19.....		340	543	141	141	117	117	141
20.....		277	543	141	141	117	117	141
21.....		277	579	141	141	141	141	141
22.....		277	472	141	117	117	141	117
23.....		543	405	141	117	117	141	117
24.....		652	372	141	117	141	141	117
25.....		507	340	141	117	141	141	117
26.....		507	340	141	117	141	141	117
27.....		579	340	166	95	141	141	117
28.....	192	579	340	141	95	141	141	117
29.....	166	543	372	141	95	141	117	117
30.....	141	438	372	141	95	141	117	117
31.....		472	-----	141	95	-----	117	-----

NOTE.—Daily discharge determined from a fairly well-defined rating curve.

Monthly discharge of Ruby River near Alder, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	652	141	373	22,900	B.
June.....	920	340	630	37,500	B.
July.....	340	141	189	11,600	B.
August.....	219	95	147	9,040	B.
September.....	141	76	114	6,780	B.
October.....	166	117	139	8,550	B.
November.....	141	117	134	7,970	B.
December.....	.....	.....	α 100	6,150	D.
The period.....	.....	.....	.....	110,000	.....

α Estimated.

PIPESTONE CREEK BASIN.

PIPESTONE CREEK NEAR WHITEHALL, MONT.

Location.—Six miles west of Whitehall, Mont., at Peyton Allred's ranch, a short distance above junction of Pipestone and Little Pipestone creeks.

Records available.—October 13, 1910, to September 30, 1911.

Gage.—Staff fastened securely to a large post on the left bank of the stream directly north of the observer's house.

Channel.—Sandy and shifting.

Cooperation.—Gage heights and discharge measurements supplied by G. E. Baker.

Discharge measurements of Pipestone Creek near Whitehall, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 9	Baker and Bell.....	0.68	12.9	Apr. 20	Baker and Bell.....	1.00	24.3
Mar. 9	.....do.....	.66	12.2	July 16	C. S. Heidel.....	1.00	2.47
Apr. 19	.....do.....	1.03	26.4	.....	G. E. Baker.....	1.01	2.27

Daily gage height, in feet, and discharge, in second-feet, of Pipestone Creek near Whitehall, Mont., for 1910.

[Mrs. Payton Allred, observer.]

October.		November.		December.		Day.	October.		November.		December.	
Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.		Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....	.....	0.6	5	0.85	15	16....	0.5	2.5	0.5	3.5	0.7	10
2.....	.....	.6	5	.8	13	17....	.5	2.5	.7	10	.75	13
3.....	.....	.6	5	.8	13	18....	.55	3.5	.8	13	.75	13
4.....	.....	.55	3.5	.85	15	19....	.55	3.5	.8	13	.75	13
5.....	.....	.5	2.5	.85	15	20....	.55	3.5	.8	13	.7	11
6.....	.....	.55	3.5	.9	16	21....	.5	2.5	.8	13	.7	11
7.....	.....	.55	3.5	.9	16	22....	.5	2.5	.8	13	.7	11
8.....	.....	.6	5	.85	15	23....	.5	2.5	.8	13	.7	11
9.....	.....	.6	5	.85	15	24....	.5	2.5	.75	12	.7	11
10....	.....	.6	5	.8	13	25....	.55	3.5	.75	12	.7	11
11....	.....	.6	5	.8	13	26....	.55	3.5	.75	12	.7	11
12....	.....	.6	6.5	.8	13	27....	.55	3.5	.75	12	.7	11
13....	0.5	2.5	.6	6.5	.75	28....	.55	3.5	.8	13	.7	11
14....	.5	2.5	.5	3.5	.75	29....	.55	3.5	.8	13	.7	11
15....	.5	2.5	.5	3.5	.7	30....	.55	3.5	.85	15	.7	11
						31....	.55	3.5	.....	.....	.7	11

Daily gage height, in feet, of Pipestone Creek near Whitehall, Mont., for 1911.

[Mrs. Payton Allred, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1....	0.6	0.85	1.2	1.8	1.7	1.0	0.9	16....	0.7	0.8	1.5	1.8	1.0	0.95	0.95
2....	.6	.9	1.2	2.1	1.3	1.1	.9	17....	.7	.85	1.4	1.9	1.0	.95	.....
3....	.6	.9	1.1	1.7	1.6	1.1	.9	18....	.7	.85	1.3	1.8	1.0	.95	.....
4....	.6	.85	1.1	1.8	1.3	1.15	.9	19....	.75	.85	1.3	1.8	.95	.95	.....
5....	.6	.8	1.15	2.0	1.3	1.2	.95	20....	.75	.9	1.25	2.2	.95	.9	.....
6....	.7	.75	1.5	1.8	1.2	1.2	.95	21....	.8	.9	1.25	2.0	1.0	.9	.....
7....	.7	.75	1.2	1.9	1.2	1.0	1.0	22....	.85	1.0	1.2	1.8	1.0	.9	.....
8....	.7	.75	1.25	1.9	1.1	1.0	.95	23....	.95	1.0	1.35	1.65	1.0	.9	.....
9....	.65	.75	1.4	2.2	1.0	1.0	.95	24....	.95	1.0	1.4	1.55	1.0	.9	.....
10....	.65	.75	1.2	1.8	1.0	1.0	.95	25....	.85	1.0	1.5	1.5	.95	.95	.....
11....	.65	.75	1.2	1.8	1.0	1.0	.95	26....	.75	1.0	1.5	1.5	.95	.95	.....
12....	.7	.75	1.2	1.8	1.0	.95	.95	27....	.75	1.5	1.5	1.5	.95	.95	.....
13....	.7	.8	1.2	1.8	1.0	.95	.95	28....	.75	1.45	1.5	1.5	.95	.95	.....
14....	.7	.8	1.2	1.8	1.0	.95	.95	29....	.75	1.2	1.5	1.5	1.0	.9	.....
15....	.7	.8	1.4	1.8	1.0	.95	.95	30....	.8	1.0	1.5	1.6	1.0	.9	.....
								31....	.8	.....	1.5	.....	1.0	.9	.....

Daily discharge, in second-feet, of Pipestone Creek near Whitehall, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1....	10	19	33	67	33	2.5	0.5	16....	13	17	49	53	2.5	1.5	1.5
2....	10	21	33	87	17	5.0	.5	17....	13	19	43	58	2.5	1.5	.....
3....	10	21	29	61	28	5.0	.5	18....	13	19	38	49	2.5	1.5	.....
4....	10	19	29	67	15	6.5	.5	19....	15	19	38	49	1.5	1.5	.....
5....	10	17	31	80	15	8.0	1.5	20....	15	21	36	73	1.5	.5	.....
6....	13	15	49	63	11	8.0	1.5	21....	17	21	36	61	2.5	.5	.....
7....	13	15	33	71	11	2.5	2.5	22....	19	25	33	45	2.5	.5	.....
8....	13	15	36	71	7	2.5	1.5	23....	23	25	40	37	2.5	.5	.....
9....	12	15	43	87	4	2.5	1.5	24....	23	25	43	33	2.5	.5	.....
10....	12	15	33	57	4	2.5	1.5	25....	19	25	49	30	1.5	1.5	.....
11....	12	15	33	57	4	2.5	1.5	26....	15	25	49	27	1.5	1.5	.....
12....	13	15	33	57	2.5	1.5	1.5	27....	15	49	49	27	1.5	1.5	.....
13....	13	17	33	57	2.5	1.5	1.5	28....	15	46	49	27	1.5	1.5	.....
14....	13	17	33	53	2.5	1.5	1.5	29....	15	33	49	27	2.5	.5	.....
15....	13	17	43	53	2.5	1.5	1.5	30....	17	25	49	29	2.5	.5	.....
								31....	17	.....	49	.....	2.5	.5	.....

NOTE.—Daily discharge determined as follows: Oct. 13, 1910, to June 5, 1911, from curve fairly well defined below 35 second-feet; June 6 to July 15, by indirect method for shifting channels; July 16 to Sept. 16, from curve drawn parallel to other curve but poorly defined.

Monthly discharge of Pipestone Creek near Whitehall, Mont., for 1910-11.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
1910.					
October 13-31.....	3.5	2.5	3.03	114	B.
November.....	15	2.5	8.28	493	B.
December.....	16	10	12.5	769	B.
1911.					
January.....			a 10	615	D.
February.....			a 12	666	D.
March.....	23	10	14.2	873	B.
April.....	49	15	21.6	1,290	B.
May.....	49	29	39.5	2,430	C.
June.....	87	27	53.8	3,200	C.
July.....	33	1.5	6.23	383	C.
August.....	8	.5	2.24	138	C.
September.....	1.5	.5	1.40	83.3	C.
The period.....				9,680	

a Estimated.

NOTE.—Discharge Sept. 17 to 30 estimated at 1.5 second-feet per day.

WHITETAIL CREEK BASIN.

WHITETAIL CREEK AT WHITEHALL, MONT.

Location.—At highway bridge in the northeast part of the town.

Records available.—March 19 to June 30, 1911.

Drainage area.—Not measured.

Gage.—Staff gage nailed to pile on upstream side of bridge.

Channel.—Sandy; liable to shift.

Discharge measurements.—Made by wading at ordinary stages.

Winter flow.—Affected by ice.

Artificial control.—Water is diverted above the station for irrigation.

Cooperation.—Gage heights and discharge measurements supplied by G. E. Baker.

Discharge measurements of Whitetail Creek at Whitehall, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 28	Geo. E. Baker	2.35	14.9	Apr. 22	Geo. E. Baker.....	4.42	66.3
Apr. 8	.....do.....	2.80	24.8	26	.....do.....	5.11	96.9
19	.....do.....	4.59	75.5	27	.....do.....	5.66	123.4
20	.....do.....	3.88	50.9	July 16 ^b	Baker and Heidel....	1.57	0.6

^b Estimated.

Daily gage height, in feet, and discharge, in second-feet, of Whitetail Creek at Whitehall, Mont., for 1911.

[G. E. Baker, observer.]

Day.	March.		April.		May.		June.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1.....			2.44	17	3.80	48	2.80	24
2.....			2.50	18	3.50	39	3.70	45
3.....			2.50	18	3.55	40	4.70	80
4.....			2.75	23	3.50	39	4.80	84
5.....			2.45	17	3.90	51	5.10	96
6.....			3.00	28	4.50	72	5.10	96
7.....			2.90	26	3.50	39	4.05	56
8.....			2.80	24	3.75	46	3.75	46
9.....			2.90	26	3.30	34	4.00	54
10.....			2.95	27	3.20	32	3.80	48
11.....			2.80	24	2.85	25	3.40	36
12.....			2.65	21	2.45	17	2.90	26
13.....			2.85	25	2.45	17	2.80	24
14.....			2.60	20	2.40	16	2.70	22
15.....			2.45	17	2.30	14	2.50	18
16.....			2.40	16	4.00	54	2.40	16
17.....			3.00	28	3.95	52	2.30	14
18.....			2.67	21	3.40	36	2.20	12
19.....	2.50	18	4.61	76	3.00	28	2.10	10
20.....	2.55	19	3.88	50	2.80	24	2.20	12
21.....	2.60	20	4.70	80	2.70	22	2.30	14
22.....	2.50	18	4.42	69	2.50	18	2.40	16
23.....	2.60	20	3.70	45	2.40	16	2.60	18
24.....	2.60	20	3.65	44	2.50	18	2.30	14
25.....	2.50	18	3.85	50	3.40	36	2.30	14
26.....	2.30	14	5.11	96	3.75	46	2.20	12
27.....	2.40	16	5.67	124	3.50	39	2.50	18
28.....	2.35	15	5.10	96	3.60	42	2.30	14
29.....	2.35	15	4.50	72	3.70	45	2.20	12
30.....	2.40	16	3.90	51	3.45	38	2.30	14
31.....	2.30	14	.....	.....	3.00	28	.....	.....

NOTE.—Daily discharge determined from a well-defined rating curve.

Monthly discharge of Whitetail Creek at Whitehall, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
March 19-31.....	20	14	17.1	440	A.
April.....	124	16	41.6	2,480	A.
May.....	72	14	34.6	2,130	A.
June.....	96	10	32.2	1,920	A.

LITTLE WHITETAIL CREEK NEAR WHITEHALL, MONT.

Location.—At Collins's ranch, about 7 miles above Whitehall.

Records available.—March 17 to September 22, 1911.

Drainage area.—Not measured.

Gage.—Staff gage on right bank just above ford near the stables.

Channel.—Sandy and shifting.

Discharge measurements.—Made by wading at different sections.

Winter flow.—Is affected by ice.

Artificial control.—Water is diverted for irrigating.

Accuracy.—Fair. The shifting affects the results to some extent.

Cooperation.—Gage heights and discharge measurements supplied by G. E. Baker.

Discharge measurements of Little Whitetail Creek near Whitehall, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.
Mar. 7	Geo. E. Baker.....	<i>Feet.</i> 1.06	<i>Sec.-ft.</i> 4.7
Apr. 19	.....do.....	1.10	4.7
July 16	.....do.....	.92	1.8
16	C. S. Heidel.....	.94	2.0

Daily gage height, in feet, of Little Whitetail Creek near Whitehall, Mont., for 1911.

[Ella Collins, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1....		1.20	1.20	1.20	0.80	0.90	1.00	16....	1.10	1.20	1.20	1.10	.....	1.00	0.90
2....		1.20	1.20	1.30	.80	.90	1.00	17....	1.00	1.20	1.10	1.00	.....	1.00	.90
3....		1.20	1.20	1.40	.80	.90	1.00	18....	1.00	1.20	1.00	1.00	.....	1.00	.90
4....		1.20	1.10	1.30	.80	.90	1.00	19....	1.00	1.10	1.00	1.00	.....	1.00	.90
5....		1.20	1.10	1.30	.80	.90	1.00	20....	1.10	1.10	.90	1.00	.....	1.00	.90
6....		1.20	1.00	1.30	.80	.90	1.00	21....	1.20	1.10	.90	1.00	.....	1.00	.90
7....	1.10	1.20	1.00	1.20	.90	.90	1.00	22....	1.30	1.10	.90	.90	.....	1.00	.90
8....	1.10	1.20	1.10	1.30	.90	.90	1.00	23....	1.20	1.10	.90	.90	0.90	1.00	.....
9....	1.10	1.20	1.10	1.40	.80	.90	1.00	24....	1.20	1.10	.90	.90	.90	1.10	.....
10....	1.00	1.20	1.10	1.30	.80	1.00	.80	25....	1.20	1.10	.90	.90	.90	1.10	.....
11....	1.10	1.20	1.10	1.20	.80	1.00	.80	26....	1.20	1.20	.90	.90	.90	1.10	.....
12....	1.10	1.20	1.00	1.10	.90	1.00	.90	27....	1.20	1.30	.90	.90	.90	1.00	.....
13....	1.10	1.10	1.00	1.10	.....	1.00	.90	28....	1.10	1.40	.90	.90	.90	1.00	.....
14....	1.10	1.20	.80	1.10	.....	1.00	.90	29....	1.10	1.30	.90	.80	.90	1.00	.....
15....	1.10	1.10	.90	1.10	.....	1.00	1.00	30....	1.10	1.20	.90	.80	.90	1.00	.....
								31....	1.10	.....	.90	.....	.90	1.00	.....

Daily discharge, in second-feet, of Little Whitetail Creek near Whitehall, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1....	5.0	7.2	6.8	6.8	.6	1.5	2.9	16....	5.4	7.0	6.8	4.7	1.5	2.9	1.5
2....	5.0	7.2	6.8	9.1	.6	1.5	2.9	17....	3.3	7.0	4.7	2.9	1.5	2.9	1.5
3....	5.1	7.2	6.8	12.0	.6	1.5	2.9	18....	3.3	7.0	2.9	2.9	1.5	2.9	1.5
4....	5.2	7.2	4.7	9.1	.6	1.5	2.9	19....	3.3	4.8	2.9	2.9	1.5	2.9	1.5
5....	5.3	7.2	4.7	9.1	.6	1.5	2.9	20....	5.2	4.7	1.5	2.9	1.5	2.9	1.5
6....	5.4	7.2	2.9	9.1	.6	1.5	2.9	21....	7.3	4.7	1.5	2.9	1.5	2.9	1.5
7....	5.4	7.0	2.9	6.8	1.5	1.5	2.9	22....	9.7	4.7	1.5	1.5	1.5	2.9	1.5
8....	5.4	7.0	4.7	9.1	1.5	1.5	2.9	23....	7.3	4.7	1.5	1.5	1.5	2.9	1.5
9....	5.4	7.0	4.7	12.0	.6	1.5	2.9	24....	7.3	4.7	1.5	1.5	1.5	4.7	1.5
10....	3.5	7.0	4.7	9.1	.6	2.9	.6	25....	7.3	4.7	1.5	1.5	1.5	4.7	1.5
11....	5.4	7.0	4.7	6.8	.6	2.9	.6	26....	7.3	6.8	1.5	1.5	1.5	4.7	1.5
12....	5.4	7.0	2.9	4.7	1.5	2.9	1.5	27....	7.3	9.1	1.5	1.5	1.5	2.9	1.5
13....	5.4	4.8	2.9	4.7	1.5	2.9	1.5	28....	5.0	12.0	1.5	1.5	1.5	2.9	1.5
14....	5.4	7.0	.6	4.7	1.5	2.9	1.5	29....	5.0	9.1	1.5	.6	1.5	2.9	1.5
15....	5.4	4.8	1.5	4.7	1.5	2.9	2.9	30....	5.0	6.8	1.5	.6	1.5	2.9	1.5
								31....	5.0	.....	1.5	.....	1.5	2.9	.....

NOTE.—Daily discharge determined from a fairly well-defined rating curve Apr. 19 to end of season. Indirect method used Mar. 7 to Apr. 18. Discharge estimated Mar. 1 to 6, July 13 to 22, and Sept. 23 to 30.

Monthly discharge of Little Whitetail Creek near Whitehall, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
March.....	9.7	3.3	5.54	341	C.
April.....	12	4.7	6.65	396	C.
May.....	6.8	.6	3.15	194	B.
June.....	12	.6	4.96	295	B.
July.....	1.5	.6	1.24	76.2	B.
August.....	4.7	1.5	2.67	164	B.
September.....	2.9	.6	1.89	112	B.
The period.....				1,580	

GALLATIN RIVER BASIN.

WEST GALLATIN RIVER NEAR SALESVILLE, MONT.

Location.—On highway bridge 4 miles above Salesville, Mont., just below mouth of canyon. Above the station Spanish Creek is the most important tributary.

Records available.—July 18, 1895, to December 31, 1905; August 9 to December 31, 1910; and July to December, 1911.

Drainage area.—860 square miles.

Gage.—Standard chain, boxed and fastened near middle of bridge on upstream side; datum unchanged.

Channel.—Bed of stream is of gravel and small bowlders, and will not shift.

Discharge measurements.—Made from the lower side of the highway bridge.

Diversions.—Irrigation is practiced extensively on this stream, and practically the entire low-water flow of the river is appropriated.

Discharge measurements of West Gallatin River near Salesville, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
July 19	R. Richards.....	4.27	1,220
Aug. 22	C. S. Heidel.....	3.37	564
Nov. 8	B. E. Jones.....	3.17	425

Daily gage height, in feet, and discharge, in second-feet, of West Gallatin River near Salesville, Mont., for 1910.

[Mrs. James Gant, observer.]

Day.	Aug.		Sept.		Oct.		Nov.		Dec.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....		475	3.1	390	3.1	390	3.25	452	3.2	430
2.....		475	3.1	390	3.2	430	3.35	502	3.05	372
3.....		475	3.1	390	3.2	430	3.25	452	3.05	372
4.....		475	3.2	430	3.2	430	3.25	452	3.15	410
5.....		475	3.2	430	3.3	475	3.2	430	3.0	355
6.....		475	3.2	430	3.3	475	3.2	430	3.0	355
7.....		475	3.2	430	3.3	475	3.2	430	3.05	372
8.....		475	3.2	430	3.3	475	3.2	430	3.1	390
9.....	3.3	475	3.2	430	3.2	430	3.2	430	3.0	355
10.....	3.2	430	3.2	430	3.3	475	3.1	390	2.9	330
11.....	3.2	430	3.2	430	3.2	430	3.1	390	3.0	355
12.....	3.2	430	3.2	430	3.2	430	3.2	430	3.0	355
13.....	3.4	530	3.2	430	3.3	475	3.05	372	2.95	342
14.....	3.2	430	3.2	430	3.2	430	3.05	372	2.95	342
15.....	3.2	430	3.2	430	3.2	430	3.15	410	3.0	355
16.....	3.2	430	3.2	430	3.2	430	3.0	355	3.0	355
17.....	3.1	390	3.2	430	3.3	475	3.0	355	2.95	342
18.....	3.1	390	3.2	430	3.3	475	3.1	390	3.0	355
19.....	3.1	390	3.2	430	3.3	475	3.2	430	3.05	372
20.....	3.1	390	3.2	430	3.4	530	3.1	390	3.05	372
21.....	3.0	355	3.2	430	3.2	430	3.1	390	2.95	342
22.....	3.0	355	3.2	430	3.2	430	3.25	452	3.0	355
23.....	3.0	355	3.2	430	3.3	475	3.15	410	3.05	372
24.....	3.1	390	3.2	430	3.2	430	3.15	410	3.0	355
25.....	3.1	390	3.1	390	3.2	430	3.25	452	2.95	342
26.....	3.1	390	3.2	430	3.3	475	3.15	410	3.0	355
27.....	3.1	390	3.2	430	3.3	475	3.1	390	3.05	372
28.....	3.0	355	3.2	430	3.2	430	3.2	430	3.05	372
29.....	3.0	355	3.1	390	3.2	430	3.1	390	2.95	342
30.....	3.1	390	3.0	355	3.3	475	3.1	390	3.0	355
31.....	3.1	390			3.2	430			3.05	372

Daily gage height, in feet, and discharge, in second-feet, of West Gallatin River near Salesville, Mont., for 1911.

[C. L. Crew, observer.]

Day.	July.		Aug.		Sept.		Oct.		Nov.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....			3.75	762	3.25	452	3.25	452	3.05	372
2.....			3.90	880	3.30	475	3.30	475	3.10	390
3.....			3.75	762	3.25	452	3.25	452	3.05	372
4.....			3.80	800	3.30	475	3.30	475	3.20	430
5.....			3.75	762	3.35	502	3.25	452	3.15	410
6.....			3.80	800	3.35	502	3.25	452	3.15	410
7.....			3.75	762	3.40	530	3.30	475	3.20	430
8.....			3.80	800	3.35	502	3.25	452	3.05	372
9.....			3.70	725	3.40	530	3.30	475	3.10	390
10.....			3.65	690	3.25	452	3.25	452	3.05	372
11.....			3.70	725	3.25	452	3.25	452		
12.....			3.60	655	3.30	475	3.30	475		
13.....			3.60	655	3.35	502	3.25	452		
14.....			3.55	622	3.40	530	3.30	475		
15.....			3.55	622	3.35	502	3.25	452		
16.....			3.50	590	3.35	502	3.25	452		
17.....			3.45	560	3.30	475	3.30	475		
18.....			3.45	560	3.25	452	3.25	452		
19.....	4.30	1,240	3.35	502	3.30	475	3.30	475		
20.....	4.25	1,190	3.35	502	3.25	452	3.25	452		

Daily gage height, in feet, and discharge, in second-feet, of West Gallatin River near Salesville, Mont., for 1911—Continued.

Day.	July.		Aug.		Sept.		Oct.		Nov.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
21.....	4.30	1,240	3.40	530	3.25	452	3.15	410	.....	.....
22.....	4.20	1,140	3.35	502	3.30	475	3.20	430	.....	.....
23.....	4.10	1,060	3.40	530	3.25	452	3.25	452	.....	.....
24.....	4.05	1,010	3.35	502	3.30	475	3.30	475	.....	.....
25.....	3.95	922	3.25	452	3.25	452	3.25	452	.....	.....
26.....	4.00	965	3.30	475	3.25	452	3.15	410	.....	.....
27.....	3.85	840	3.25	452	3.30	475	3.20	430	.....	.....
28.....	3.90	880	3.30	475	3.25	452	3.15	410	.....	.....
29.....	3.85	840	3.25	452	3.30	475	3.20	430	.....	.....
30.....	3.85	840	3.30	475	3.25	452	3.05	372	.....	.....
31.....	3.80	800	3.25	452	.....	.....	3.05	372	.....	.....

NOTE.—Daily discharge determined from a rating curve that is fairly well defined for all gage heights.

Monthly discharge of West Gallatin River near Salesville, Mont., for 1910-11.

[Drainage area, 860 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accu- racy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1910.							
August.....	530	355	421	0.490	0.56	25,900	B.
September.....	430	355	421	.490	.55	25,100	B.
October.....	530	390	451	.524	.60	27,700	B.
November.....	502	355	414	.481	.54	24,600	B.
December.....	430	330	362	.421	.49	22,300	B.
1911.							
July 19-31.....	1,240	800	997	1.16	.56	25,700	B.
August.....	880	452	614	.714	.82	37,800	B.
September.....	530	452	477	.555	.62	28,400	B.
October.....	475	372	447	.520	.60	27,500	B.
November.....	.....	.....	382	.444	.50	22,700	C.
December.....	.....	.....	325	.378	.44	20,000	D.

NOTE.—Discharge Aug. 1 to 8, 1910, estimated at 475 second-feet.

NOTE.—Mean for December estimated; mean for period Nov. 11 to 30 estimated at 375 second-feet.

DEEP CREEK BASIN.

DEEP CREEK NEAR TOWNSEND, MONT.

Location.—In sec. 29, T. 7 N., R. 4 E., Montana principal meridian, unsurveyed, 12 miles from Townsend, directly back of the ranger station in the canyon of Deep Creek, approximately 10 miles above the confluence with the Missouri River.

Records available.—October 9, 1910, to June 30, 1911.

Drainage area.—89 square miles.

Gage.—Vertical staff.

Channel.—Small rock; probably permanent.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversion.—Small quantities of water are diverted for irrigation on small flats above the gage. Below the gage, nearly the entire flow is diverted, or will eventually be diverted, for irrigation on the land adjoining this creek and Missouri River.

Discharge measurements of Deep Creek near Townsend, Mont., in 1910–11.

Date.	Hydrographer.	Gage height.	Discharge.
1910. Oct. 30	John C. Beebe.....	<i>Feet.</i> 0.78	<i>Sec.-ft.</i> 17.4
1911. May 12	F. E. Bonner.....	1.29	45

Daily gage height, in feet, of Deep Creek near Townsend, Mont., for 1910.

[D. N. Maryott, observer.]

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1.....		0.76		0.71	16.....		0.75	0.71	0.69
2.....			0.71	.71	17.....		.74	.71	.69
3.....			.71	.71	18.....		.73	.71	.68
4.....			.71	.70	19.....		.73	.71	.68
5.....			.72	.70	20.....		.72	.71	.66
6.....			.72	.70	21.....		.72	.71	.66
7.....			.71	.70	22.....		.72	.71	.65
8.....			.71	.70	23.....		.72	.71	.65
9.....		.75	.71	.70	24.....		.71	.71	.65
10.....		.75	.71	.70	25.....		.72	.71	
11.....		.76	.71	.70	26.....		.73	.72	
12.....		.76	.71	.70	27.....		.73	.72	
13.....		.76	.71	.70	28.....		.72	.71	
14.....		.76	.71	.69	29.....		.71	.71	
15.....		.76	.71	.69	30.....	0.78	.71	.71	
					31.....		.74		

Daily gage height, in feet, of Deep Creek near Townsend, Mont., for 1911.

[D. N. Maryott, observer.]

Day.	Mar.	Apr.	May.	June.	Day.	Mar.	Apr.	May.	June.
1.....	0.63	0.98	1.42	1.10	16.....	0.67	0.89	1.28	1.02
2.....	.63	1.04	1.46	1.10	17.....	.67	.96	1.30	1.02
3.....	.64	1.04	1.47	1.08	18.....	.69	1.04	1.30	1.00
4.....	.64	1.01	1.50	1.06	19.....	.70	1.08	1.27	1.00
5.....	.63	1.01	1.55	1.06	20.....	.70	1.09	1.24	.98
6.....	.63	.96	1.55	1.08	21.....	.70	1.13	1.26	.96
7.....	.63	.90	1.50	1.08	22.....	.72	1.13	1.26	.96
8.....	.64	.88	1.50	1.06	23.....	.75	1.20	1.24	.94
9.....	.64	.88	1.46	1.04	24.....	.79	1.22	1.20	.96
10.....	.65	.86	1.38	1.04	25.....	.76	1.30	1.18	.96
11.....	.65	.85	1.28	1.04	26.....	.70	1.36	1.18	.94
12.....	.65	.85	1.28	1.02	27.....	.70	1.38	1.16	.94
13.....	.66	.84	1.28	.98	28.....	.74	1.36	1.14	.92
14.....	.66	.85	1.30	.98	29.....	.80	1.36	1.14	.92
15.....	.67	.86	1.28	.98	30.....	.86	1.39	1.11	.92
					31.....	.90		1.11	

PRICKLY PEAR CREEK BASIN.

PRICKLY PEAR CREEK NEAR CLANCY, MONT.

Location.—On the private wagon bridge back of the ranch buildings on the Stafford ranch and just to the right of the Great Northern Railway, about 1 mile below Clancy and just below the mouth of Lump Gulch Creek. This station was established to take the place of the one previously maintained about a mile below. The same amount of water passes both stations.

Records available.—July 15, 1908, to June 30, 1909 (old site); July 12, 1910, to December 31, 1911 (present site).

Drainage area.—Not measured.

Gage.—Staff, nailed to bridge abutment, right bank, on downstream side.

Discharge measurements.—Made from the wagon bridge or by wading.

Winter flow.—Ice is common in extreme cold weather.

Diversions.—Irrigation is carried on to some extent along this stream, the greater number of diversions being made below the station.

Discharge measurements of Prickly Pear Creek near Clancy, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
June 1	B. E. Jones.....	<i>Feet.</i> 2.56	<i>Sec.-ft.</i> 162
July 20	.....do.....	1.58	34

Daily gage height, in feet, of Prickly Pear Creek near Clancy, Mont., for 1911.

[H. Y. Barrows, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		1.79	1.90	2.60	2.38	1.43	1.38	1.59	1.53
2.....		1.80	1.95	3.00	2.10	1.42	1.39	1.60	1.52
3.....		1.62	1.96	2.98	2.08	1.44	1.48	1.58	1.52
4.....		1.64	2.00	3.18	2.16	1.52	1.50	1.56	1.50
5.....		1.55	2.15	3.13	2.00	1.61	1.60	1.54	1.50
6.....		1.50	2.35	2.93	1.96	1.70	1.68	1.54	1.50
7.....		1.54	2.10	2.88	1.89	1.78	1.66	1.53	1.50
8.....		1.62	2.10	3.18	1.85	1.75	1.64	1.52	1.50
9.....		1.70	2.12	3.10	1.84	1.72	1.63	1.54	1.62
10.....		1.74	2.10	3.00	1.83	1.68	1.61	1.82	.....
11.....		1.71	2.03	2.86	1.81	1.71	1.63	1.79	.....
12.....		1.60	2.01	2.83	1.80	1.69	1.58	1.64	.....
13.....		1.56	1.99	2.80	1.76	1.62	1.59	1.62	.....
14.....		1.54	2.02	2.76	1.68	1.60	1.55	1.69	.....
15.....		1.50	2.12	2.68	1.70	1.54	1.54	1.67	.....
16.....		1.63	2.32	2.60	1.78	1.52	1.51	1.61	.....
17.....		1.70	2.25	2.48	1.61	1.51	1.50	1.60	.....
18.....	1.60	1.70	2.18	2.36	1.58	1.48	1.50	1.60	.....
19.....	1.70	1.72	2.10	2.40	1.45	1.42	1.50	1.60	.....
20.....	1.81	1.70	2.08	2.48	1.48	1.41	1.48	1.58	.....
21.....	1.83	1.80	2.05	2.41	1.70	1.39	1.48	1.55	.....
22.....	1.72	1.91	2.08	2.33	1.63	1.40	1.48	1.54	.....
23.....	1.82	1.92	2.14	2.19	1.61	1.41	1.49	1.54	.....
24.....	1.80	1.85	2.16	2.23	1.58	1.39	1.50	1.53	.....
25.....	1.81	1.90	2.15	2.20	1.50	1.40	1.51	1.52	.....
26.....	1.82	2.00	2.18	2.18	1.52	1.40	1.54	1.52	.....
27.....	1.52	2.88	2.12	2.08	1.54	1.40	1.51	1.54	.....
28.....	1.69	2.40	2.16	2.18	1.48	1.39	1.47	1.53	.....
29.....	1.73	1.94	2.25	2.16	1.41	1.40	1.53	1.53	.....
30.....	1.72	1.91	2.30	2.18	1.42	1.40	1.55	1.54	.....
31.....	1.72	.....	2.54	.....	1.45	1.40	.....	1.54	.....

Daily discharge, in second-feet, of Prickly Pear Creek near Clancy, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		40	52	170	151	23	20	34	29
2.		41	58	259	91	22	20	35	29
3.		25	59	231	88	23	26	33	29
4.		26	64	300	102	29	27	32	27
5.		20	86	289	84	36	35	30	27
6.		17	120	256	77	45	43	30	27
7.		19	78	242	72	55	41	29	27
8.		25	78	310	62	52	39	29	27
9.		31	81	292	61	48	38	30	37
10.		35	78	272	60	43	36	61	.....
11.		32	68	260	57	46	38	57	.....
12.		23	65	231	56	44	33	39	.....
13.		21	63	224	51	37	34	37	.....
14.		19	67	213	42	35	31	44	.....
15.		17	81	196	44	30	30	42	.....
16.		25	115	188	55	29	28	36	.....
17.		31	102	162	36	28	27	35	.....
18.	23	31	91	139	33	26	27	35	.....
19.	31	33	78	147	24	22	27	35	.....
20.	42	31	75	162	26	22	26	33	.....
21.	44	41	71	149	45	20	26	31	.....
22.	33	53	75	132	38	21	26	30	.....
23.	43	54	84	107	36	22	26	30	.....
24.	41	46	88	114	33	20	27	29	.....
25.	42	52	86	110	27	21	28	29	.....
26.	43	64	91	105	29	21	30	29	.....
27.	18	232	81	88	30	21	28	30	.....
28.	30	130	88	105	26	20	25	29	.....
29.	34	57	102	101	22	21	29	29	.....
30.	33	53	111	105	22	21	31	30	.....
31.	33	.....	158	.....	24	21	.....	30	.....

NOTE.—Daily discharge determined from rating curves as follows: Mar. 18 to May 31, well defined; indirect method for shifting channels used June 1 to July 20; July 21 to Nov. 8, curve poorly defined.

Monthly discharge of Prickly Pear Creek near Clancy, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January			a 30	1,840	D.
February			a 25	1,390	D.
March			29.5	1,810	C.
April	232	17	43.9	2,610	B.
May	158	52	83.7	5,150	B.
June	310	88	189	11,200	C.
July	151	22	51.7	3,180	C.
August	55	20	29.8	1,830	C.
September	43	20	30.1	1,790	C.
October	61	29	34.3	2,110	C.
November			22.6	1,340	C.
December			a 20	1,230	D.
The year			49.7	35,500	

a Estimated.

NOTE.—Discharge Mar. 1 to 17 estimated at 25 second-feet and Nov. 10 to 30 estimated at 20 second-feet.

PRICKLY PEAR CREEK AT EAST HELENA, MONT.

Location.—In NE. $\frac{1}{4}$ sec. 36, T. 10 N., R. 3 E., at the point where the Northern Pacific Railway crosses the stream at East Helena, Mont. The only important tributaries entering Prickly Pear Creek above the station are McClellan and Lump Gulch creeks; Tenmile and Silver creeks come in below.

Records available.—July 18, 1908, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Staff fastened to piling on the Northern Pacific Railway bridge; datum unchanged.

Channel.—Rocky, clean, and nonshifting.

Discharge measurements.—Made from a highway bridge near the railway bridge or by wading just below the gage.

Diversions.—All the normal flow of Prickly Pear Creek is used for irrigation, the greater part of the water being diverted below the station.

Accuracy.—The bed of the stream is so extremely rough that discharge measurements are difficult, even in low water. Fair results have, however, been obtained.

Discharge measurements of Prickly Pear Creek at East Helena, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 26 ^a	B. E. Jones.....	0.99	35	Apr. 26	B. E. Jones.....	1.03	36
Feb. 14	.....do.....	0.93	31	May 26	.....do.....	1.04	36
Mar. 7	.....do.....	1.10	48	July 18	.....do.....	1.12	50
20	.....do.....	1.15	60	Sept. 26	R. Richards.....	0.95	33
30	.....do.....	1.08	50	Oct. 24	B. E. Jones.....	1.06	42

^a Ice at gage.

Daily gage height, in feet, of Prickly Pear Creek at East Helena, Mont., for 1911.

[R. T. Ray, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		1.1	1.0	1.6	1.5	1.05	0.9	0.9	0.95
2.		1.1	.95	1.9	1.4	1.1	.9	.9	.95
3.		1.0	.95	1.9	1.35	1.05	.9	.9	.95
4.		1.0	1.0	1.95	1.35	1.05	.9	.9	.95
5.		1.0	1.1	2.0	1.3	1.1	1.0	.9	.9
6.		.85	1.3	1.85	1.25	1.1	1.0	.95	.9
7.		.85	1.2	2.0	1.2	1.1	.95	.95	.9
8.		1.0	1.15	2.0	1.15	1.0	.95	.95	.9
9.		1.05	1.15	1.95	1.15	1.05	.95	.95	
10.		1.05	1.1	1.9	1.15	1.05	.95	.95	
11.		1.05	1.15	1.85	1.15	1.0	.9	1.2	
12.		.9	1.15	1.8	1.15	1.0	.9	1.2	
13.		1.0	1.15	1.8	1.15	1.0	.95	1.1	
14.		1.0	1.15	1.85	1.1	1.0	.95	1.1	
15.		.95	1.3	1.8	1.1	1.0	.95	1.1	
16.		1.0	1.35	1.7	1.1	1.0	.95	1.1	
17.		1.0	1.35	1.65	1.1	.95	.95	1.05	
18.		1.0	1.3	1.7	1.1	.95	.95	1.05	
19.		1.0	1.2	1.7	1.1	.95	.95	1.05	
20.		.95	1.25	1.65	1.1	.95	.9	1.05	
21.		1.0	1.25	1.55	1.1	.95	.9	1.05	
22.	1.50	1.05	1.15	1.5	1.1	.95	.9	1.05	
23.	1.40	1.1	1.2	1.5	1.1	.95	.95	1.05	
24.	1.20	1.05	1.3	1.45	1.1	.95	.95	1.05	
25.	1.00	1.0	1.3	1.4	1.1	.95	.95	1.05	
26.	1.10	.95	1.35	1.4	1.1	.95	.95	1.0	
27.	1.10	1.3	1.4	1.35	1.05	.95	.95	.95	
28.	1.10	1.1	1.4	1.35	1.05	.95	.9	.95	
29.	1.10	1.0	1.35	1.35	1.0	.9	.9	.95	
30.	1.10	.95	1.4	1.45	.95	.9	.9	.95	
31.	1.10		1.5		.95	.9		.95	

Daily discharge, in second-feet, of Prickly Pear Creek at East Helena, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.	32	51	37	168	140	44	26	26	32
2.	34	51	32	257	112	51	26	26	32
3.	36	37	32	257	100	44	26	26	32
4.	38	37	37	272	100	44	26	26	32
5.	41	37	51	288	88	51	37	26	26
6.	45	23	88	242	78	51	37	32	26
7.	48	23	68	288	68	51	32	32	26
8.	49	37	60	288	60	37	32	32	26
9.	50	44	60	272	60	44	32	32	26
10.	51	44	51	257	60	44	32	32	26
11.	52	44	60	242	60	37	26	68	26
12.	53	26	60	227	60	37	26	68	26
13.	54	37	60	227	60	37	32	51	26
14.	55	37	60	242	51	37	32	51	26
15.	56	32	88	227	51	37	32	51	26
16.	57	37	100	197	51	37	32	51	26
17.	58	37	100	182	51	32	32	44	26
18.	59	37	88	197	51	32	32	44	26
19.	60	37	68	197	51	32	32	44	26
20.	60	32	78	182	51	32	26	44	26
21.	100	37	78	154	51	32	26	44	26
22.	140	44	60	140	51	32	26	44	26
23.	112	51	68	140	51	32	32	44	26
24.	68	44	88	126	51	32	32	44	26
25.	37	37	88	112	51	32	32	44	26
26.	51	32	100	112	51	32	32	37	26
27.	51	88	112	100	44	32	32	32	26
28.	51	51	112	100	44	32	26	32	26
29.	51	37	100	100	37	26	26	32	26
30.	51	32	112	126	32	26	26	32	26
31.	51	140	140	140	32	26	32	32	26

NOTE.—Daily discharge determined from a rating curve well defined below 90 second-feet.

Monthly discharge of Prickly Pear River near East Helena, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January .....	.....	.....	a 35	2,150	D.
February .....	.....	.....	a 31	1,720	D.
March	140	32	56.5	3,470	C.
April	88	23	39.8	2,370	A.
May	140	32	75.4	4,640	A.
June	288	100	197	11,700	B.
July	140	32	61.2	3,760	A.
August	51	26	36.9	2,270	A.
September	37	26	29.9	1,780	A.
October	68	26	39.5	2,430	A.
November .....	.....	.....	26.1	1,550	C.
December .....	.....	.....	a 25	1,540	D.
The year	288	.....	54.4	39,400	.....

a Estimated.

NOTE.—Discharge Mar. 1 to 21 estimated; Nov. 9 to 30 estimated as 25 second-feet per day.

LUMP GULCH CREEK NEAR CLANCY, MONT.

Location.—In sec. 4, T. 8 N., R. 3 W., at the ranch of Charles Zastron, 1 mile from Clancy, 15 miles from Helena, and half a mile above the junction of the creek with Prickly Pear Creek.

Records available.—July 15, 1908, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Staff; on left bank directly south of observer's house. A new gage was set October 12, 1910, at the original site but at a datum 1.0 foot lower than that previously used. All gage heights for 1910 were reduced to new datum.

Channel.—Gravelly, unclean, and shifting.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—The water of Lump Gulch Creek has been extensively used for placer mining. At present the creek furnishes some water for irrigation, but the valley is narrow and affords but little irrigable land. The normal flow of the stream is appropriated.

Accuracy.—Data not entirely satisfactory; no flood records have been obtained.

Discharge measurements of Lump Gulch Creek near Clancy, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
June 1	B. E. Jones.....	<i>Feet.</i> 1.47	<i>Sec.-ft.</i> 23
July 20	.....do.....	1.12	3

Daily gage height, in feet, of Lump Gulch Creek near Clancy, Mont., for 1911.

[Charles Zastron, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1		1.45	1.5	1.45	1.45	1.0	1.1	1.2	1.2
2		1.4	1.5	1.45	1.45	1.0	1.1	1.2	1.2
3		1.4	1.5	1.45	1.45	1.1	1.1	1.2	1.2
4		1.4	1.55	1.45	1.45	1.1	1.2	1.2	1.2
5		1.45	1.6	1.6	1.4	1.15	1.2	1.2	1.2
6		1.4	1.55	1.65	1.35	1.15	1.2	1.2	1.2
7		1.45	1.45	1.85	1.35	1.15	1.2	1.2	1.2
8		1.45	1.45	1.85	1.35	1.15	1.2	1.2	1.2
9		1.45	1.45	1.95	1.3	1.15	1.2	1.2	
10		1.5	1.5	2.0	1.25	1.15	1.2	1.2	
11		1.4	1.45	1.95	1.25	1.15	1.2	1.2	
12	1.25	1.4	1.45	1.95	1.25	1.15	1.2	1.2	
13	1.25	1.35	1.45	1.85	1.25	1.1	1.2	1.2	
14	1.25	1.35	1.4	1.85	1.15	1.1	1.2	1.2	
15	1.3	1.4	1.45	1.8	1.2	1.1	1.2	1.2	
16	1.3	1.35	1.4	1.75	1.15	1.1	1.2	1.2	
17	1.35	1.35	1.4	1.65	1.15	1.1	1.2	1.2	
18	1.35	1.35	1.4	1.65	1.15	1.1	1.2	1.2	
19	1.4	1.4	1.4	1.55	1.15	1.1	1.2	1.2	
20	1.45	1.45	1.45	1.6	1.1	1.1	1.2	1.2	
21	1.4	1.4	1.35	1.55	1.1	1.1	1.2	1.2	
22	1.45	1.45	1.4	1.55	1.1	1.1	1.2	1.2	
23	1.45	1.45	1.4	1.45	1.1	1.1	1.2	1.2	
24	1.45	1.45	1.45	1.45	1.1	1.1	1.2	1.2	
25	1.5	1.5	1.5	1.5	1.1	1.1	1.2	1.2	
26	1.45	1.5	1.45	1.45	1.1	1.1	1.2	1.2	
27	1.45	1.5	1.45	1.45	1.1	1.1	1.2	1.2	
28	1.45	1.5	1.45	1.45	1.0	1.1	1.2	1.2	
29	1.45	1.5	1.45	1.45	1.0	1.1	1.2	1.2	
30	1.5	1.55	1.5	1.5	1.0	1.1	1.2	1.2	
31	1.45		1.45		1.0	1.1		1.2	

Daily discharge, in second-feet, of Lump Gulch Creek near Clancy, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		22	25	22	16	0.8	2.6	5.0	5.0
2.....		20	25	22	16	.8	2.6	5.0	5.0
3.....		20	25	22	16	2.6	2.6	5.0	5.0
4.....		20	28	22	16	2.6	5.0	5.0	5.0
5.....		22	30	30	14	3.8	5.0	5.0	5.0
6.....		20	28	32	12	3.8	5.0	5.0	5.0
7.....		22	22	43	12	3.8	5.0	5.0	5.0
8.....		22	22	43	12	3.8	5.0	5.0	5.0
9.....		22	22	49	9	3.8	5.0	5.0	.....
10.....		25	25	52	7	3.8	5.0	5.0	.....
11.....		20	22	49	7	3.8	5.0	5.0	.....
12.....	13	20	22	49	7	3.8	5.0	5.0	.....
13.....	13	18	22	40	7	2.6	5.0	5.0	.....
14.....	13	18	20	40	3.8	2.6	5.0	5.0	.....
15.....	15	20	22	37	5.0	2.6	5.0	5.0	.....
16.....	15	18	20	34	3.8	2.6	5.0	5.0	.....
17.....	18	18	20	28	3.8	2.6	5.0	5.0	.....
18.....	18	18	20	28	3.8	2.6	5.0	5.0	.....
19.....	20	20	20	22	3.8	2.6	5.0	5.0	.....
20.....	22	22	22	25	2.6	2.6	5.0	5.0	.....
21.....	20	20	18	22	2.6	2.6	5.0	5.0	.....
22.....	22	22	20	22	2.6	2.6	5.0	5.0	.....
23.....	22	22	20	16	2.6	2.6	5.0	5.0	.....
24.....	22	22	22	16	2.6	2.6	5.0	5.0	.....
25.....	25	25	25	19	2.6	2.6	5.0	5.0	.....
26.....	22	25	22	16	2.6	2.6	5.0	5.0	.....
27.....	22	25	22	16	2.6	2.6	5.0	5.0	.....
28.....	22	25	22	16	.8	2.6	5.0	5.0	.....
29.....	22	25	22	16	.8	2.6	5.0	5.0	.....
30.....	25	28	25	19	.8	2.6	5.0	5.0	.....
31.....	22		22	.....	.8	2.6	.....	5.0	.....

NOTE.—Daily discharge determined from two poorly defined rating curves.

Monthly discharge of Lump Gulch Creek near Clancy, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			α 3.00	184	
February.....			α 3.00	167	
March.....	25		15.1	928	C.
April.....	28	18	21.5	1,280	C.
May.....	30	18	22.6	1,390	C.
June.....	52	16	28.9	1,720	C.
July.....	16		6.42	395	C.
August.....	3.8	.8	2.79	172	C.
September.....	5.0	2.6	4.76	283	C.
October.....	5.0	5.0	5.00	307	C.
November.....			5.00	298	C.
December.....			α 3.50	215	
The year.....			10.1	7,340	

α Estimated.

NOTE.—Mar. 1 to 11 estimated as 7.0 second-feet per day; Nov. 9 to 30 estimated as 5.0 second-feet per day.

TENMILE CREEK NEAR HELENA, MONT.

Location.—In SW. $\frac{1}{4}$ S. E. $\frac{1}{4}$ sec. 22, T. 10 N., R. 4 W., opposite the Broadwater Hotel, near Helena, Mont.

Records available.—July 8, 1908, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Staff, on right bank; datum unchanged.

Channel.—Shifts somewhat during flood stages.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—Part of the water supply for the city of Helena is taken from Tenmile Creek above the station. Two irrigation ditches also take water from the creek above the gage. The entire low-water flow is appropriated and used before it reaches the mouth of the creek.

Accuracy.—At low and medium stages conditions favor accurate determination of discharge.

Discharge measurements of Tenmile Creek near Helena, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 26	B. E. Jones.....	1.66	5.4	Apr. 25	B. E. Jones.....	2.37	32
Feb. 14	do.....	1.76	7.1	May 1	do.....	2.40	37
Mar. 7	do.....	^a 1.60	4.4	26	do.....	2.76	74
31	do.....	2.12	17.0	July 18	do.....	1.81	6.5
31	do.....	2.12	17.2	Sept. 27	R. Richards.....	1.71	5.4

^a Ice conditions.

Daily gage height, in feet, of Tenmile Creek near Helena, Mont., for 1911.

[J. W. Jackson, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	2.2	2.45	3.5	3.3	1.45	1.35	1.7	2.3
2.....	2.25	2.45	3.7	3.0	1.45	1.35	1.75	2.3
3.....	2.15	2.45	3.8	2.85	1.7	1.35	1.95	2.2
4.....	2.1	2.55	3.85	2.8	1.75	1.45	1.8	2.2
5.....	2.05	2.8	3.8	2.75	1.85	1.4	1.8	2.25
6.....	2.05	3.2	3.6	2.65	1.8	1.45	1.8	2.3
7.....	2.1	3.0	3.65	2.6	1.95	1.45	1.75	2.3
8.....	2.05	2.9	3.65	2.5	1.6	1.55	1.8	2.3
9.....	2.15	2.95	3.6	2.45	1.65	1.7	1.8	.....
10.....	2.2	2.8	3.5	2.4	1.65	1.8	1.8	.....
11.....	2.15	2.8	3.4	2.3	1.6	1.8	2.15	.....
12.....	2.0	2.8	3.3	2.2	1.6	1.7	2.15	.....
13.....	2.0	2.8	3.2	2.1	1.55	1.7	2.15	.....
14.....	2.0	2.8	3.25	2.05	1.5	1.7	2.15	.....
15.....	2.0	3.0	3.05	1.9	1.5	1.65	2.15	.....
16.....	2.0	3.0	3.0	1.9	1.45	1.7	2.15	.....
17.....	2.15	3.05	2.9	1.85	1.45	1.7	2.25	.....
18.....	2.15	3.0	2.7	1.9	1.4	1.7	2.2	.....
19.....	2.2	2.9	2.6	1.85	1.4	1.7	2.1	.....
20.....	2.2	2.75	2.7	1.8	1.4	1.7	2.1	.....
21.....	2.3	2.7	2.85	1.75	1.4	1.7	2.1	.....
22.....	2.4	2.65	2.7	1.75	1.4	1.7	2.1	.....
23.....	2.35	2.7	2.6	1.65	1.35	1.7	2.0	.....
24.....	2.3	2.9	2.8	1.55	1.4	1.7	2.0	.....
25.....	2.4	2.9	2.6	1.5	1.35	1.75	2.0	.....
26.....	2.6	2.8	2.55	1.65	1.35	1.75	1.9	.....
27.....	2.8	2.8	2.5	1.7	1.4	1.75	2.0	.....
28.....	2.65	2.8	2.55	1.65	1.4	1.7	2.3	.....
29.....	2.6	2.85	2.5	1.6	1.35	1.7	2.35	.....
30.....	2.5	2.9	2.6	1.55	1.35	1.7	2.4	.....
31.....	.....	3.2	.....	1.6	1.35	.....	2.3	.....

Daily discharge, in second-feet, of Tenmile Creek near Helena, Mont., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	22	42	178	148	1.2	.6	4.3	29
2.....	26	42	208	104	1.2	.6	5.4	29
3.....	20	42	223	85	4.3	.6	10	22
4.....	17	51	230	79	5.4	1.2	6.4	22
5.....	14	79	223	73	7.7	.8	6.4	26
6.....	14	133	193	62	6.4	1.2	6.4	29
7.....	17	104	200	56	10	1.2	5.4	29
8.....	14	91	200	46	2.7	2.1	6.4	29
9.....	20	98	193	42	3.5	4.3	6.4	.....
10.....	22	79	178	37	3.5	6.4	6.4	.....
11.....	20	79	163	29	2.7	6.4	20	.....
12.....	12	79	148	22	2.7	4.3	20	.....
13.....	12	79	133	17	2.1	4.3	20	.....
14.....	12	79	140	14	1.5	4.3	20	.....
15.....	12	104	111	9.0	1.5	3.5	20	.....
16.....	12	104	104	9.0	1.2	4.3	20	.....
17.....	20	111	91	7.7	1.2	4.3	26	.....
18.....	20	104	67	9.0	.8	4.3	22	.....
19.....	22	91	56	7.7	.8	4.3	17	.....
20.....	22	73	67	6.4	.8	4.3	17	.....
21.....	29	67	85	5.4	.8	4.3	17	.....
22.....	37	62	67	5.4	.8	4.3	17	.....
23.....	33	67	56	3.5	.6	4.3	12	.....
24.....	29	91	79	2.1	.8	4.3	12	.....
25.....	37	91	56	1.5	.6	5.4	12	.....
26.....	56	79	51	3.5	6	5.4	9.0	.....
27.....	79	79	46	4.3	.8	5.4	12	.....
28.....	62	79	51	3.5	.8	4.3	29	.....
29.....	56	85	46	2.7	.6	4.3	33	.....
30.....	46	91	56	2.1	.6	4.3	37	.....
31.....	.....	133	.....	2.7	.6	.....	29	.....

NOTE.—Daily discharge determined from a fairly well-defined rating curve.

Monthly discharge of Tenmile Creek near Helena, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			a 5.0	307	D.
February.....			a 6.0	333	D.
March.....			a 11.0	676	D.
April.....	79	12	27.1	1,610	B.
May.....	133	42	83.5	5,130	C.
June.....	230	46	123	7,320	C.
July.....	148	1.5	29	1,780	B.
August.....	10	.6	2.22	136	B.
September.....	6.4	.6	3.65	217	B.
October.....	37	4.3	15.6	959	B.
November.....			a 15	893	D.
December.....			a 9	553	D.
The year.....				19,900	

a Estimated.

SEVENMILE CREEK AT BIRDSEYE, MONT.

Location.—At Richard Tobin's ranch, one-fourth mile from Birdseye, Mont.

Records available.—March 27, 1909, to December 31, 1911. From July 16, 1908, to August 26, 1908, a station was maintained on this stream at Dr. Head's ranch, near Helena.

Drainage area.—Not measured.

Gage.—Staff.

Channel.—Sandy and shifting.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—Entire flow of creek is appropriated and used for irrigation.

Discharge measurements of Sevenmile Creek at Birdseye, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
Mar. 7	B. E. Jones.....	<i>Feet.</i> (<i>a</i>)	<i>Sec.-ft.</i>
21	.....do.....	2.34	5.9
July 18	.....do.....	2.17	8.5 3.2

a Three feet of snow at gage.

Daily gage height, in feet, of Sevenmile Creek at Birdseye, Mont., for 1911.

[R. Tobin, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1		2.25	2.1	2.3	2.5	2.3	2.0	2.0	2.3
2		2.2	2.1	2.3	2.5	2.3	2.0	2.1	2.3
3		2.2	2.0	2.3	2.45	2.3	2.0	2.05	2.35
4		2.2	2.0	2.35	2.4	2.2	2.0	2.0	2.4
5		2.15	1.95	2.45	2.25	2.15	1.95	1.95	2.35
6		2.2	2.0	2.5	2.3	2.2	2.0	2.0	.....
7		2.2	2.0	2.5	2.3	2.2	2.0	2.0	.....
8		2.2	2.0	2.5	2.3	2.2	2.0	2.0	.....
9		2.2	2.3	2.5	2.3	2.2	2.0	2.0	.....
10		2.15	2.25	2.45	2.25	2.15	1.85	2.0	.....
11		2.2	2.3	2.4	2.3	2.2	1.95	2.1	.....
12		2.2	2.3	2.4	2.3	2.2	2.0	2.3	.....
13		2.2	2.3	2.35	2.3	2.2	2.0	2.3	.....
14		2.2	2.3	2.3	2.25	2.2	2.1	2.3	.....
15		2.15	2.25	2.25	2.2	2.15	2.05	2.1	.....
16		2.2	2.4	2.3	2.2	2.2	2.1	2.0	.....
17		2.15	2.4	2.3	2.2	2.1	2.0	2.0	.....
18		2.1	2.35	2.3	2.35	2.1	2.0	2.0	.....
19		2.1	2.35	2.4	2.2	2.1	2.0	2.0	.....
20		2.05	2.3	2.4	2.15	2.05	1.95	1.95	.....
21	2.30	2.1	2.35	2.5	2.2	2.1	2.1	2.15	.....
22	2.20	2.1	2.35	2.6	2.2	2.05	2.1	2.1	.....
23	2.20	2.1	2.35	2.6	2.2	2.0	2.1	2.1	.....
24	2.20	2.1	2.35	2.6	2.2	2.0	2.05	2.1	.....
25	2.15	2.05	2.25	2.55	2.15	1.95	1.95	2.05	.....
26	2.30	2.1	2.3	2.6	2.2	2.0	2.0	2.2	.....
27	2.20	2.1	2.3	2.5	2.3	2.0	2.0	2.3	.....
28	2.20	2.1	2.3	2.5	2.3	2.0	2.0	2.3	.....
29	2.20	2.15	2.3	2.5	2.3	2.0	2.0	2.35	.....
30	2.15	2.05	2.25	2.45	2.25	1.95	1.95	2.3	.....
31	2.20	.....	2.3	.....	2.3	2.0	.....	2.3	.....

Daily discharge, in second-feet, of Sevenmile Creek at Birdseye, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	4.0	5.2	1.8	6.7	15	6.7	0.7	0.7	6.7
2.....	4.0	3.8	1.8	6.7	15	6.7	.7	1.8	6.7
3.....	4.0	3.8	.7	6.7	13	6.7	.7	1.2	8.6
4.....	5.0	3.8	.7	8.6	10	3.8	.7	.7	10
5.....	5.0	2.8	.4	13	5.2	2.8	.4	.4	8.6
6.....	5.0	3.8	.7	15	6.7	3.8	.7	.7	.....
7.....	5.9	3.8	.7	15	6.7	3.8	.7	.7	.....
8.....	6.0	3.8	.7	15	6.7	3.8	.7	.7	.....
9.....	6.0	3.8	6.7	15	6.7	3.8	.7	.7	.....
10.....	6.0	2.8	5.2	13	5.2	2.8	.1	.7	.....
11.....	6.0	3.8	6.7	10	6.7	3.8	.4	1.8	.....
12.....	6.0	3.8	6.7	10	6.7	3.8	.7	6.7	.....
13.....	6.0	3.8	6.7	8.6	6.7	3.8	.7	6.7	.....
14.....	6.5	3.8	6.7	6.7	5.2	3.8	1.8	6.7	.....
15.....	6.5	2.8	5.2	5.2	3.8	2.8	1.2	1.8	.....
16.....	6.5	3.8	10	6.7	3.8	3.8	1.8	.7	.....
17.....	6.5	2.8	10	6.7	3.8	1.8	.7	.7	.....
18.....	6.5	1.8	8.6	6.7	8.6	1.8	.7	.7	.....
19.....	6.5	1.8	8.6	10	3.8	1.8	.7	.7	.....
20.....	6.5	1.2	6.7	10	2.8	1.2	.4	.4	.....
21.....	6.7	1.8	8.6	15	3.8	1.8	1.8	2.8	.....
22.....	3.8	1.8	8.6	20	3.8	1.2	1.8	1.8	.....
23.....	3.8	1.8	8.6	20	3.8	.7	1.8	1.8	.....
24.....	3.8	1.8	8.6	20	3.8	.7	1.2	1.8	.....
25.....	2.8	1.2	5.2	18	2.8	.4	.4	1.2	.....
26.....	6.7	1.8	6.7	20	3.8	.7	.7	3.8	.....
27.....	3.8	1.8	6.7	15	6.7	.7	.7	6.7	.....
28.....	3.8	1.8	6.7	15	6.7	.7	.7	6.7	.....
29.....	3.8	2.8	6.7	15	6.7	.7	.7	8.6	.....
30.....	2.8	1.2	5.2	13	5.2	.4	.4	6.7	.....
31.....	3.8	.....	6.7	.....	6.7	.7	.....	6.7	.....

NOTE.—Daily discharge determined from a rating curve that is poorly defined. Discharge estimated Mar. 1 to 6 and 8 to 20.

Monthly discharge of Sevenmile Creek at Birdseye, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	α 3.0	184	D. C. C. C. C. C. C.
February.....	.....	.....	α 3.0	167
March.....	6.7	2.8	5.16	317	
April.....	5.2	1.2	2.82	168	
May.....	10	.4	5.60	344	
June.....	20	5.2	12.2	726	
July.....	15	2.8	6.32	389	
August.....	6.7	.4	2.64	162	
September.....	1.8	.4	.85	51	
October.....	8.6	.4	2.70	166	
November.....	.....	.....	α 5.0	298
December.....	.....	.....	α 3.0	184
The year.....	20	4.36	3,160	

α Estimated.

LITTLE PRICKLY PEAR CREEK BASIN.

LITTLE PRICKLY PEAR CREEK NEAR MARYSVILLE, MONT.

Location.—In NW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 24, T. 12 N., R. 7 W., at the Pearce ranch, 6 miles west and 3 miles north of Marysville, Mont.

Records available.—May 18, 1909, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Staff; datum unchanged.

Channel.—Shifts in high water.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—Many small ditches take water from the stream, practically the entire flow being appropriated.

Discharge measurements of Little Prickly Pear Creek near Marysville, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
May 18	C. S. Heidel.....	<i>Feet.</i> 3.02	<i>Sec.-ft.</i> 22
July 20	.....do.....	2.74	11

Daily gage height, in feet, of Little Prickly Pear Creek near Marysville, Mont., for 1911.

[Gertrude P. Johnson, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		2.36	2.62	3.10	2.93	2.70	2.49	2.55	2.58
2.....		2.36	2.65	3.15	2.93	2.70	2.49	2.55	2.58
3.....		2.36	2.67	3.15	2.93	2.70	2.55	2.55	2.58
4.....		2.36	2.68	3.20	2.91	2.70	2.55	2.55	2.58
5.....		2.36	2.68	3.23	2.91	2.70	2.55	2.55	2.58
6.....		2.36	3.00	3.25	2.90	2.70	2.62	2.55	2.57
7.....		2.36	3.02	3.22	2.90	2.68	2.62	2.55	2.57
8.....	2.28	2.36	2.98	3.20	2.90	2.68	2.62	2.55	2.56
9.....	2.28	2.38	2.95	3.20	2.90	2.67	2.62	2.55	2.55
10.....	2.28	2.38	2.90	3.20	2.90	2.65	2.62	2.55	2.55
11.....	2.28	2.40	2.85	3.15	2.88	2.65	2.60	2.55	2.55
12.....	2.28	2.40	2.82	3.13	2.85	2.65	2.60	2.55	.....
13.....	2.28	2.43	2.82	3.08	2.82	2.65	2.58	2.55	.....
14.....	2.29	2.43	2.91	3.05	2.80	2.65	2.58	2.55	.....
15.....	2.30	2.44	2.95	3.00	2.80	2.63	2.58	2.55	.....
16.....	2.30	2.44	2.98	3.00	2.80	2.63	2.58	2.55	.....
17.....	2.31	2.44	3.00	3.00	2.80	2.58	2.58	2.60	.....
18.....	2.31	2.44	3.00	3.00	2.80	2.58	2.57	2.60	.....
19.....	2.31	2.45	2.95	3.00	2.80	2.58	2.57	2.60	.....
20.....	2.32	2.45	2.90	3.00	2.72	2.58	2.56	2.60	.....
21.....	2.32	2.46	2.90	2.95	2.72	2.58	2.56	2.60	.....
22.....	2.34	2.46	2.85	2.95	2.72	2.58	2.56	2.60	.....
23.....	2.35	2.47	2.85	3.00	2.72	2.58	2.56	2.60	.....
24.....	2.35	2.47	2.85	3.05	2.72	2.56	2.56	2.60	.....
25.....	2.35	2.49	2.88	3.00	2.72	2.55	2.56	2.60	.....
26.....	2.35	2.49	2.88	2.98	2.72	2.55	2.56	2.60	.....
27.....	2.35	2.49	2.90	2.98	2.72	2.55	2.55	2.59	.....
28.....	2.36	2.51	2.95	2.95	2.70	2.55	2.55	2.58	.....
29.....	2.36	2.52	3.00	2.93	2.70	2.55	2.55	2.58	.....
30.....	2.36	2.60	3.05	2.93	2.70	2.49	2.55	2.58	.....
31.....	2.36	.....	3.05	.....	2.70	2.49	.....	2.58	.....

Daily discharge, in second-feet, of Little Prickly Pear Creek near Marysville, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	1.5	2.4	8.0	25	18	10	4.8	6.2	6.9
2.....	1.5	2.4	8.8	27	18	10	4.8	6.2	6.9
3.....	1.4	2.4	9.4	27	18	10	6.2	6.2	6.9
4.....	1.4	2.4	9.7	28	17	10	6.2	6.2	6.9
5.....	1.3	2.4	9.7	30	17	10	6.2	6.2	6.9
6.....	1.3	2.4	21	30	17	10	8.0	6.2	6.7
7.....	1.2	2.4	21	29	17	9.7	8.0	6.2	6.7
8.....	1.2	2.4	20	28	17	9.7	8.0	6.2	6.4
9.....	1.2	2.7	19	28	17	9.4	8.0	6.2	6.2
10.....	1.2	2.7	17	28	17	8.8	8.0	6.2	6.2
11.....	1.2	3.0	15	27	16	8.8	7.4	6.2	6.2
12.....	1.2	3.0	14	26	15	8.8	7.4	6.2	.....
13.....	1.2	3.6	14	24	14	8.8	6.9	6.2	.....
14.....	1.4	3.6	17	23	14	8.8	6.9	6.2	.....
15.....	1.5	3.8	19	21	14	8.3	6.9	6.2	.....
16.....	1.5	3.8	20	21	14	8.3	6.9	6.2	.....
17.....	1.6	3.8	21	21	14	6.9	6.9	7.4	.....
18.....	1.6	3.8	21	21	14	6.9	6.7	7.4	.....
19.....	1.6	4.0	19	21	14	6.9	6.7	7.4	.....
20.....	1.8	4.0	17	21	11	6.9	6.4	7.4	.....
21.....	1.8	4.2	17	19	11	6.9	6.4	7.4	.....
22.....	2.1	4.2	15	19	11	6.9	6.4	7.4	.....
23.....	2.2	4.4	15	21	11	6.9	6.4	7.4	.....
24.....	2.2	4.4	15	23	11	6.4	6.4	7.4	.....
25.....	2.2	4.8	16	21	11	6.2	6.4	7.4	.....
26.....	2.2	4.8	16	20	11	6.2	6.4	7.4	.....
27.....	2.2	4.8	17	20	11	6.2	6.2	7.2	.....
28.....	2.4	5.2	19	19	10	6.2	6.2	6.9	.....
29.....	2.4	5.5	21	18	10	6.2	6.2	6.9	.....
30.....	2.4	7.4	23	18	10	4.8	6.2	6.9	.....
31.....	2.4	.....	23	.....	10	4.8	.....	6.9	.....

NOTE.—Daily discharge determined from a fairly well defined rating curve. Discharge estimated Mar. 1 to 7.

Monthly discharge of Little Prickly Pear Creek near Marysville, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	.....	.....	a 2.5	154	.....
February.....	.....	.....	a 1.5	83	.....
March.....	2.4	1.2	1.70	104	C.
April.....	7.4	2.4	3.69	220	B.
May.....	23	8.0	16.7	1,030	B.
June.....	30	18	23.5	1,400	B.
July.....	18	10	13.9	855	B.
August.....	10	4.8	7.89	485	B.
September.....	8.0	4.8	6.68	397	B.
October.....	7.4	6.2	6.71	413	B.
November.....	.....	.....	a 5.5	327	D.
December.....	.....	.....	a 5.0	307	.....
The year.....	.....	.....	7.94	5,780	.....

a Estimated.

LITTLE PRICKLY PEAR CREEK NEAR CANYON CREEK, MONT.

Location.—Near Canyon Creek post office, Mont. Principal tributaries above the station are Canyon, Marsh, Lost Horse, and Deadman creeks.

Records available.—April 1, 1909, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Staff; datum unchanged.

Channel.—Permanent at ordinary stages; will shift at flood stages.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—Many small ditches take water from this stream and the low-water flow is practically all appropriated.

Discharge measurements of Little Prickly Pear Creek near Canyon Creek, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Fect.</i>	<i>Sec.-ft.</i>
May 18	C. S. Heidel	2.85	90
July 20	.....do.....	1.72	1.8

Daily gage height, in feet, of Little Prickly Pear Creek near Canyon Creek, Mont., for 1911.

[W. J. Carbis, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.		2.4	2.7	3.1	1.9	1.7	2.1
2.		2.5	2.65	3.0	1.9	1.7	2.1
3.		2.4	2.65	3.0	1.8	1.7	2.1
4.		2.4	2.6	2.9	1.9	1.7	2.2
5.		2.5	2.65	2.9	1.9	1.7	2.2
6.		2.5	2.65	2.9	1.8	1.8	2.25
7.	2.2	2.45	2.75	3.0	1.8	1.85	2.25
8.	2.1	2.45	2.75	3.0	1.8	1.9	2.3
9.	2.1	2.4	2.65	2.9	1.9	1.9	2.3
10.	2.1	2.4	2.7	2.8	1.9	1.9	2.3
11.	2.1	2.34	2.75	2.8	1.8	1.9	2.3
12.	2.1	2.34	2.75	2.7	1.8	1.9	2.3
13.	2.2	2.34	2.75	2.6	1.8	1.9	2.2
14.	2.25	2.35	2.75	2.6	1.8	2.0	2.2
15.	2.3	2.35	2.8	2.4	1.8	2.1	2.3
16.	2.35	2.35	2.8	2.4	1.8	2.1	2.4
17.	2.4	2.35	2.8	2.4	1.8	2.1	2.4
18.	2.3	2.4	2.8	2.3	1.8	2.0	2.4
19.	2.3	2.4	2.8	2.3	1.7	2.0	2.4
20.	2.3	2.4	2.9	2.3	1.7	2.0	2.5
21.	2.3	2.5	2.9	2.2	1.7	1.9	2.5
22.	2.4	2.65	2.8	2.2	1.6	1.9	2.4
23.	2.5	2.65	2.8	2.2	1.6	1.8	2.4
24.	2.5	2.7	2.85	2.15	1.6	1.8	2.3
25.	2.4	2.7	2.8	2.15	1.6	1.7	2.3
26.	2.3	2.75	2.85	2.1	1.6	1.8	2.3
27.	2.35	2.65	2.9	2.1	1.6	1.8	2.3
28.	2.4	2.65	2.9	2.1	1.7	1.9	2.2
29.	2.4	2.65	3.0	2.15	1.6	2.0	2.2
30.	2.5	2.7	3.0	2.2	1.6	2.0	2.2
31.	2.5		3.0		1.6	2.0	

Daily discharge, in second-feet, of Little Prickly Pear Creek near Canyon Creek, Mont., for 1911.

Day ¹	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	15	35	67	129	5.0	1.5	13
2.....	15	44	61	111	5.0	1.5	13
3.....	16	35	61	111	3.0	1.5	13
4.....	16	35	55	95	5.0	1.5	20
5.....	17	44	61	95	5.0	1.5	20
6.....	17	44	61	95	3.0	3.0	24
7.....	20	40	74	111	3.0	4.0	24
8.....	13	40	74	111	3.0	5.0	27
9.....	13	35	61	95	5.0	5.0	27
10.....	13	35	67	81	5.0	5.0	27
11.....	13	30	74	81	3.0	5.0	27
12.....	13	30	74	67	3.0	5.0	27
13.....	20	30	74	55	3.0	5.0	20
14.....	24	31	74	55	3.0	8.0	20
15.....	27	31	81	35	3.0	13	27
16.....	31	31	81	35	3.0	13	35
17.....	35	31	81	35	3.0	13	35
18.....	27	35	81	27	3.0	8.0	35
19.....	27	35	81	27	1.5	8.0	35
20.....	27	35	95	27	1.5	8.0	44
21.....	27	44	95	20	1.5	5.0	44
22.....	35	61	81	20	0	5.0	35
23.....	44	61	81	20	0	3.0	35
24.....	44	67	88	16	0	3.0	27
25.....	35	67	81	16	0	1.5	27
26.....	27	74	88	13	0	3.0	27
27.....	31	61	95	13	0	3.0	27
28.....	35	61	95	13	1.5	5.0	20
29.....	35	61	111	16	0	8.0	20
30.....	44	67	111	20	0	8.0	20
31.....	44	.....	111	.....	0	8.0	.....

NOTE.—Daily discharge determined from a fairly well-defined rating curve. Discharge estimated Mar. 1 to 6.

Monthly discharge of Little Prickly Pear Creek near Canyon Creek, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	.....	.....	α 18	1, 110	D.
February.....	.....	.....	α 15	833	D.
March.....	44	13	25.8	1, 590	B.
April.....	74	30	44.3	2, 640	B.
May.....	111	55	79.8	4, 910	B.
June.....	129	13	54.8	3, 260	B.
July.....	5.0	.0	2.32	143	B.
August.....	13	1.5	5.42	333	B.
September.....	44	13	26.5	1, 580	B.
October.....	.....	.....	α 20	1, 230	D.
November.....	.....	.....	α 15	893	D.
December.....	.....	.....	α 12	738	D.
The year.....	.....	.....	26.6	19,300	.....

α Estimated.

DEADMAN CREEK NEAR MARYSVILLE, MONT.

Location.—Near the ranch of Charles Johnson, half a mile above the junction of Deadman Creek with Lost Horse Creek, and 6 miles from Marysville, Mont.

Records available.—April 2, 1909, to June 30, 1911.

Drainage area.—Not measured.

Gage.—Staff. The staff gage was moved to a point 300 yards below the original site on June 8, 1909, and was established at a new datum.

Channel.—Probably permanent.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—One or two small ditches take water from the stream.

Discharge measurements of Deadman Creek near Marysville, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
May 18	C. S. Heidel	<i>Feet.</i> 2.51	<i>Sec.-ft.</i> 36.3
July 20	.....do.....	2.11	10.3

Daily gage height, in feet, and discharge, in second-feet, of Deadman Creek near Marysville, Mont., for 1911.

[Chas. Johnson, observer.]

Day.	March.		April.		May.		June.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1.....		4.0	2.10	10	2.52	38	2.42	30
2.....		4.0	2.10	10	2.52	38	2.45	32
3.....		4.0	2.12	11	2.57	42	2.45	32
4.....		4.0	2.12	11	2.60	45	2.45	32
5.....		3.9	2.12	11	2.65	50	2.49	35
6.....		3.9	2.12	11	2.67	52	2.52	38
7.....		3.9	2.12	11	2.67	52	2.55	40
8.....		3.8	2.10	10	2.67	52	2.54	40
9.....		3.8	2.07	8.8	2.72	57	2.52	38
10.....		3.8	2.10	10	2.72	57	2.52	38
11.....		3.7	2.12	11	2.70	55	2.52	38
12.....		3.7	2.07	8.8	2.67	52	2.52	38
13.....	1.92	3.6	2.07	8.8	2.67	52	2.52	38
14.....	1.92	3.6	2.07	8.8	2.64	49	2.51	37
15.....	1.97	5.1	2.07	8.8	2.62	47	2.50	36
16.....	1.97	5.1	2.12	11	2.61	46	2.50	36
17.....	2.00	6.0	2.12	11	2.55	40	2.50	36
18.....	2.00	6.0	2.14	12	2.50	36	2.50	36
19.....	2.07	8.8	2.17	14	2.49	35	2.50	36
20.....	2.05	8.0	2.17	14	2.48	34	2.48	34
21.....	2.10	10	2.22	16	2.48	34	2.45	32
22.....	2.10	10	2.22	16	2.48	34	2.45	32
23.....	2.10	10	2.27	19	2.46	33	2.45	32
24.....	2.07	8.8	2.27	19	2.46	33	2.42	30
25.....	2.07	8.8	2.31	22	2.45	32	2.42	30
26.....	2.10	10	2.35	24	2.45	32	2.44	31
27.....	2.07	8.8	2.40	28	2.45	32	2.45	32
28.....	2.05	8.0	2.42	30	2.45	32	2.45	32
29.....	2.05	8.0	2.47	34	2.45	32	2.45	32
30.....	2.10	10	2.47	34	2.42	30	2.45	32
31.....	2.10	10			2.42	30		

NOTE.—Daily discharge determined from a poorly defined rating curve. Discharge Mar. 1 to 12 estimated.

Monthly discharge of Deadman Creek near Marysville, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			a 5.0	307	
February.....			a 4.0	222	
March.....	10	3.6	6.3	387	C.
April.....	34	8.8	15.1	898	C.
May.....	57	30	41.4	2,550	C.
June.....	40	30	34.5	2,050	C.
The period.....			17.9	6,410	

a Estimated.

LOST HORSE CREEK NEAR MARYSVILLE, MONT.

Location.—At the ranch of Charles Johnson, one-fourth mile above the junction of Lost Horse with Deadman Creek and about 6 miles from Marysville.

Records available.—April 2, 1909, to June 30, 1911.

Drainage area.—Not measured.

Gage.—Staff.

Channel.—Will shift at high stages.

Discharge measurements.—Made by wading.

Diversions.—One ditch takes water from Lost Horse Creek.

Accuracy.—Conditions favor accurate determinations of discharge at low and ordinary stages.

Discharge measurements of Lost Horse Creek near Marysville, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.
May 18	C. S. Heidell.....	<i>Feet.</i> 2.12	<i>Sec.-ft.</i> 3.29
July 20	do.....	2.01	1.75

Daily gage height, in feet, and discharge, in second-feet, of Lost Horse Creek near Marysville, Mont., for 1911.

[Chas. Johnson, observer.]

April.		May.		June.		April.		May		June.			
Day.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Day.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1....	0	2.00	1.8	2.15	3.4	16....	1.58	0.08	2.10	2.8	2.12	3.0	
2....	0	2.00	1.8	2.15	3.4	17....	1.62	.12	2.12	3.0	2.12	3.0	
3....	0	2.00	1.8	2.15	3.4	18....	1.65	.15	2.12	3.0	2.12	3.0	
4....	0	2.05	2.3	2.15	3.4	19....	1.68	.18	2.12	3.0	2.12	3.0	
5....	0	2.05	2.3	2.18	3.8	20....	1.71	.23	2.15	3.4	2.12	3.0	
6....	0	2.05	2.3	2.20	4.0	21....	1.75	.35	2.15	3.4	2.10	2.8	
7....	0	2.05	2.3	2.20	4.0	22....	1.78	.4	2.15	3.4	2.10	2.8	
8....	0	2.05	2.3	2.20	4.0	23....	1.80	.5	2.15	3.4	2.10	2.8	
9....	1.50	0	2.06	2.4	2.18	3.8	24....	1.81	.6	2.15	3.4	2.10	2.8
10....	1.50	0	2.08	2.6	2.16	3.5	25....	1.85	.8	2.18	3.8	2.10	2.8
11....	1.50	0	2.08	2.6	2.15	3.4	26....	1.85	.8	2.18	3.8	2.10	2.8
12....	1.55	.05	2.10	2.8	2.15	3.4	27....	1.90	1.0	2.18	3.8	2.11	2.9
13....	1.55	.05	2.10	2.8	2.15	3.4	28....	1.90	1.0	2.18	3.8	2.12	3.0
14....	1.58	.08	2.10	2.8	2.12	3.0	29....	1.98	1.6	2.16	3.5	2.12	3.0
15....	1.58	.08	2.10	2.8	2.12	3.0	30....	2.00	1.8	2.16	3.5	2.12	3.0
							31....			2.16	3.5		

NOTE.—Daily discharge determined from a poorly defined rating curve. Discharge Apr. 1 to 8 estimated.

Monthly discharge of Lost Horse Creek near Marysville, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
April.....	1.8	0	0.33	20	C.
May.....	3.8	1.8	2.91	179	C.
June.....	4.0	2.8	3.22	192	C.

NOTE.—Practically no flow January and February. Records discontinued June 30.

MARSH CREEK NEAR MARYSVILLE, MONT.

Location.—In the NE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 6, T. 12 N., R. 6 W., at the Hartmiller ranch, about 1 mile above the junction of Marsh Creek with Little Prickly Pear Creek.

Records available.—April 1, 1909, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Staff.

Channel.—Shifting.

Discharge measurements.—Made by wading near gage.

Winter flow.—Affected by ice.

Diversions.—The creek supplies no important ditches.

Discharge measurements of Marsh Creek near Marysville, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.
May 18	C. S. Heidel.....	<i>Feet.</i> 1.48	<i>Sec.-ft.</i> 2.69
July 20	.....do.....	1.40	2.54

Daily gage height, in feet, of Marsh Creek near Marysville, Mont., for 1911.

[J. Hartmiller, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		1.44	1.40	1.45	1.46	1.36	1.25	.....	1.25
2.....		1.45	1.40	1.45	1.45	1.45	1.25	1.35	1.30
3.....		1.42	1.40	1.45	1.43	1.38	1.45	1.30	1.30
4.....		1.42	1.45	1.47	1.41	1.44	1.35	1.30	1.30
5.....		1.40	1.45	1.46	1.41	1.40	1.35	1.30	1.30
6.....		1.40	1.45	1.47	1.40	1.45	1.35	1.30	1.30
7.....		1.40	1.45	1.52	1.40	1.40	1.33	1.30	.....
8.....		1.40	1.45	1.52	1.40	1.40	1.33	1.26	.....
9.....		1.40	1.43	1.48	1.39	1.40	1.30	1.26	.....
10.....		1.40	1.43	1.46	1.40	1.36	1.25	1.25	.....
11.....		1.38	1.43	1.45	1.40	1.35	1.25	1.35	.....
12.....		1.41	1.43	1.48	1.40	1.34	1.25	1.35	.....
13.....		1.40	1.41	1.48	1.40	1.33	1.25	1.35	.....
14.....		1.36	1.41	1.48	1.40	1.32	1.25	1.35	.....
15.....		1.38	1.60	1.48	1.42	1.32	1.25	1.35	.....
16.....		1.39	1.48	1.45	1.40	1.32	1.25	1.35	.....
17.....		1.38	1.46	1.45	1.42	1.25	1.25	1.35	.....
18.....	1.36	1.39	1.46	1.40	1.44	1.25	1.25	1.35	.....
19.....	1.40	1.40	1.47	1.75	1.42	1.25	1.25	1.35	.....
20.....	1.44	1.40	1.46	1.55	1.40	1.26	1.25	1.30	.....
21.....	1.44	1.41	1.46	1.45	1.40	1.30	1.30	1.30	.....
22.....	1.45	1.40	1.45	1.42	1.40	1.30	1.30	1.30	.....
23.....	1.44	1.40	1.46	1.42	1.39	1.30	1.30	1.30	.....
24.....	1.45	1.39	1.48	1.50	1.39	1.25	1.30	1.25	.....
25.....	1.42	1.39	1.50	1.45	1.39	1.25	1.30	1.25	.....
26.....	1.38	1.39	1.50	1.45	1.38	1.25	1.30	1.25	.....
27.....	1.36	1.40	1.50	1.45	1.35	1.25	1.30	1.25	.....
28.....	1.39	1.42	1.50	1.44	1.35	1.25	1.30	1.25	.....
29.....	1.40	1.43	1.50	1.48	1.35	1.25	.....	1.25	.....
30.....	1.42	1.40	1.50	1.47	1.35	1.25	.....	1.25	.....
31.....	1.42	.....	1.45	.....	1.35	1.25	.....	1.25	.....

Daily discharge, in second-feet, of Marsh Creek near Marysville, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	1.3	2.4	2.0	2.4	3.0	2.2	1.6	2.0	1.6
2.....	1.3	2.4	2.0	2.4	2.9	2.9	1.6	2.1	1.8
3.....	1.3	2.2	2.0	2.4	2.7	2.3	2.9	1.8	1.8
4.....	1.3	2.2	2.4	2.6	2.5	2.8	2.1	1.8	1.8
5.....	1.4	2.0	2.4	2.5	2.5	2.4	2.1	1.8	1.8
6.....	1.4	2.0	2.4	2.6	2.4	2.9	2.1	1.8	1.8
7.....	1.4	2.0	2.4	3.2	2.4	2.4	2.0	1.8	.....
8.....	1.4	2.0	2.4	3.2	2.4	2.4	2.0	1.7	.....
9.....	1.5	2.0	2.3	2.7	2.3	2.4	1.8	1.7	.....
10.....	1.5	2.0	2.3	2.5	2.4	2.2	1.6	1.6	.....
11.....	1.5	1.9	2.3	2.4	2.4	2.1	1.6	2.1	.....
12.....	1.5	2.1	2.3	2.7	2.4	2.0	1.6	2.1	.....
13.....	1.6	2.0	2.1	2.7	2.4	2.0	1.6	2.1	.....
14.....	1.6	1.8	2.1	2.7	2.4	1.9	1.6	2.1	.....
15.....	1.6	1.9	4.4	2.7	2.6	1.9	1.6	2.1	.....
16.....	1.7	2.0	2.7	2.4	2.4	1.9	1.6	2.1	.....
17.....	1.7	1.9	2.5	2.4	2.6	1.6	1.6	2.1	.....
18.....	1.8	2.0	2.5	2.0	2.8	1.6	1.6	2.1	.....
19.....	2.0	2.0	2.6	8.4	2.6	1.6	1.6	2.1	.....
20.....	2.4	2.0	2.5	4.2	2.4	1.7	1.6	1.8	.....
21.....	2.4	2.1	2.5	2.9	2.4	1.8	1.8	1.8	.....
22.....	2.4	2.0	2.4	2.6	2.4	1.8	1.8	1.8	.....
23.....	2.4	2.0	2.5	2.6	2.3	1.8	1.8	1.8	.....
24.....	2.4	2.0	2.7	3.4	2.3	1.6	1.8	1.6	.....
25.....	2.2	2.0	2.9	2.9	2.3	1.6	1.8	1.6	.....
26.....	1.9	2.0	2.9	2.9	2.3	1.6	1.8	1.6	.....
27.....	1.8	2.0	2.9	2.9	2.1	1.6	1.8	1.6	.....
28.....	2.0	2.2	2.9	2.8	2.1	1.6	1.8	1.6	.....
29.....	2.0	2.3	2.9	3.2	2.1	1.6	1.9	1.6	.....
30.....	2.2	2.0	2.9	3.1	2.1	1.6	2.0	1.6	.....
31.....	2.2	.....	2.4	.....	2.1	1.6	.....	1.6	.....

NOTE.—Daily discharge determined from two poorly defined rating curves, as follows: Mar. 18 to June 18 and June 19 to Nov. 6. Discharge estimated Mar. 1 to 17 and Sept. 29 to Oct. 1.

Monthly discharge of Marsh Creek near Marysville, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	.....	.....	a 1.30	80	
February.....	.....	.....	a 1.30	72	
March.....	2.4	1.3	1.78	109	C.
April.....	2.4	1.8	2.05	122	C.
May.....	4.4	2.0	2.53	156	C.
June.....	8.4	2.0	2.95	176	C.
July.....	3.0	2.1	2.42	149	C.
August.....	2.9	1.6	1.98	122	C.
September.....	2.9	1.6	1.80	107	C.
October.....	2.1	1.6	1.84	113	C.
November.....	.....	.....	a 1.70	101	
December.....	.....	.....	a 1.50	92	
The year.....	.....	.....	1.93	1,400	

a Estimated.

DEARBORN RIVER BASIN.

DEARBORN RIVER NEAR CLEMONS, MONT.

Location.—2 miles above Clemons, Mont., half a mile above the headworks of the old Dearborn Canal, and half a mile above the mouth of Falls Creek.

Records available.—May 4, 1908, to December 31, 1911.

Drainage area.—110 square miles.

Gage.—Staff; not read every day as it is about 2 miles from observer's house. The datum of the gage was lowered 1 foot on October 21, 1910, and all gage heights for the year were consequently changed.

Channel.—Permanent.

Discharge measurements.—Made from cable just above gage or by wading.

Winter flow.—Stream freezes over and gage-height observations are discontinued.

Diversions.—None above the station.

Accuracy.—Interpolations between gage readings are believed to be fairly accurate.

Discharge measurements of Dearborn River near Clemons, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 17 ^a	J. C. Beebe.....	.....	13.7	June 25	B. E. Jones.....	1.65	252
Mar. 21	do.....	0.93	38	July 28	R. Richards.....	1.09	78
May 21	B. E. Jones.....	1.68	252	Oct. 27	W. A. Lamb.....	.93	43
June 6	J. C. Beebe.....	2.08	508				

^a Ice conditions. Discharge estimated from a measurement made below mouth of Falls Creek, wading.

Daily gage height, in feet, of Dearborn River near Clemons, Mont., for 1911.

[O. A. Kench, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....					1.49		0.94	1.04
2.....		1.10	1.42	1.97	1.44	1.09		
3.....						1.08	.97	1.14
4.....		1.00	1.50	2.15		1.13		
5.....					1.39		1.35	1.08
6.....		.97	1.61	2.05	1.37	1.11		
7.....			1.75				1.38	1.07
8.....		.97		2.65	1.34	1.10		1.06
9.....		.96	1.69	2.15	1.30	1.10	1.39	
10.....				2.10			1.38	1.06
11.....			1.60	2.10	1.30	1.09		1.06
12.....		1.04					1.37	
13.....			1.65	2.15	1.27	1.05	1.37	1.05
14.....		1.00			1.22			
15.....			2.35	2.00		1.03	1.28	1.05
16.....		.99			1.20		1.20	
17.....			2.05	1.88		1.00		
18.....		1.05			1.19		1.20	1.07
19.....		1.11	2.00	1.80		1.00		
20.....					1.16	.99	1.20	1.03
21.....	0.93	1.16	1.68	1.76	1.19			
22.....						.99	1.18	1.00
23.....	.90	1.30	1.64	1.75	1.16			
24.....				1.72		.97	1.17	1.00
25.....	.93	1.30	1.66	1.65	1.15			.99
26.....					1.12	.97	1.15	
27.....	.99	1.35	1.60	1.59		.99		1.05
28.....					1.09	.98	1.11	
29.....	.94	1.37	1.52	1.52				.94
30.....		1.34			1.09		1.05	
31.....	.98		1.82			.95		.94

Daily discharge, in second-feet, of Dearborn River near Clemons, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....	30	62	140	376	176	71	44	61
2.....	30	73	152	424	159	71	46	71
3.....	31	63	166	502	153	69	48	81
4.....	31	53	180	580	147	79	90	75
5.....	32	50	202	534	142	77	132	69
6.....	32	48	224	488	137	75	136	68
7.....	33	48	290	824	133	74	140	67
8.....	33	48	276	1,160	129	73	141	65
9.....	34	47	260	580	118	73	142	65
10.....	34	51	240	530	118	72	140	65
11.....	35	56	220	530	118	71	138	65
12.....	35	61	231	555	114	67	137	64
13.....	36	57	242	590	111	63	137	63
14.....	36	53	521	512	99	61	125	63
15.....	37	52	800	445	96	59	113	63
16.....	38	52	644	404	94	56	94	64
17.....	38	57	488	363	93	53	94	66
18.....	40	63	466	339	92	53	94	67
19.....	41	75	445	315	89	53	94	68
20.....	42	80	350	305	86	52	94	59
21.....	42	86	256	295	92	52	92	56
22.....	40	102	247	292	89	52	90	53
23.....	38	118	238	290	86	50	88	53
24.....	40	118	242	275	85	48	87	53
25.....	42	118	247	242	84	48	86	52
26.....	47	125	234	230	77	48	84	58
27.....	52	132	220	216	74	52	80	63
28.....	48	134	204	202	71	50	75	54
29.....	44	137	188	188	71	49	69	44
30.....	47	129	458	182	71	47	63	44
31.....	50	.....	327	.....	71	46	.....	44

NOTE.—Daily discharge determined from a fairly well-defined rating curve. Discharge Mar. 1 to 20 estimated. Discharge interpolated for days on which gage was not read.

Monthly discharge of Dearborn River near Clemons, Mont., for 1911.

[Drainage area 110 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accu- racy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....	.....	.....	a 35	0.318	0.37	2,150	D.
February.....	.....	.....	a 30	.273	.28	1,670	D.
March.....	52	30	38.4	.349	.40	2,360	C.
April.....	137	48	78.3	.712	.79	4,660	B.
May.....	800	140	297	2.70	3.11	18,300	B.
June.....	1,160	182	425	3.86	4.31	25,300	B.
July.....	176	71	106	.964	1.11	6,520	B.
August.....	79	46	60.1	.546	.63	3,700	B.
September.....	142	44	99.8	.907	1.01	5,940	B.
October.....	81	44	61.4	.558	.64	3,730	B.
November.....	.....	.....	a 40	.364	.41	2,380	D.
December.....	.....	.....	a 35	.318	.37	2,150	D.
The year.....	1,160	.....	109	.991	13.43	78,900	

a Estimated.

FALLS CREEK NEAR CLEMONS, MONT.

Location.—At a point $1\frac{1}{2}$ miles above Clemons, Mont., 500 feet above the mouth of the creek.

Records available.—May 4, 1908, to December 31, 1911; fragmentary because of the great distance the observer lives from the gage.

Drainage area.—Not measured.

Gage.—Staff; datum unchanged.

Channel.—Permanent except in flood.

Discharge measurements.—Made by wading or from a cable.

Winter flow.—Affected by ice.

Diversions.—The entire flow of this stream reaches Dearborn River.

Accuracy.—Interpolations between observed gage heights believed to be fairly accurate.

Falls Creek affords opportunities for water power development above the station, as its fall is large.

Discharge measurements of Falls Creek near Clemons, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i> (^a)	<i>Sec.-ft.</i> (^b)			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 17	J. C. Beebe			June 25	B. E. Jones	1.50	101
Mar. 21	do	0.70	11.8	July 28	R. Richards	1.01	41
May 21	B. E. Jones	1.57	111	Oct. 27	W. A. Lamb	1.05	32
June 6	J. C. Beebe	2.04	226				

^a Ice conditions.

^b Discharge estimated from measurement made below junction with Dearborn River.

Daily gage height in feet of Falls Creek near Clemons, Mont., for 1911.

[O. A. Kench, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1					1.41		0.91	1.03
2		0.77	1.11	1.83	1.37	1.0		
3						1.0	.92	1.14
4		.77	1.15	2.12		1.04		
5					1.32		1.1	1.1
6		.77	1.29	1.96	1.29	1.04		
7			1.45				1.27	1.08
8		.78		2.25	1.23	1.05		1.08
9		.78	1.42	2.02	1.22	1.04	1.3	
10				2.02			1.32	1.08
11			1.39	2.0	1.21	1.02		1.08
12		.98					1.38	
13			1.41	2.18	1.19	.97	1.4	1.1
14		.97			1.17			
15			1.86	1.97		.97	1.32	1.07
16		.99			1.12		1.28	
17			1.8	1.75		.95		
18		.82			1.11		1.19	1.11
19		.83	1.77	1.68		.94		
20					1.09	.94	1.14	1.1
21	0.70	.87	1.57	1.65	1.17			
22						.93	1.15	1.1
23	.70	.93	1.50	1.63	1.12			
24				1.58		.93	1.15	1.1
25	.70	1.05	1.49	1.51	1.09			1.08
26					1.08	.92	1.11	
27	.72	1.10	1.49	1.49		.92		.93
28					1.01	.91	1.09	
29	.72	1.10	1.48	1.45				.93
30		1.11	1.7		1.00		1.05	.91
31	.74		1.7			.92		

Daily discharge, in second-feet, of Falls Creek near Clemons, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.		15	42	156	85	40	31	43
2.		16	42	172	78	40	32	49
3.		16	44	209	75	40	32	55
4.		16	47	246	72	44	41	52
5.		16	56	225	70	44	50	50
6.		16	66	205	66	44	61	49
7.		16	92	245	62	44	72	48
8.		16	90	285	57	45	74	48
9.		16	87	220	56	44	76	48
10.		20	84	220	59	43	79	48
11.		24	81	215	63	42	85	48
12.		29	83	240	62	40	90	49
13.		29	85	264	61	37	93	50
14.		29	132	236	58	37	86	48
15.		30	180	208	55	37	79	47
16.		30	172	180	52	36	73	48
17.		24	165	152	52	35	67	50
18.		18	162	144	51	34	61	51
19.		19	158	136	50	34	58	51
20.		20	136	133	49	34	55	51
21.	12	21	114	130	58	34	56	51
22.	12	23	107	128	55	33	56	51
23.	12	25	101	126	52	33	56	51
24.	12	30	100	116	50	33	56	51
25.	12	36	99	103	49	32	54	48
26.	12	38	99	101	48	32	51	40
27.	13	41	99	99	44	32	50	33
28.	13	41	98	96	41	31	49	33
29.	13	41	97	92	40	31	47	33
30.	14	42	140	88	40	32	45	31
31.	14		140		40	32		31

NOTE.—Daily discharge determined from two fairly well-defined curves as follows: Mar. 21 to July 9 and July 11 to Oct. 31.

Monthly discharge of Falls Creek near Clemons, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.			a 10	615	
February.			a 10	555	
March.	14		10.9	670	C.
April.	42	15	25.1	1,490	B.
May.	180	42	103	6,330	B.
June.	285	88	172	10,200	B.
July.	85	40	56.5	3,470	C.
August.	45	31	37.1	2,280	C.
September.	93	31	60.5	3,600	C.
October.	55	31	46.3	2,850	C.
November.			a 25	1,490	
December.			a 15	922	
The year.	285		47.7	34,500	

a Estimated. Discharge Mar. 1 to 20 estimated at 10 second-feet per day.

SUN RIVER BASIN.

NORTH FORK OF SUN RIVER NEAR AUGUSTA, MONT.

Location.—At the head of Kilraven ditch, near Christian's ranch, 12 miles northwest of Augusta, 21 miles southwest of Chouteau, Mont.

Records available.—October 31, 1903, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Chain, datum unchanged.

Channel.—Permanent.

Discharge measurements.—Made from cable.

Winter flow.—Affected by ice.

Diversions.—Water is diverted below the station for irrigation of the valley lands, but no water is diverted above the station.

Accuracy.—Conditions for accurate determination of discharge are excellent, except during the winter months.

Discharge measurements of North Fork of Sun River near Augusta, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 14	J. C. Beebe	1.83	242	June 8	J. C. Beebe	4.43	4,900
Mar. 23	do.	1.04	447	July 24	B. E. Jones	3.35	2,670
May 19	B. E. Jones	3.43	2,870	July 27	R. Richards	1.41	652
19	do.	3.39	2,780	Oct. 25	W. A. Lamb	0.94	351

^a Ice present.

Daily gage height, in feet of North Fork of Sun River near Augusta, Mont., for 1911.

[Charles Dox, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		1.4			2.2	4.0	3.1	1.4		0.9	0.9	0.9
2	0.8			1.0		4.5	3.1		0.9	1.1	0.95	0.9
3		1.5			2.3	4.5	3.1	1.4	0.9	1.2	0.9	0.85
4	0.8	1.5		1.0			3.1			1.1	0.85	0.8
5		1.5			3.9		3.0	1.4	1.2	1.0	0.85	0.8
6	0.8	1.3	1.2			4.0	3.0	1.5		1.1	0.85	0.8
7				1.0	3.5		2.9		1.4	1.0	0.85	0.8
8	1.4	1.3	1.3			4.4	2.8	1.4		0.9	0.85	0.85
9				0.9	3.2		2.6		1.0	1.0	0.85	0.8
10	1.6	1.3				3.9	2.5	1.5	1.0	0.9	0.85	0.8
11			1.1		3.0		2.2			0.9	0.9	0.85
12	1.6	1.1		0.9			2.0	1.5	1.1	1.0	1.0	0.85
13	1.8		1.1			4.5		1.5		0.9	1.05	0.85
14							1.9		1.0	0.9	1.25	0.85
15	1.6	1.1	1.0	1.1		4.8	1.9	1.4		1.0	1.35	0.8
16					4.2		1.8		1.0	1.0	1.4	0.75
17		1.1	0.8	1.0	3.6	3.9		1.1	1.0	1.0	1.45	0.7
18	1.3				3.5		1.7			1.1	1.35	0.75
19		1.0	0.8	1.2				1.0	1.0	1.2	1.1	0.75
20	1.3				3.0	3.8	1.7			1.1	1.0	0.7
21			0.9	1.9				1.0	0.9	1.0	0.95	0.75
22	1.2				3.0	3.8	1.4		0.9	1.1	0.85	0.8
23			1.2	2.1				1.0		1.0	0.8	0.8
24	1.4			2.0	3.0	3.7	1.5		1.0	1.0	0.85	0.85
25			1.0	2.2			1.6	0.9		1.0	0.85	0.8
26	1.4				2.8	3.6			1.0	0.85	0.9	0.85
27			0.9	2.4		3.5		0.9		0.8	0.9	0.85
28	1.4				2.7	3.4	1.4		1.0	0.85	0.9	0.8
29			1.0	2.2		3.3		0.9		0.85	0.8	0.75
30	1.5				2.8	3.1	1.3	1.0	0.9	0.8	0.9	0.75
31			0.9		2.8			0.9		0.9		0.75

NOTE.—Gage heights Jan. 7 to Feb. 11 and Nov. 14 to Dec. 31 distorted by ice.

Daily discharge, in second-feet, of North Fork of Sun River near Augusta, Mont., for 1911.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	250	510	395	1,350	3,920	2,320	630	340	340	340
2.....	270	520	420	1,400	5,000	2,320	630	340	435	362
3.....	290	530	420	1,450	5,000	2,320	630	340	495	340
4.....	310	540	420	2,580	4,640	2,320	630	418	435	320
5.....	330	540	420	3,710	4,280	2,190	630	495	385	320
6.....	350	540	420	3,320	3,920	2,190	710	562	435	320
7.....	370	570	420	2,970	4,350	2,060	670	630	385	320
8.....	390	600	395	2,740	4,780	1,940	630	508	340	320
9.....	410	560	370	2,520	4,240	1,710	670	385	385	320
10.....	440	520	370	2,380	3,710	1,600	710	385	340	320
11.....	460	480	370	2,250	4,140	1,300	710	410	340	340
12.....	480	480	370	2,670	4,570	1,120	710	435	385	385
13.....	480	480	405	3,090	5,000	1,080	710	410	340	410
14.....	480	450	440	3,500	5,340	1,030	670	385	340	400
15.....	480	420	480	3,920	5,690	1,030	630	385	385	390
16.....	480	375	450	4,340	4,700	950	532	385	385	380
17.....	480	330	420	3,140	3,710	910	435	385	385	370
18.....	450	330	480	2,970	3,610	870	410	385	435	360
19.....	420	330	540	2,610	3,520	870	385	385	495	350
20.....	420	350	805	2,250	3,430	870	385	362	435	340
21.....	430	370	1,070	2,250	3,430	750	385	340	385	320
22.....	440	455	1,160	2,250	3,430	630	385	340	435	300
23.....	450	540	1,250	2,250	3,340	670	385	362	385	300
24.....	460	480	1,160	2,250	3,250	710	362	385	385	300
25.....	470	420	1,350	2,120	3,160	790	340	385	385	290
26.....	480	395	1,450	2,000	3,080	740	340	385	320	290
27.....	490	370	1,550	1,940	2,920	680	340	385	300	290
28.....	500	395	1,450	1,880	2,760	630	340	385	320	280
29.....		420	1,350	1,940	2,610	595	340	362	320	280
30.....		395	1,350	2,000	2,320	560	385	340	300	280
31.....		370		2,000		595	340		340	

NOTE.—Daily discharge determined from two rating curves that are well defined and are used for periods from Feb. 12 to June 17, and from June 18 to Nov. 12, respectively. Discharge estimated Feb. 1 to 11, Nov. 14 to 30, and on days for which gage heights are missing.

Monthly discharge of North Fork of Sun River near Augusta, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			^a 250	15,400	C.
February.....	500	250	420	23,300	B.
March.....	600	330	454	27,900	B.
April.....	1,550	370	732	43,600	B.
May.....	4,340	1,350	2,520	155,000	B.
June.....	5,690	2,320	3,930	234,000	B.
July.....	2,320	560	1,240	76,200	B.
August.....	710	340	518	31,900	B.
September.....	630	340	400	23,800	B.
October.....	495	300	380	23,400	B.
November.....	410	280	331	19,700	C.
December.....			^a 275	16,900	D.
The year.....			954	691,000	

^a Estimated.

SUN RIVER AT SUN RIVER, MONT.

Location.—At the highway bridge at Sun River, Mont. The principal tributaries of Sun River all enter above the station; South Fork of Sun River, Willow Creek, and Simms Creek are the most important.

Records available.—July 31, 1905, to December 31, 1911.

Drainage area.—Not measured.

Gage.—A staff nailed to piling on the left bank just above the bridge; datum unchanged.

Channel.—Shifts at all stages.

Discharge measurements.—Made from bridge or by wading.

Diversions.—Practically the entire valley above this point is irrigated with water taken from the river.

Accuracy.—Conditions at the measuring section have been very poor since the high water of 1907; at low stages good measurements can be made.

Discharge measurements of Sun River at Sun River, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 25	C. S. Heidel.....	2.95	702	Aug. 9	R. Richards.....	3.19	595
May 16	B. E. Jones.....	7.75	5,860	15	J. C. Beebe.....	2.86	412
June 26	.....do.....	5.48	2,660	Dec. 11	B. E. Jones.....	2.63	437

Daily gage height, in feet, of Sun River at Sun River, Mont., for 1911.

[R. A. Lange, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		2.8	4.1	5.4	5.4	2.6	2.6	2.9	2.7
2.....		2.9	4.2	5.9	5.0	2.7	2.6	3.0	2.8
3.....		2.9	4.5	7.6	4.8	2.8	2.6	3.3	2.8
4.....		2.9	4.6	7.4	4.8	2.7	3.2	3.6	2.8
5.....		2.9	4.8	7.2	4.6	3.3	3.2	3.3	2.7
6.....		2.8	5.0	6.6	4.2	3.4	3.2	3.2	2.7
7.....		2.8	7.0	7.2	4.2	3.3	3.1	3.0	2.6
8.....		2.7	6.4	7.2	4.0	3.2	3.0	3.0	2.6
9.....		2.7	5.6	7.1	3.8	3.2	3.0	3.0	2.3
10.....		2.8	5.6	7.0	3.6	3.2	3.0	3.0	2.2
11.....		2.8	5.2	7.8	3.5	3.2	3.0	2.8	2.2
12.....		2.7	5.0	7.6	3.5	3.0	3.0	3.0	2.3
13.....		2.7	5.0	7.5	3.6	2.8	3.0	3.0	2.6
14.....		2.7	4.8	7.4	3.6	2.8	3.0	3.0	3.3
15.....		2.7	5.0	7.2	3.4	2.8	3.0	3.0	3.4
16.....		2.8	7.0	7.2	3.4	2.8	3.0	3.0	3.3
17.....		2.8	7.0	7.0	3.3	2.7	3.0	3.0	.....
18.....		3.0	6.6	7.0	3.4	2.7	3.0	3.0	.....
19.....		3.0	5.8	6.8	3.3	2.6	2.9	3.0	.....
20.....		3.0	5.6	6.6	3.2	2.6	2.9	3.0	.....
21.....		3.2	5.5	6.9	3.2	2.6	3.0	3.0	.....
22.....		3.8	5.4	6.8	3.3	2.5	3.0	3.0	.....
23.....		4.1	5.4	6.6	3.1	2.4	2.9	3.0	.....
24.....		4.0	5.4	6.4	3.0	2.4	2.9	2.9	.....
25.....		4.6	5.2	6.2	3.0	2.5	3.0	2.9	.....
26.....	3.0	4.6	5.2	6.0	3.0	2.5	3.0	2.9	.....
27.....	2.8	5.0	5.0	5.8	3.0	2.6	2.9	2.8	.....
28.....	2.8	5.0	5.0	5.5	2.8	2.6	2.9	2.8	.....
29.....	2.7	4.6	4.9	5.4	2.8	2.6	3.0	2.8	.....
30.....	2.8	4.2	4.6	5.4	2.8	2.6	3.0	2.8	.....
31.....	2.8	.....	4.8	.....	2.6	2.6	.....	2.8	.....

Daily discharge, in second-feet, of Sun River at Sun River, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		630	1,500	2,510	2,510	310	350	440	430
2.		680	1,580	3,120	2,080	350	350	480	470
3.		680	1,830	5,620	1,880	390	350	700	470
4.		680	1,920	5,300	1,880	350	650	900	470
5.		680	2,110	4,980	1,680	650	650	700	430
6.		630	2,310	4,080	1,320	710	650	650	430
7.		630	4,780	4,980	1,320	650	540	480	390
8.		580	3,960	4,980	1,150	590	480	480	390
9.		580	2,960	4,830	990	590	480	480	275
10.		630	2,960	4,680	850	590	480	480	240
11.		630	2,510	5,940	780	590	480	440	240
12.		580	2,310	5,620	780	490	480	480	275
13.		580	2,310	5,460	850	390	480	480	390
14.		580	2,110	5,300	850	390	480	480	740
15.		580	2,310	4,980	710	390	480	480	800
16.		630	4,780	4,980	710	390	480	570	740
17.		630	4,680	4,680	650	350	480	570	
18.		730	4,080	4,680	710	350	480	570	
19.		730	2,990	4,380	650	310	440	570	
20.		730	2,750	4,080	590	310	440	570	
21.			850	2,630	4,530	590	310	480	570
22.			1,260	2,510	4,380	650	280	480	570
23.			1,500	2,510	4,080	540	250	440	570
24.			1,420	2,510	3,800	490	250	440	520
25.			1,920	2,290	3,520	490	280	480	520
26.	730	1,920	2,290	3,250	490	280	480	520	
27.	630	2,310	2,080	2,990	490	310	440	470	
28.	630	2,310	2,080	2,630	390	310	440	470	
29.	580	1,920	1,980	2,510	390	310	480	470	
30.	630	1,580	1,680	2,510	390	310	480	470	
31.	630		1,880		310	310		470	

NOTE.—Daily discharge determined as follows: Mar. 25 to May 16 and May 17 to Aug. 31 from two fairly well-defined curves; Sept. 1 to Nov. 16, by indirect method for shifting channels.

Monthly discharge of Sun River at Sun River, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January			a 350	21,500	D.
February			a 500	27,800	D.
March	730		572	35,200	C.
April	2,310	580	993	59,100	B.
May	4,780	1,500	2,620	161,000	B.
June	5,940	2,510	4,310	256,000	B.
July	2,510	310	908	55,800	B.
August	710	250	398	24,500	B.
September	650	350	478	28,400	C.
October	900	440	538	33,100	C.
November	800	240	473	28,100	C.
December			a 400	24,600	D.
The year	5,940		1,040	755,000	

a Estimated.

NOTE.—Discharge Mar. 1 to 24 and Nov. 17 to 30 estimated at 550 second-feet and 500 second-feet per day, respectively.

WILLOW CREEK NEAR AUGUSTA, MONT.

Location.—At Jordan's ranch, just below the mouth of Little Willow Creek and about 7 miles northwest of Augusta.

Records available.—June 8, 1905, to May 14, 1911.

Drainage area.—Not measured.

Gage.—A standard chain on right bank near observer's footbridge; datum unchanged.

Channel.—Permanent.

Winter flow.—No ice forms at this station as a large spring enters the creek just above the gage.

Diversions.—Water is diverted from the creek above the station for irrigation of the valley lands.

Storage.—Willow Creek dam, work on which has been begun, will provide a reservoir with a capacity of 84,320 acre-feet.

Accuracy.—Conditions for obtaining accurate discharge data are excellent.

Discharge measurements of Willow Creek near Augusta, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 14	John C. Beebe.....	0.65	3.5
Mar. 23	do.....	.96	9.5
May 19	B. E. Jones.....	1.58	36
June 9	J. C. Beebe.....	2.56	83
July 27	R. Richards.....	.95	13

Daily gage height, in feet, and discharge, in second-feet, of Willow Creek near Augusta, Mont., for 1911.

[Elizabeth Ireland, observer.]

Day.	January.		February.		March.		April.		May.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1.....	0.66	4.0	0.66	4.0	0.60	3.0	0.91	9.1	0.90	8.8
2.....	.62	3.3	.67	4.1	.60	3.0	.90	8.8	.90	8.8
3.....	.60	3.0	.67	4.1	.61	3.2	.92	9.3	.84	7.4
4.....	.61	3.2	.67	4.1	.62	3.3	.92	9.3	.84	7.4
5.....	.61	3.2	.67	4.1	.63	3.5	.90	8.8	.93	9.6
6.....	.63	3.5	.67	4.1	.65	3.8	1.00	11	1.03	12
7.....	.64	3.6	.67	4.1	.65	3.8	.93	9.6	.97	11
8.....	.64	3.6	.67	4.1	.65	3.8	.91	9.1	.98	11
9.....	.65	3.8	.67	4.1	.68	4.3	.91	9.1	.90	8.8
10.....	.64	3.6	.68	4.3	.71	4.8	.91	9.1	.90	8.8
11.....	.64	3.6	.68	4.3	.71	4.8	.90	8.8	.90	8.8
12.....	.63	3.5	.68	4.3	.74	5.4	.85	7.7	.85	7.7
13.....	.64	3.6	.68	4.3	.77	6.0	.89	8.6	.80	6.5
14.....	.64	3.6	.68	4.3	.80	6.5	.85	7.7	.80	6.5
15.....	.64	3.6	.67	4.1	.95	10.0	.80	6.5		
16.....	.64	3.6	.65	3.8	.95	10	.80	6.5		
17.....	.65	3.8	.65	3.8	.98	11	.80	6.5		
18.....	.65	3.8	.65	3.8	.98	11	.80	6.5		
19.....	.68	4.3	.65	3.8	1.01	12	.83	7.2		
20.....	.70	4.6	.64	3.6	1.15	16	.80	6.5		
21.....	.70	4.6	.63	3.5	1.05	13	.80	6.5		
22.....	.69	4.4	.62	3.3	1.03	12	.80	6.5		
23.....	.68	4.3	.60	3.0	1.06	13	.90	8.8		
24.....	.67	4.1	.60	3.0	1.09	14	.89	8.6		
25.....	.67	4.1	.60	3.0	1.03	12	.85	7.7		
26.....	.66	4.0	.60	3.0	.95	10	.85	7.7		
27.....	.65	3.8	.60	3.0	.95	10	.85	7.7		
28.....	.65	3.8	.60	3.0	.96	10	.90	8.8		
29.....	.65	3.8			.96	10	.90	8.8		
30.....	.66	4.0			.94	9.8	.90	8.8		
31.....	.66	4.0			.94	9.8				

NOTE.—Daily discharge determined from a rating curve well defined at all gage heights.

Monthly discharge of Willow Creek River near Augusta, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	4.6	3.0	3.80	234	A.
February.....	4.3	3.0	3.79	210	A.
March.....	16.0	3.0	8.15	501	A.
April.....	11.0	6.5	8.19	487	A.
May 1-14.....	12.0	6.5	8.79	244	A.

SOUTH FORK OF SUN RIVER AT AUGUSTA, MONT.

Location.—In sec. 11, T. 20 N., R. 6 W., at the highway bridge on the road from Augusta to Craig, Mont., about half a mile from Augusta.

Records available.—December 2, 1904, to December 31, 1911.

Drainage area.—Not measured.

Gage.—The original gage was spiked to the cribwork of the right abutment on the downstream side of the bridge; a new gage was installed April 17, 1907, at a different datum and was used during 1907 and 1908; records for 1909, 1910, and 1911 are referred to the old gage.

Channel.—Shifting.

Discharge measurements.—High-stage measurements may be made from the highway bridge; low-stage measurements are made by wading.

Winter flow.—Affected by ice.

Diversions.—Water is diverted to irrigate the valley lands both above and below stations. During dry seasons the entire summer flow is utilized.

Discharge measurements of South Fork of Sun River at Augusta, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
Jan. 15	John C. Beebe.....	<i>Feet.</i> (<i>a</i>)	<i>Sec.-ft.</i> 19.7	June 25	B. E. Jones.....	<i>Feet.</i> 1.85	<i>Sec.-ft.</i> 189
Mar. 2	do.....	0.98	38	26	do.....	1.82	163
May 20	B. E. Jones.....	1.95	279	July 26	R. Richards.....	1.28	32
June 9	J. C. Beebe.....	2.44	459	Oct. 26	W. A. Lamb.....	1.42	44

^a About 10 inches of ice over the entire river.

Daily gage height, in feet, of South Fork of Sun River at Augusta, Mont., for 1911.

[W. J. Auchard, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		0.9	1.0	2.3	1.8	1.3	1.2	1.5	1.4
2.....		.9	.9	2.6	1.8	1.3	1.2	1.4	1.7
3.....		.9	.9	2.7	1.8	1.3	1.2	1.6	1.5
4.....		.9	.9	2.5	1.7	1.3	1.4	1.5	1.4
5.....		.9	.9	2.3	1.7	1.4	1.4	1.5	1.4
6.....		.9	.9	2.3	1.7	1.4	1.5	1.5	1.4
7.....		.8	.9	2.2	1.6	1.4	1.5	1.5	1.4
8.....		.8	.9	2.5	1.6	1.4	1.5	1.5	1.4
9.....		.9	.9	2.4	1.6	1.4	1.5	1.5	1.7
10.....		.9	.9	2.3	1.6	1.4	1.5	1.5	2.2
11.....		.9	.9	2.2	1.5	1.3	1.5	1.5	2.3
12.....		.8	.9	2.2	1.5	1.3	1.5	1.5	2.7
13.....		.8	.9	2.2	1.5	1.3	1.5	1.5	2.7
14.....		.8	.9	2.1	1.5	1.3	1.5	1.5	2.7
15.....		.8	1.1	2.0	1.5	1.3	1.5	1.5	2.7

Daily gage height, in feet, of South Fork of Sun River at Augusta, Mont., for 1911—Con.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
16.....		0.8	2.5	2.0	1.4	1.3	1.5	1.5	2.7
17.....		.8	2.3	2.0	1.4	1.3	1.5	1.5	2.1
18.....		.8	2.1	1.9	1.4	1.2	1.5	1.5	2.1
19.....		.8	2.0	1.9	1.4	1.2	1.5	1.5	1.9
20.....		.8	1.9	1.9	1.4	1.3	1.5	1.5	1.6
21.....		.8	1.9	1.9	1.4	1.3	1.5	1.5	1.5
22.....		.9	1.8	1.9	1.3	1.2	1.5	1.5	1.4
23.....		1.0	1.8	1.9	1.3	1.2	1.5	1.5	1.5
24.....	1.6	.9	1.8	1.9	1.3	1.2	1.5	1.5	1.4
25.....	1.6	.9	1.8	1.9	1.3	1.2	1.5	1.5	.....
26.....	.9	1.0	1.9	1.8	1.3	1.2	1.5	1.5	.....
27.....	.9	1.0	1.9	1.8	1.3	1.2	1.5	1.5	.....
28.....	.9	1.0	1.8	1.8	1.2	1.2	1.5	1.4	.....
29.....	.9	1.0	1.8	1.8	1.2	1.2	1.5	1.4	.....
30.....	.9	1.0	1.9	1.8	1.2	1.2	1.5	1.4	.....
31.....	.9	.....	2.0	.....	1.2	1.2	.....	1.4	.....

NOTE.—Gage heights distorted by ice Mar. 24 to 25 and Nov. 1 to 24.

Daily discharge, in second-feet, of South Fork of Sun River at Augusta, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....	38	30	45	400	160	30	20	65
2.....	38	30	30	520	160	30	20	45
3.....	38	30	30	560	160	30	20	90
4.....	38	30	30	480	120	30	45	65
5.....	37	30	30	400	120	45	45	65
6.....	37	30	30	400	120	45	65	65
7.....	37	20	30	365	90	45	65	65
8.....	36	20	30	480	90	45	65	65
9.....	36	30	30	440	90	45	65	65
10.....	36	30	30	390	90	45	65	65
11.....	35	30	30	340	65	30	65	65
12.....	35	20	30	340	65	30	65	65
13.....	35	20	30	340	65	30	65	65
14.....	34	20	30	290	65	30	65	65
15.....	34	20	60	245	65	30	65	65
16.....	34	20	480	245	45	30	65	65
17.....	33	20	400	245	45	30	65	65
18.....	33	20	330	200	45	20	65	65
19.....	33	20	295	200	45	20	65	65
20.....	32	20	260	200	45	30	65	65
21.....	32	20	260	200	45	30	65	65
22.....	32	30	230	200	30	20	65	65
23.....	31	45	230	200	30	20	65	65
24.....	30	30	230	200	30	20	65	65
25.....	30	30	230	200	30	20	65	65
26.....	30	45	260	160	30	20	65	65
27.....	30	45	260	160	30	20	65	65
28.....	30	45	230	160	20	20	65	45
29.....	30	45	230	160	20	20	65	45
30.....	30	45	260	160	20	20	65	45
31.....	30	.....	295	.....	20	20	.....	45

NOTE.—Daily discharges determined from two fairly well-defined rating curves for periods Mar. 26 to June 9 and June 10 to Oct. 31. Discharges estimated Mar. 1 to 23.

Monthly discharge of South Fork of Sun River at Augusta, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			a 20	1,230	
February.....			a 25	1,390	
March.....	38	30	34	2,090	C.
April.....	45	20	29.0	1,730	B.
May.....	480	30	160	9,840	B.
June.....	560	160	296	17,600	B.
July.....	160	20	66.1	4,060	B.
August.....	45	20	29.0	1,780	B.
September.....	65	20	59.2	3,520	B.
October.....	90	45	62.6	3,850	B.
November.....			a 40	2,380	
December.....			a 25	1,540	
The year.....			70.5	51,000	

a Estimated.

FORD CREEK NEAR AUGUSTA, MONT.

Location.—At the ranch of Joseph Ford, 16 miles west of Augusta, Mont. Ford Creek unites with Smith Creek to form the South Fork of Sun River. Ford Creek has no tributary.

Records available.—April 11, 1906, to December 31, 1911.

Drainage area.—18 square miles.

Gage.—Staff, on the right bank near the observer's house; datum unchanged.

Channel.—Shifting; current swift.

Discharge measurements.—Made by wading.

Winter flow.—Little affected by ice.

Diversions.—One irrigation ditch, capacity about 15 sec.-ft., diverts water from the creek above the gage.

Accuracy.—As conditions of flow are changeable, frequent discharge measurements are necessary to properly define the rating curve.

Discharge measurements of Ford Creek near Augusta, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 15	J. C. Beebe.....	Ice.	10.1	June 24	B. E. Jones.....	1.64	53
Mar. 21	do.....	0.80	10.9	July 27	R. Richards.....	1.29	28
May 20	B. E. Jones.....	1.72	66.	Oct. 27	W. A. Lamb.....	1.10	12.8
June 9	J. C. Beebe.....	2.03	104				

Daily gage height, in feet, of Ford Creek near Augusta, Mont., for 1911.

[Joseph Ford, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....		1.00	1.20	2.00	1.52	1.30	1.20
2.....		1.00	1.20	2.05	1.50	1.30	1.20
3.....		1.00	1.30	2.10	1.50	1.30	1.20
4.....		1.05	1.42	2.02	1.50	1.30	1.20
5.....		1.05	1.50	2.00	1.45	1.30	1.20
6.....		1.05	1.52	2.00	1.40	1.30	1.20
7.....		1.00	1.50	2.10	1.40	1.25	1.20
8.....		1.00	1.42	2.10	1.40	1.20	1.20
9.....		1.00	1.40	2.00	1.40	1.20	1.20
10.....		1.00	1.40	2.00	1.40	1.20	1.20

Daily gage height, in feet, of Ford Creek near Augusta, Mont., for 1911—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
11.....		1.00	1.40	2.00	1.40	1.18	1.20
12.....		1.00	1.40	1.92	1.40	1.15	1.20
13.....		1.05	1.40	1.90	1.40	1.15	1.20
14.....		1.00	1.40	1.90	1.40	1.15	1.18
15.....		1.00	2.05	1.88	1.40	1.15	1.15
16.....			1.98	1.80	1.40	1.15	1.15
17.....		1.00	1.85	1.80	1.40	1.20	1.15
18.....		1.00	1.78	1.80	1.40	1.20	1.15
19.....		1.00	1.70	1.80	1.40	1.20	1.15
20.....		1.00	1.70	1.75	1.40	1.20	1.15
21.....		1.00	1.70	1.70	1.38	1.20	1.15
22.....		1.00	1.70	1.60	1.35	1.20	1.15
23.....	1.00	1.00	1.70	1.60	1.30	1.20	1.15
24.....	1.00	1.00	1.70	1.60	1.30	1.20	1.15
25.....	1.00	1.22	1.70	1.60	1.30	1.20	1.12
26.....	1.00	1.25	1.65	1.60	1.30	1.20	1.10
27.....	1.00	1.32	1.60	1.60	1.30	1.20	1.10
28.....	1.00	1.30	1.60	1.55	1.30	1.20	1.10
29.....	1.00	1.20	1.65	1.55	1.30	1.20	1.10
30.....	1.00	1.20	1.75	1.55	1.30	1.20	1.10
31.....	1.00		1.85		1.30	1.20	

Daily discharge, in second-feet, of Ford Creek near Augusta, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	10	13	21	100	44	26	18
2.....	10	13	21	107	42	26	18
3.....	10	13	27	114	42	26	18
4.....	10	15	36	103	42	26	18
5.....	10	15	42	100	38	26	18
6.....	10	15	44	100	34	26	18
7.....	10	13	42	114	34	23	18
8.....	10	13	36	114	34	21	18
9.....	10	13	34	100	34	21	18
10.....	10	13	34	100	34	21	18
11.....	11	13	34	100	34	20	18
12.....	11	13	34	89	34	17	18
13.....	11	15	34	86	34	17	17
14.....	11	13	34	86	34	17	16
15.....	11	13	107	84	34	17	15
16.....	11	13	97	74	34	17	15
17.....	11	13	80	74	34	19	15
18.....	11	13	72	74	34	19	15
19.....	11	13	62	74	34	19	15
20.....	11	13	62	68	34	19	15
21.....	11	13	62	62	33	19	15
22.....	12	13	62	52	30	19	15
23.....	13	13	62	52	27	19	15
24.....	13	13	62	52	27	19	15
25.....	13	22	62	52	27	19	14
26.....	13	24	57	52	27	19	14
27.....	13	28	52	52	27	19	14
28.....	13	27	52	47	26	18	13
29.....	13	21	57	47	26	18	13
30.....	13	21	68	47	26	18	13
31.....	13		80		26	18	

NOTE.—Daily discharge Mar. 23 to July 27 determined from a rating curve fairly well defined; discharge July 28 to Sept. 30 determined by indirect method for shifting channels; discharge Mar. 1 to 22 estimated.

Monthly discharge of Ford Creek near Augusta, Mont., for 1911.

[Drainage area, 18 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....			<i>a</i> 10	0.556	0.64	615	D.
February.....			<i>a</i> 10	.556	.58	555	D.
March.....			<i>a</i> 11.3	.628	.72	695	C.
April.....	28	13	15.4	.856	.96	916	B.
May.....	107	21	52.5	2.92	3.37	3,230	B.
June.....	114	47	79.2	4.40	4.91	4,710	B.
July.....	44	26	32.9	1.83	2.11	2,020	B.
August.....	26	17	20.3	1.13	1.30	1,250	C.
September.....	18	13	16.0	.889	.99	952	C.
October.....			<i>a</i> 13	.722	.83	799	C.
November.....			<i>a</i> 10	.556	.62	595	D.
December.....			<i>a</i> 8	.444	.51	492	D.
The year.....			23.2	1.29	17.54	16,800	

a Estimated.**SMITH CREEK NEAR AUGUSTA, MONT.**

Location.—At a point 1 mile above J. W. Nixon's ranch, 16 miles southwest of Augusta, Mont.

Records available.—April 14, 1906, to December 31, 1911.

Drainage area.—26 square miles.

Gage.—Inclined staff fastened to a boulder on the left bank just above the ford.

Channel.—Shifts during high stages.

Discharge measurements.—Made by wading.

Winter flow.—Open entire year.

Diversions.—The ordinary summer flow of this creek is practically all used for irrigation, but no water is diverted above the gaging station.

Discharge measurements of Smith Creek near Augusta, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 16	J. C. Beebe.....	0.38	9.6	June 9	J. C. Beebe.....	1.25	131
Mar. 21	.....do.....	.48	13.4	24	B. E. Jones.....	.90	52
May 20	B. E. Jones.....	1.09	97	July 28	R. Richards.....	.56	23
June 7	J. C. Beebe.....	1.26	135	Oct. 27	W. A. Lamb.....	.44	12.3
7	.....do.....	1.26	127				

Daily gage height, in feet, of Smith Creek near Augusta, Mont., for 1911.

[Mrs. J. W. Nixon, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		0.5	0.7	1.75	0.8	0.5	0.5	0.6	0.35	0.45
2.		.5	.7	1.8	.8	.5	.5	.65	.55	.45
3.		.5	.7	1.7	.8	.5	.5	.7	.55	.45
4.		.5	.8	1.6	.75	.5	.55	.6	.55	.45
5.		.5	.9	1.4	.75	.5	.65	.6	.55	.45
6.		.5	1.0	1.3	.7	.5	.65	.6	.55	.4
7.		.5	.95	1.25	.7	.5	.7	.6	.55	.4
8.		.5	.9	1.35	.65	.5	.75	.6	.5	.4
9.		.5	.9	1.25	.65	.5	.75	.6	.5	.4
10.		.5	.9	1.2	.65	.5	.75	.6	.5	.4
11.	0.3	.5	.9	1.2	.65	.5	.8	.6	.5	.4
12.	.3	.5	.85	1.15	.65	.5	.8	.6	.5	.35
13.	.3	.5	.9	1.15	.65	.5	.75	.6	.5	.35
14.	.3	.5	.95	1.1	.65	.5	.75	.6	.5	.35
15.	.3	.5	2.4	1.1	.7	.5	.7	.6	.5	.35
16.	.3	.5	1.7	1.0	.7	.5	.7	.6	.5	.35
17.	.3	.5	1.45	1.0	.65	.5	.65	.6	.5	.35
18.	.3	.5	1.3	1.0	.65	.5	.65	.6	.5	.35
19.	.4	.5	1.2	1.0	.65	.5	.6	.6	.5	.35
20.	.45	.55	1.1	.9	.65	.5	.6	.6	.5	.35
21.	.5	.55	1.1	.9	.65	.5	.6	.6	.5	.35
22.	.5	.6	1.05	.9	.6	.5	.6	.6	.5	.35
23.	.5	.65	1.0	.85	.6	.5	.6	.6	.5	.35
24.	.5	.7	1.0	.9	.6	.5	.6	.6	.5	.35
25.	.5	.7	1.0	.9	.55	.5	.6	.6	.5	.35
26.	.5	.8	1.0	.9	.55	.5	.6	.6	.5	.35
27.	.5	.75	1.0	.85	.55	.5	.6	.6	.5	.35
28.	.5	.7	1.1	.85	.55	.5	.6	.6	.5	.35
29.	.5	.7	1.1	.85	.5	.5	.6	.6	.5	.35
30.	.5	.7	1.15	.8	.5	.5	.6	.55	.5	.35
31.	.5		1.5		.5	.5		.55		.35

Daily discharge, in second-feet, of Smith Creek near Augusta, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.	6	15	34	252	47	15	15	23	19	12
2.	6	15	34	264	47	15	15	28	19	12
3.	6	15	34	239	47	15	15	34	19	12
4.	6	15	47	214	40	15	19	23	19	12
5.	6	15	62	164	40	15	28	23	19	12
6.	6	15	80	141	34	15	28	23	19	9
7.	6	15	71	130	34	15	34	23	19	9
8.	6	15	62	152	28	15	40	23	15	9
9.	6	15	62	130	28	15	40	23	15	9
10.	6	15	62	119	28	15	40	23	15	9
11.	6	15	62	119	28	15	47	23	15	9
12.	6	15	54	108	28	15	47	23	15	7.5
13.	6	15	62	108	28	15	40	23	15	7.5
14.	6	15	71	98	28	15	40	23	15	7.5
15.	6	15	414	98	34	15	34	23	15	7.5
16.	6	15	239	80	34	15	34	23	15	7.5
17.	6	15	176	80	28	15	28	23	15	7.5
18.	6	15	141	80	28	15	28	23	15	7.5
19.	9	15	119	80	28	15	23	23	15	7.5
20.	12	19	98	62	28	15	23	23	15	7.5
21.	15	19	98	62	28	15	23	23	15	7.5
22.	15	23	89	62	23	15	23	23	15	7.5
23.	15	28	80	54	23	15	23	23	15	7.5
24.	15	34	80	62	23	15	23	23	15	7.5
25.	15	34	80	62	19	15	23	23	15	7.5
26.	15	47	80	62	19	15	23	23	15	7.5
27.	15	40	80	54	19	15	23	23	15	7.5
28.	15	34	98	54	19	15	23	23	15	7.5
29.	15	34	98	54	15	15	23	23	15	7.5
30.	15	34	108	47	15	15	23	19	15	7.5
31.	15		189		15	15		19		7.5

NOTE.—Daily discharge determined from a rating curve well defined below 165 second-feet. Discharge estimated Mar. 1 to 10.

Monthly discharge of Smith Creek near Augusta, Mont., for 1911.

[Drainage area, 26 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....			^a 10.0	0.385	0.44	615	C.
February.....			^a 8.0	.308	.32	444	D.
March.....	15		9.5	.365	.42	584	C.
April.....	47	15	21.0	.808	.90	1,250	B.
May.....	414	34	98.8	3.80	4.38	6,080	B.
June.....	264	47	110	4.23	4.72	6,550	B.
July.....	47	15	28.5	1.10	1.27	1,750	B.
August.....	15	15	15.0	.577	.67	922	B.
September.....	47	15	28.3	1.09	1.22	1,680	B.
October.....	34	19	23.3	.896	1.03	1,430	B.
November.....	19	15	15.9	.612	.68	946	B.
December.....	12	7.5	8.52	.328	.38	524	B.
The year.....	414		31.5	1.21	16.43	22,800	

^a Estimated.

MARIAS RIVER BASIN.

MARIAS RIVER NEAR SHELBY, MONT.

Location.—At the highway bridge near James A. Johnson's ranch, 7 miles south of Shelby, Mont.

Records available.—April 4, 1902, to June 30, 1906; March 21 to December 31, 1911.

Drainage area.—2,610 square miles.

Gages.—A standard chain gage fastened to the up-stream guardrail of the bridge was read during 1905-6; a Bristol automatic and a staff gage were set when the station was reestablished in 1911. The new gages are at practically the same datum as the old gage.

Channel.—Straight for 100 yards above and 200 yards below the station; right bank sandy, sloping, and liable to overflow; left bank high and protected by sheet piling and a plank wall. Bed composed of sand and gravel with some cobblestones. Liable to shift after freshets. Only one channel at all stages. Current is of moderate velocity and sets toward the left bank as it rounds a sharp curve some distance above.

Discharge measurements.—Made from highway bridge, lower chord of which is about 15 feet above low water.

Winter flow.—Affected by ice.

Discharge measurements of Marias River near Shelby, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 21	C. S. Heidel.....	^a 5.91	1,170	Aug. 14	J. C. Beebe.....	3.59	810
May 13	.....do.....	5.0	2,260	Oct. 3	C. S. Heidel.....	4.42	1,770
June 28 ^b	.....do.....	5.08	2,430	Oct. 18	B. E. Jones.....	3.96	1,120

^a Ice present.

^b New chain gage placed same datum as staff but different section.

Daily gage height, in feet, of Marias River near Shelby, Mont., for 1911.

[Orin Hughes, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		4.6	5.5	5.0	3.5	3.1	4.3	3.65	4.1
2.		4.6	6.05	4.8	3.7	3.1	4.4	3.6	4.0
3.		4.8	6.55	4.7	3.8	3.0	4.4	3.6	4.05
4.		5.0	6.7	4.6	3.8	3.8	4.4	3.6	4.05
5.		5.4	6.5	4.5	3.7	4.7	4.3	3.55	3.95
6.		5.8	6.2	4.4	3.6	6.5	4.2	3.55	3.95
7.		5.75	5.95	4.3	3.7	6.1	4.1	3.4	3.9
8.		5.6	5.95	4.2	3.7	5.4	4.1	3.3	3.95
9.		5.6	5.9	4.2	3.9	5.1	4.1	2.9	3.95
10.		5.5	5.7	4.1	3.8		4.0	2.7	
11.		5.3	5.7	4.0	3.9	5.0	3.9	2.9	
12.		5.2	5.75	3.9	3.8	5.1	3.8	3.3	3.8
13.		5.1	5.95	3.8	3.7		3.7	3.5	3.8
14.		5.2	5.95	3.8	3.6	5.0	3.7	3.8	3.85
15.		5.4	5.95	3.7	3.6	4.7	3.8	3.8	3.7
16.		6.95	5.9	3.8	3.5	4.5	4.0	3.85	3.7
17.		7.75	5.7	3.8	3.5	4.6	3.9	3.9	3.7
18.		7.25	5.45	3.7	3.4	4.5	3.95	4.1	3.75
19.		6.65	5.35	3.7	3.4	4.4	3.9	4.2	3.8
20.		6.15	5.25	3.7	3.3	4.3	3.9	4.3	3.9
21.		5.7	5.2	3.7	3.3	4.2	3.85		3.85
22.		5.7	5.35	3.7	3.2	4.3	3.85		3.8
23.	4.4	5.6	5.55		3.3		3.8	4.4	3.9
24.	4.35	5.55	6.1	3.6	3.4		3.8	4.5	3.85
25.	4.7	5.55	6.7	3.6	3.3		3.75	4.5	3.8
26.	5.0	5.45	6.35	3.5	3.3		3.7	4.4	3.7
27.	5.2	5.3	5.65	3.5	3.4	4.4	3.6	4.35	3.7
28.	5.05	5.2	5.1	3.4	3.4	4.5	3.6	4.2	
29.	5.05	5.15		3.4	8.3	4.4	3.7	4.2	
30.	4.7	5.15		3.4	3.2	4.4	3.7	4.1	
31.		5.25		3.4	3.2		3.65		

NOTE.—Gage heights Nov. 12 to 30 distorted by ice.

Daily discharge, in second-feet, of Marias River near Shelby, Mont., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		1,830	2,960	2,310	750	480	1,500	870
2.		1,830	3,730	2,070	910	480	1,610	830
3.		2,070	4,430	1,950	1,000	480	1,610	830
4.		2,310	4,640	1,830	1,000	1,000	1,610	830
5.		2,830	4,360	1,720	910	1,950	1,500	790
6.		3,380	3,940	1,610	830	4,360	1,390	790
7.		3,310	3,590	1,500	910	3,800	1,290	680
8.		3,100	3,590	1,390	910	2,830	1,290	610
9.		3,100	3,520	1,390	1,090	2,440	1,290	380
10.		2,960	3,240	1,290	1,000	2,380	1,190	300
11.		2,700	3,240	1,190	1,090	2,310	1,090	380
12.		2,570	3,310	1,090	1,000	2,440	1,000	370
13.		2,440	3,590	1,000	910	2,380	910	360
14.		2,570	3,590	1,000	830	2,310	910	350
15.		2,830	3,590	910	830	1,950	1,000	340
16.		4,990	3,520	1,000	750	1,720	1,190	330
17.		6,110	3,240	1,000	750	1,830	1,090	320
18.		5,410	2,900	910	680	1,720	1,140	310
19.		4,570	2,760	910	680	1,610	1,090	300
20.		3,870	2,640	910	610	1,500	1,090	290
21.		3,240	2,570	910	610	1,390	1,040	280
22.		3,240	2,760	910	540	1,500	1,040	270
23.	1,610	3,100	3,030	870	610	1,520	1,000	260
24.	1,560	3,030	3,800	830	680	1,540	1,000	250
25.	1,950	3,030	4,640	830	610	1,570	955	250
26.	2,310	2,900	4,150	750	610	1,590	910	250
27.	2,570	2,700	3,170	750	680	1,610	830	250
28.	2,380	2,570	2,440	680	680	1,720	830	250
29.	2,380	2,500	2,440	680	610	1,610	910	250
30.	1,950	2,500	2,310	680	540	1,610	910	250
31.		2,640		680	540		870	

NOTE.—Daily discharge determined from a rating curve well defined between 750 and 2,960 second-feet. Discharge estimated Nov. 12 to 30 and for days for which gage heights are missing.

Monthly discharge of Marias River near Shelby, Mont., for 1911.

[Drainage area, 2,610 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
April 23-30.....	2,570	1,560	2,090	0.801	0.24	33,200	A.
May.....	6,110	1,830	3,100	1.19	1.37	191,000	B.
June.....	4,640	2,310	3,390	1.30	1.45	202,000	B.
July.....	2,310	680	1,150	.441	.51	70,700	A.
August.....	1,090	540	779	.298	.34	47,900	A.
September.....	4,360	430	1,850	.709	.79	110,000	A.
October.....	1,610	830	1,130	.433	.50	69,500	A.
November.....	870	250	427	.164	.18	25,400	C.
December.....	.....	.....	a 250	.096	.11	15,400	D.
The period.....	.....	.....	.....	.....	.....	765,000	

a Estimated.

TWO MEDICINE RIVER AT FAMILY, MONT.

Location.—In the NE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 2, T. 31 N., R. 9 W., at the Holy Family Mission, 16 miles southeast of Browning, Mont., and about 6 miles above the mouth of Badger Creek, the nearest tributary.

Records available.—April, 1907, to December 31, 1911.

Drainage area.—368 square miles.

Gage.—Standard chain on the east bank of the stream directly back of the Mission buildings; datum of gage was lowered 0.95 foot July 21, 1908.

Channel.—Gravel.

Discharge measurements.—Low-water measurements made by wading at section near the gage; high-water measurements must be made from the old wagon bridge about 3 miles above the Mission.

Winter flow.—Affected by ice.

Diversions and storage.—Water is diverted at a point about 2 miles above the gage by a ditch which supplies water for about 100 acres of land on the farm at the Holy Family Mission. The United States Reclamation Service has under construction a project which will use about 200 second-feet of water for irrigating land north of the stream for the Blackfeet Indians. The water will be diverted near the mouth of Little Badger Creek, a small tributary entering from the south above the station. A storage reservoir will be built at Two Medicine Lake near the headwaters of the stream to augment the low-water flow.

Accuracy.—Results at this station are good except during the winter months.

Discharge measurements of Two Medicine River at Family, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
Jan. 1 ^a	B. E. Jones.....	<i>Feet.</i> 4.32	<i>Sec.-ft.</i> 53	June 12	B. E. Jones.....	<i>Feet.</i> 3.95	<i>Sec.-ft.</i> 1,400
Mar. 16	.....do.....	1.56	72	July 14	W. A. Lamb.....	2.25	324
May 11	.....do.....	3.63	1,170				

a Ice at gage.

Daily gage height, in feet, of Two Medicine River at Family, Mont., for 1911.

[Walter Owens, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	.....	2.3	3.2	3.8	2.95	1.9	1.7	2.5	1.8
2.....	.....	2.2	3.4	4.3	2.85	1.85	1.65	2.5	1.8
3.....	.....	2.1	3.6	4.5	2.8	1.9	1.6	2.55	1.8
4.....	.....	2.0	3.8	4.5	2.75	1.85	3.4	2.5	1.8
5.....	.....	1.9	4.3	4.2	2.7	1.85	3.6	2.4	1.75
6.....	.....	1.9	4.6	4.0	2.75	1.9	3.3	2.35	1.7
7.....	.....	1.95	3.9	4.0	2.65	1.95	3.15	2.3	1.75
8.....	2.5	2.0	4.0	3.9	2.6	1.95	3.0	2.25	1.8
9.....	1.5	2.05	4.2	3.7	2.6	2.0	3.05	2.2	1.75
10.....	1.4	2.25	3.6	3.7	2.5	2.1	3.1	2.15	1.75
11.....	1.9	2.2	3.45	3.8	2.4	2.0	3.2	2.15	1.8
12.....	2.3	2.1	3.5	4.0	2.35	1.95	3.15	2.2	.....
13.....	1.45	2.1	3.6	3.9	2.3	1.95	3.1	2.35	.....
14.....	1.5	2.0	3.7	4.0	2.25	1.95	3.0	2.25	.....
15.....	1.5	2.0	3.6	3.9	2.25	1.9	2.9	2.2	.....
16.....	1.6	2.2	6.8	3.8	2.2	1.85	2.95	2.2	.....
17.....	1.6	2.55	5.2	3.8	2.25	1.85	2.8	2.2	.....
18.....	1.6	2.75	4.6	3.5	2.25	1.8	2.65	2.15	.....
19.....	1.7	2.7	4.3	3.5	2.2	1.8	2.55	2.1	.....
20.....	1.8	3.1	4.0	3.45	2.15	1.85	2.45	2.0	.....
21.....	2.0	3.6	3.7	3.35	2.15	1.8	2.45	1.95	.....
22.....	2.2	3.8	3.8	3.4	2.1	1.8	2.6	1.95	.....
23.....	2.35	3.6	3.6	3.35	2.05	1.75	2.6	2.0	.....
24.....	2.6	3.4	3.5	3.45	1.9	1.75	2.65	2.05	.....
25.....	2.6	3.9	3.3	3.8	2.0	1.8	2.7	2.0	.....
26.....	2.25	4.2	3.3	3.3	1.95	1.8	2.75	1.95	.....
27.....	2.2	4.2	3.2	3.25	1.95	1.8	2.8	1.9	.....
28.....	2.0	3.5	3.3	3.2	1.8	1.75	2.65	1.85	.....
29.....	2.05	3.3	3.2	3.05	1.9	1.7	2.55	1.85	.....
30.....	2.25	3.15	3.3	3.05	1.85	1.6	2.5	1.9	.....
31.....	2.3	.....	3.35	.....	1.95	1.7	.....	1.85	.....

NOTE.—Gage heights distorted by ice Mar. 8 to 12.

Daily discharge, in second-feet, of Two Medicine River at Family, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	50	325	855	1,320	988	167	107	425	135
2.....	50	280	1,000	1,770	625	151	96	425	135
3.....	51	240	1,150	1,950	595	167	84	452	135
4.....	51	202	1,320	1,950	565	151	1,000	425	135
5.....	52	167	1,770	1,680	535	151	1,150	375	121
6.....	52	167	2,040	1,490	565	167	925	350	107
7.....	53	184	1,400	1,490	508	184	820	325	121
8.....	54	202	1,490	1,400	480	184	720	302	135
9.....	55	221	1,680	1,230	480	202	752	280	121
10.....	56	302	1,150	1,230	425	240	785	260	121
11.....	57	280	1,040	1,320	375	202	855	260	135
12.....	58	240	1,080	1,490	350	184	820	280	.....
13.....	58	240	1,150	1,400	325	184	785	350	.....
14.....	65	202	1,230	1,490	302	184	720	302	.....
15.....	65	202	1,150	1,400	302	167	655	280	.....
16.....	84	280	4,140	1,320	280	151	688	280	.....
17.....	84	452	2,620	1,320	302	151	595	280	.....
18.....	84	565	2,040	1,080	302	135	508	260	.....
19.....	107	535	1,770	1,080	280	135	452	240	.....
20.....	135	785	1,490	1,040	260	151	400	202	.....
21.....	202	1,150	1,230	962	260	135	400	184	.....
22.....	280	1,320	1,320	1,000	240	135	480	184	.....
23.....	350	1,150	962	962	221	121	480	202	.....
24.....	480	1,000	1,080	1,040	167	121	508	221	.....
25.....	480	1,400	925	1,320	202	135	535	202	.....
26.....	302	1,680	925	925	184	135	565	184	.....
27.....	280	1,680	855	890	184	135	595	167	.....
28.....	202	1,060	925	855	135	121	508	151	.....
29.....	221	925	855	752	167	107	452	151	.....
30.....	302	820	925	752	151	84	425	167	.....
31.....	325	.....	962	.....	184	107	.....	151	.....

NOTE.—Daily discharge determined from a well-defined rating curve. Discharges Mar. 1 to 12 estimated.

Monthly discharge of Two Medicine River at Family, Mont., for 1911.

[Drainage area, 368 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....	.....	.....	50	0.136	0.16	3,070	C.
February.....	.....	.....	50	.136	.14	2,780	C.
March.....	480	.....	153	.416	.48	9,410	B.
April.....	1,680	167	609	1.65	1.84	36,200	A.
May.....	4,140	855	1,380	3.75	4.32	84,800	B.
June.....	1,950	752	1,260	3.42	3.82	75,000	A.
July.....	988	135	353	.959	1.11	21,700	A.
August.....	240	84	153	.416	.48	9,410	A.
September.....	1,150	84	596	1.62	1.81	35,500	A.
October.....	452	151	268	.728	.84	16,500	A.
November.....	.....	.....	120	.326	.36	7,140	C.
December.....	.....	.....	90	.244	.28	5,530	D.
The year.....	4,140	.....	424	1.15	15.64	307,000	

NOTE.—Means for January, February, and December, estimated; mean for period Nov. 12-30 estimated at 115 second-feet.

BADGER CREEK NEAR FAMILY, MONT.

Location.—In the NE. $\frac{1}{4}$ sec. 19, T. 31 N., R. 8 W., near the road crossing, 4 miles east of Family, Mont.

Records available.—April 20, 1907, to December 31, 1911.

Drainage area.—224 square miles.

Gage.—Chain. The original staff gage established April 20, 1907, and bench marks were washed out in June, 1908, and a new gage was established July 22, 1908, about 400 feet farther upstream and at a different datum; as the bench mark was also destroyed the relation between the two gages could not be determined. The gage was again washed out on May 25, 1909, and was reset at a different datum and 400 feet below the old Piegan Mission crossing.

Channel.—Two channels at both medium and low stages; at high stages the stream flows in several channels.

Discharge measurements.—High-water measurements made from a cable 4 miles above the gage; low-water measurements can be made by wading at the ford above the gage.

Diversions.—The United States Reclamation Service proposes to divert the natural flow of Badger Creek to irrigate land in the eastern part of the Blackfeet Indian Reservation north of Birch Creek.

Accuracy.—High-water measurements are only fair; low-water records are, however, good.

Discharge measurements of Badger Creek near Family, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 1 ^a	B. E. Jones.....	3.8	30	June 27	W. A. Lamb.....	4.79	557
Mar. 16 ^a	.....do.....	5.52	73	July 14	.....do.....	4.24	269
May 11	.....do.....	4.80	576	Aug. 30	B. E. Jones.....	3.86	146
June 11	.....do.....	5.07	809	Oct. 16	.....do.....	4.47	368

^a Ice measurement.

Daily gage height, in feet, of Badger Creek near Family, Mont., for 1911.

[Oliver J. Racine, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		3.85	4.55	5.2		4.1	3.9	4.7	4.2
2.		3.85	4.7	5.35	4.7	4.1	3.95	4.7	4.2
3.		3.85	4.75	5.4		4.1	4.0	4.7	4.2
4.		3.85	4.85	5.3		4.15	4.3	4.6	4.2
5.		3.85	4.85	5.15	4.55		4.95	4.6	4.2
6.		3.8	4.95	5.1	4.5	4.1	4.85	4.6	4.2
7.		3.75	5.0	5.15	4.5	4.1	4.85	4.6	4.25
8.		3.75	5.0	5.1	4.45	4.1	4.85	4.5	4.3
9.		3.75	5.0	5.1	4.4	4.1	4.85	4.45	4.3
10.		3.8	4.85	5.1	4.35	4.1	4.85	4.4	4.4
11.		3.9	4.8	5.15	4.4	4.1	4.9	4.45	4.4
12.		3.9	4.8	5.1	4.4	4.1	4.85	4.5	
13.		3.85	4.85	5.15	4.35	4.1	4.9	4.6	
14.		3.85	4.9	5.2	4.3	4.1	4.85	4.6	
15.		3.85	5.1	5.05	4.3	4.05	4.8	4.5	
16.		3.9	5.35	5.0	4.25	4.05	4.75	4.5	
17.		3.95	5.25	4.95	4.25	4.0	4.7	4.25	
18.		4.0	5.15	4.9	4.25	3.95	4.65	4.3	
19.	3.9	4.15	5.0	4.85	4.2	3.9	4.6	4.4	
20.	3.9	4.25	4.95	4.85	4.2	3.95	4.65	4.4	
21.	4.0	4.5	4.95	4.8	4.2	3.9	4.7	4.4	
22.	4.0	4.55	5.0	4.8	4.2	3.9	4.7	4.4	
23.	3.95	4.7	5.0	4.85	4.15	3.9	4.7	4.35	
24.	3.95	4.7	4.95	5.0	4.15	3.9	4.7	4.3	
25.	3.9	4.75	4.85	4.95	4.1	3.9	4.65	4.3	
26.	3.85	4.9	4.8	4.9	4.1	3.9	4.65	4.2	
27.	3.85	4.85	4.75	4.85	4.05	3.9	4.65	4.2	
28.	3.9	4.75	4.7	4.8	4.05	3.9	4.65	4.2	
29.	3.9	4.65	4.65	4.75	4.05	3.9	4.65	4.2	
30.	3.85	4.55	4.75	4.8	4.05	3.9	4.7	4.2	
31.	3.85		4.95		4.1	3.9		4.2	

NOTE.—Gage heights distorted by ice Mar. 19 to 31 and Nov. 7 to 11.

Daily discharge, in second-feet, of Badger Creek near Family, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.	25	150	412	905	532	215	160	500
2.	28	150	500	1,060	500	215	172	500
3.	31	180	532	1,120	470	215	185	500
4.	34	150	600	1,010	440	232	290	440
5.	37	150	600	855	412	224	675	440
6.	40	140	675	805	385	215	600	440
7.	43	132	715	855	385	215	600	440
8.	46	132	715	805	360	215	600	385
9.	49	132	715	805	335	215	600	360
10.	52	140	600	805	312	215	600	335
11.	55	160	565	855	335	215	635	360
12.	58	160	565	805	335	215	600	385
13.	61	150	600	855	312	215	635	440
14.	65	150	635	905	290	215	600	440
15.	69	150	805	760	290	200	565	385
16.	73	160	1,060	715	270	200	532	385
17.	78	172	958	675	270	185	500	270
18.	83	185	855	635	270	172	470	290
19.	88	232	715	600	250	160	440	335
20.	93	270	675	600	250	172	470	335
21.	98	385	675	565	250	160	500	335
22.	103	412	715	565	250	160	500	335
23.	108	500	715	600	232	160	500	312
24.	113	500	675	715	232	160	500	290
25.	118	532	600	675	215	160	470	290
26.	123	635	565	635	215	160	470	260
27.	128	600	532	600	200	160	470	250
28.	133	532	500	565	200	160	470	250
29.	138	470	470	532	200	160	470	250
30.	142	412	532	565	200	160	500	250
31.	146		675		215	160		250

NOTE.—Daily discharge determined from a rating curve well defined between 140 and 900 second-feet. Discharges estimated Mar. 1 to 31.

Monthly discharge of Badger Creek near Family, Mont., for 1911.

[Drainage area, 224 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accu- racy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....			a 30	0.134	0.15	1,840	D.
February.....			a 25	.112	.12	1,390	D.
March.....	146	25	a 79.0	.353	.41	4,860	C.
April.....	635	132	273	1.22	1.36	16,200	B.
May.....	1,060	412	650	2.90	3.34	40,000	B.
June.....	1,120	532	748	3.34	3.72	44,500	B.
July.....	532	200	304	1.36	1.57	18,700	B.
August.....	232	160	190	.848	.98	11,700	B.
September.....	675	160	493	2.20	2.46	29,300	B.
October.....	500	250	356	1.59	1.83	21,900	B.
November.....			a 175	.781	.87	10,400	D.
December.....			a 75	.335	.39	4,610	D.
The year.....	1,120		284	1.27	17.22	205,000	

a Estimated.

CUTBANK CREEK AT CUTBANK, MONT.

Location.—In the SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 1, T. 33 N., R. 6 W., half a mile west of Cutbank, at the Great Northern Railway bridge, and 12 miles above the mouth of Two Medicine River.

Records available.—August 4, 1905, to December 31, 1911.

Drainage area.—971 square miles.

Gage.—Chain on left bank; moved upstream 200 yards August 31, 1911. New datum.

Channel.—Gravel; shifts in flood.

Discharge measurements.—At high stages made from a cable 100 yards below the gage; low-stage measurements made by wading.

Winter flow.—Affected by ice.

Diversions.—The intake of the Great Northern Railway's pumping station is located 100 feet below the gage; the average quantity pumped is about 14,000 gallons an hour for 18 hours a day, equivalent to a continuous flow of 0.4 second-foot.

Accuracy.—Results as a whole are good.

Discharge measurements of Cutbank Creek at Cutbank, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
Jan. 6	B. E. Jones.....	<i>Feet.</i> (a)	<i>Sec.-ft.</i> 15.6	Aug 3	John C. Beebe.....	<i>Feet.</i> 3.52	<i>Sec.-ft.</i> 208
Mar. 18	.....do.....	3.33	56	Aug. 31 ^b	B. E. Jones.....	4.15	59
May 12	.....do.....	3.65	337	Sept. 24	W. A. Lamb.....	4.78	279
12	.....do.....	3.65	342	Oct. 17	B. E. Jones.....	4.41	122
June 13	.....do.....	4.00	709	Dec. 10	.....do.....	a 4.75	64

a Ice.

b New gage established; new datum.

Daily gage height, in feet, of Cutbank Creek at Cutbank, Mont., for 1911.

[Chas. Ferres, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		3.56	3.51	3.76	3.94	3.30	4.15	4.58	4.40
2.....		3.46	3.54	3.96	3.82	3.27	4.12	4.55	4.50
3.....		3.36	3.54	4.15	3.74	3.42	4.12	4.60	4.62
4.....		3.21	3.56	4.20	3.66	3.37	4.38	4.58	4.62
5.....		3.21	3.56	4.15	3.64	3.34	5.25	4.52	4.48
6.....		3.31	3.66	3.98	3.64	3.34	5.55	4.50	4.50
7.....		3.26	3.86	3.88	3.59	3.47	5.55	4.50	4.30
8.....		3.36	3.81	3.94	3.59	3.44	5.20	4.50	
9.....		3.31	3.71	3.96	3.56	3.47	4.95	4.45	
10.....		3.51	3.76	3.86	3.52	3.47	4.82	4.45	
11.....		3.56	3.66	3.86	3.46	3.47	4.80	4.45	
12.....		3.46	3.66	3.96	3.44	3.47	4.78	4.42	
13.....		3.36	3.66	4.00	3.44	3.4	4.80	4.40	
14.....		3.26	3.71	3.97	3.44	3.32	4.80	4.40	
15.....		3.16	3.86	3.95	3.36	3.32	4.80	4.40	
16.....		3.16	4.45	3.95	3.38	3.30	4.78	4.40	
17.....	3.36	3.24	4.70	3.85	3.43	3.23	4.72	4.40	
18.....	3.31	3.36	4.35	3.83	3.48	3.21	4.70	4.40	
19.....	3.41	3.38	4.10	3.80	3.51	3.19	4.62	4.40	
20.....	3.51	3.31	3.94	3.75	3.41	3.16	4.60	4.40	
21.....	3.54	3.36	3.86	3.75	3.35	3.11	4.60	4.38	
22.....	3.68	3.54	3.81	3.85	3.33	3.11	4.60	4.35	
23.....	3.76	3.61	3.86	3.85	3.33	3.13	4.70	4.35	
24.....	3.56	3.61	3.81	4.15	3.33	3.11	4.75	4.42	
25.....		3.66	3.76	5.35	3.31	3.11	4.80	4.48	
26.....		3.64	3.76	4.30	3.28	3.13	4.75	4.40	
27.....	4.05	3.66	3.76	4.00	3.23	3.16	4.75	4.50	
28.....	4.15	3.68	3.74	4.30	3.23	3.16	4.70	4.52	
29.....	3.66	3.66	3.68	3.95	3.23	3.11	4.68	4.40	
30.....	3.71	3.66	3.66	3.86	3.23	3.09	4.60	4.38	
31.....	3.71		3.64		3.25	3.03		4.30	

NOTE.—Gage heights distorted by ice Nov. 1 to 7.

Daily discharge in second-feet of Cutbank Creek at Cutbank, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		290	260	423	630	120	58	182
2.....		230	276	655	488	110	52	171
3.....		182	276	910	402	170	52	190
4.....		120	290	980	326	148	112	182
5.....		120	290	910	309	136	621	160
6.....		158	356	680	309	136	949	152
7.....		138	530	557	268	195	949	152
8.....		182	480	630	268	180	572	152
9.....		158	394	655	249	195	379	135
10.....		260	436	534	223	195	298	135
11.....		290	356	534	190	195	286	135
12.....		230	356	655	180	195	276	125
13.....		182	326	705	180	160	286	118
14.....		138	370	668	180	128	286	118
15.....		102	534	642	144	128	286	118
16.....		102	1,330	642	152	120	276	118
17.....	182	130	1,700	522	175	98	244	118
18.....	158	182	1,190	500	200	91	234	118
19.....	206	194	840	465	216	86	199	118
20.....	260	158	630	412	165	78	190	118
21.....	276	182	534	412	140	66	190	112
22.....	374	276	476	522	132	66	190	104
23.....	436	322	534	522	132	70	234	104
24.....	290	322	476	910	132	66	260	125
25.....	440	290	423	2,680	124	66	286	145
26.....	590	342	423	1,120	114	70	260	118
27.....	736	356	423	705	98	78	260	152
28.....	860	374	402	1,120	98	78	234	160
29.....	356	356	343	642	98	66	225	118
30.....	394	290	326	534	98	61	190	112
31.....	394		309		104	50		90

NOTE.—Daily discharge determined as follows: Indirect method for shifting channel used to May 12; May 13 to Aug. 31, from a fairly well-defined curve; Sept. 1 to Nov. 7 (new location), from a poorly defined curve.

Monthly discharge of Cutbank Creek at Cutbank, Mont., for 1911.

[Drainage area, 971 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accu- racy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....			16.0	0.016	0.02	984	D.
February.....			16.0	.016	.02	889	D.
March.....	860		231	.238	.27	14,200	C.
April.....	374	102	222	.228	.25	13,200	C.
May.....	1,700	260	513	.528	.61	31,500	C.
June.....	2,680	412	728	.750	.84	43,300	C.
July.....	630	98	210	.216	.25	12,900	B.
August.....	195	50	116	.119	.14	7,130	B.
September.....	949	52	298	.307	.34	17,700	C.
October.....	190	90	134	.138	.16	8,240	C.
November.....			75	.077	.09	4,460	D.
December.....			50	.052	.06	3,070	D.
The year.....	2,680		218	.224	3.05	158,000	

NOTE.—Means for January, February, November and December estimated; mean for period Mar. 1 to 16 estimated at 75 second-feet.

BIRCH CREEK NEAR DUPUYER, MONT.

Location.—In sec. 28, T. 29 N., R. 8 W., at Shield's ranch, 12 miles northwest of Dupuyer, Mont., and about 25 miles above the junction of Birch Creek with Two Medicine River.

Records available.—July 25, 1907, to December 31, 1911.

Drainage area.—155 square miles.

Gage.—A temporary staff gage was put in July 23, 1908, about 200 feet below the site of the original gage, which had been washed out by the high water of June, 1908. The temporary gage was used until October 1, 1908, when a permanent chain gage was installed at a point about one-fourth mile farther upstream.

Channel.—Shifts at high stages.

Discharge measurements.—Made from a car and cable three-fourths mile below the gage. At low stages measurements are made by wading just below the cable section.

Winter flow.—Affected by ice.

Diversions.—A number of ditches divert water for irrigation. The largest of these, owned by the Conrad Investment Co., diverts water about half a mile below the station.

Discharge measurements of Birch Creek near Dupuyer, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 23	C. S. Heidel.....	(a)	36	Aug. 5	R. Richards.....	4.70	148
Mar. 18	do.....	(a)	52	Oct. 6	Heideland Templeton	5.02	228
May 12	do.....	5.33	299	Oct. 10	C. S. Heidel.....	4.96	201
June 27	do.....	5.57	425	Dec. 1	R. M. Templeton....	4.68	142

^a Ice measurement. Not made at regular section.

Daily gage height, in feet, of Birch Creek near Dupuyer, Mont., for 1911.

[L. G. Kepple, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.39	4.95	5.90	5.40	4.65	4.45	5.10	4.70	4.70
2	4.39	4.95	6.35	5.25	4.80	4.45	5.10	4.70	4.55
3	4.32	5.05	6.25	5.25	4.70	4.45	5.05	4.65	4.55
4	4.32	5.25	6.15	5.10	4.80	4.45	5.05	4.65	4.50
5	4.32	5.60	5.85	5.05	4.70	4.50	5.10	4.70	4.60
6	4.32	5.85	5.70	5.05	4.70	4.75	5.10	4.65	4.55
7	4.32	5.60	5.75	5.10	4.70	5.50	5.00	4.65	4.55
8	4.39	5.55	5.85	5.70	4.70	5.55	5.00	4.60	4.55
9	4.39	5.50	5.85	5.55	4.75	5.65	5.00	4.50	4.50
10	4.39	5.50	5.85	5.20	4.70	5.70	5.00	4.45	4.60
11	4.39	5.40	5.75	4.95	4.70	5.85	5.00	4.35	4.55
12	4.32	5.35	5.75	4.80	4.65	5.90	5.10	4.30	4.55
13	4.32	5.35	5.60	4.80	4.60	5.85	5.10	4.30	4.55
14	4.39	5.25	5.75	4.80	4.60	5.65	5.00	5.05	4.55
15	4.39	5.85	5.70	4.80	4.60	5.55	4.95	5.05	4.60
16	4.39	6.4	5.70	4.80	4.60	5.45	4.95	5.00	4.60
17	4.39	6.2	5.70	4.75	4.60	5.40	4.95	5.10	4.60
18	4.55	6.1	5.55	4.95	4.60	5.35	4.95	5.15	4.30
19	4.60	5.90	5.25	4.90	4.60	5.25	4.90	5.20	4.30
20	4.70	5.75	5.10	4.85	4.60	5.30	4.90	4.70	4.65
21	5.05	5.70	.....	4.80	4.55	5.25	4.85	4.65	4.60
22	5.20	5.60	.....	4.80	4.60	5.20	4.85	4.60	4.60
23	5.10	5.60	.....	4.90	4.55	5.20	4.90	4.60	4.65
24	5.05	5.55	.....	4.85	4.55	5.20	4.95	4.60	4.65
25	5.10	5.55	.....	4.75	4.55	5.20	4.80	4.60	4.25
26	5.35	5.50	5.55	4.75	4.55	5.15	4.95	4.60	5.00
27	5.50	5.35	5.55	4.70	4.55	5.20	4.70	4.60	5.00
28	5.40	5.25	5.55	4.70	4.50	5.15	4.70	4.60	5.00
29	5.10	5.35	5.50	4.70	4.50	5.15	4.70	4.60	5.25
30	5.05	5.40	5.50	4.70	4.50	5.15	4.70	4.60	5.20
31	.....	5.70	.....	4.70	4.45	.....	4.70	.....	5.55

NOTE.—Gage heights distorted by ice Nov. 14 to 19 and Dec. 17 to 31.

Daily discharge, in second-feet, of Birch Creek near Dupuyer, Mont., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	101	202	533	338	140	109	240	148	148
2	101	202	728	286	168	109	240	148	134
3	92	227	683	286	148	109	227	140	124
4	92	286	640	240	168	109	227	140	116
5	92	413	512	227	148	116	240	148	131
6	92	512	452	227	148	158	240	140	124
7	92	413	472	240	148	375	214	140	124
8	101	394	512	452	148	394	214	131	124
9	101	375	512	394	158	432	214	116	116
10	101	375	512	270	148	452	214	109	131
11	101	338	472	202	148	512	214	96	124
12	92	320	472	168	140	533	240	89	124
13	92	320	413	168	131	512	240	89	124
14	101	286	472	168	131	432	214	98	124
15	101	512	452	168	131	394	202	106	131
16	101	750	452	168	131	356	202	115	131
17	101	661	452	158	131	338	202	123	131
18	124	618	394	202	131	320	202	132	120
19	131	533	286	190	131	286	190	140	120
20	148	472	240	179	131	303	190	148	120
21	227	452	271	168	124	286	179	140	110
22	270	413	299	168	131	270	179	131	110
23	240	413	327	190	124	270	190	131	110
24	227	394	355	179	124	270	202	131	110
25	240	394	375	158	124	270	168	131	110
26	320	375	394	158	124	255	202	131	100
27	375	320	394	148	124	270	148	131	100
28	338	286	394	148	116	255	148	131	100
29	240	320	375	148	116	255	148	131	100
30	227	338	375	148	116	255	148	131	100
31	.....	452	.....	148	109	.....	148	.....	100

NOTE.—Daily discharge determined from a rating curve fairly well defined below 500 second-feet; discharge interpolated June 21 to 25, Nov. 14 to 19, and Dec. 2; discharge estimated Dec. 17 to 31.

Monthly discharge of Birch Creek near Dupuyer, Mont., for 1911.

[Drainage area, 155 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....			a 50	0.323	0.37	3,070	D.
February.....			a 35	.226	.24	1,940	C.
March.....			a 55	.355	.41	3,380	C.
April.....	375	92	159	1.03	1.15	9,460	B.
May.....	750	202	399	2.57	2.96	24,500	B.
June.....	728	240	440	2.84	3.17	26,200	B.
July.....	452	148	209	1.35	1.56	12,900	B.
August.....	168	109	135	.871	1.00	8,300	B.
September.....	533	109	300	1.94	2.16	17,900	B.
October.....	240	148	201	1.30	1.50	12,400	B.
November.....	148	89	127	.819	.91	7,560	B.
December.....	148		105	.677	.78	6,460	C.
The year.....	750		186	1.20	16.21	134,000	

a Estimated.

DUPUYER CREEK AT DUPUYER, MONT.

Location.—In SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 10, T. 28 N., R. 7 W., at the highway bridge in the town of Dupuyer, Mont.

Records available.—April 15, 1908, to December 31, 1911.

Drainage area.—Not measured.

Gage.—The original staff gage was nailed to the cribbing under the east end of the highway bridge. The gage was washed out July 28, 1909, and was replaced September 20, 1909, gage readings being reduced to the original datum. In the spring of 1909 a breakwater was constructed on the left (west) bank which deflected the water to the opposite site. A new gage was installed April 25, 1910, at the same site and the original datum, but owing to changes in the channel, the gage records for 1910 and 1911 are not directly comparable with those for earlier years.

Channel.—Shifts at high stages.

Discharge measurements.—Made from downstream side of highway bridge at high stages; low-stage measurements are made by wading.

Winter flow.—Affected by ice.

Accuracy.—Frequent measurements are necessary at this station to insure good results as conditions in the channel are unfavorable.

Discharge measurements of Dupuyer Creek at Dupuyer, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
Feb. 23	C. S. Heidel.....	<i>Feet.</i> (a)	<i>Sec.-ft.</i> 2.3	Oct. 6	Heidel and Templeton.....	<i>Feet.</i> 1.5	88
Mar. 17	.....do.....	a 2.6	30	10	C. S. Heidel.....	1.45	75
May 12	.....do.....	1.10	43	Dec. 1	R. M. Templeton.....	a 2.6	55
June 27	.....do.....	1.5	88				
Aug. 5	R. Richards.....	1.38	62				

a Ice conditions.

Daily gage height, in feet, of Dupuyer Creek at Dupuyer, Mont., for 1911.

[John Pfeiffer, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.0	1.0	1.4	-----	1.3	1.2	1.5	1.3	2.6
2.....	1.0	1.0	1.5	1.5	1.6	1.2	1.5	1.3	2.6
3.....	1.95	1.1	1.6	1.5	1.5	1.2	1.5	1.3	2.6
4.....	1.0	1.1	1.6	1.4	1.4	1.75	1.5	1.3	2.6
5.....	1.05	1.1	1.5	1.4	1.5	2.0	1.5	1.3	2.6
6.....	1.0	1.1	1.5	1.4	1.5	2.0	1.5	1.3	2.2
7.....	1.0	1.1	1.5	1.5	1.5	2.0	1.5	1.4	1.6
8.....	1.05	1.1	1.4	1.4	1.5	2.0	1.5	1.4	1.6
9.....	1.0	1.1	1.8	1.4	1.5	2.0	1.5	1.4	1.6
10.....	1.0	1.1	1.8	1.4	1.4	1.9	1.5	1.5	1.6
11.....	.9	1.1	1.7	1.4	1.4	1.9	1.5	1.5	1.7
12.....	.9	1.1	1.8	1.3	1.4	1.9	1.4	1.5	1.8
13.....	1.0	1.1	1.7	1.3	1.4	1.9	1.4	1.5	1.8
14.....	1.0	1.1	1.6	1.3	1.4	1.9	1.4	1.6	1.9
15.....	1.0	1.3	1.6	1.3	1.3	1.8	1.4	1.7	1.9
16.....	1.0	1.3	1.5	1.3	1.3	1.7	1.4	1.7	1.9
17.....	1.0	1.4	1.5	1.3	1.2	1.7	1.4	1.7	1.9
18.....	1.0	1.5	1.6	1.4	1.2	1.6	1.4	1.7	1.9
19.....	1.0	1.6	1.5	1.4	1.2	1.6	1.4	1.7	2.0
20.....	1.05	1.6	1.5	1.3	1.2	1.6	1.4	1.8	2.0
21.....	1.1	1.5	1.5	1.3	1.2	1.6	1.4	1.9	1.9
22.....	1.1	1.5	1.4	1.3	1.2	1.6	1.4	2.0	1.9
23.....	1.0	1.6	1.5	1.3	1.2	1.6	1.4	2.0	1.9
24.....	1.0	1.6	1.6	1.3	1.2	1.6	1.3	2.0	1.9
25.....	1.1	1.6	1.6	1.3	1.2	1.6	1.3	2.0	1.9
26.....	1.1	1.6	1.6	1.3	1.2	1.6	1.3	2.3	1.8
27.....	1.1	1.5	1.6	1.2	1.2	1.6	1.2	2.3	1.8
28.....	1.1	1.4	1.6	1.2	1.2	1.6	1.2	2.4	1.8
29.....	1.1	1.4	1.6	1.2	1.2	1.5	1.3	2.5	1.8
30.....	1.1	1.5	1.6	1.2	1.2	1.5	1.3	2.6	1.8
31.....	-----	1.4	-----	1.2	1.2	-----	1.3	-----	1.8

NOTE.—Gage heights, Nov. 7 to Dec. 31, distorted by ice.

Daily discharge, in second-feet, of Dupuyer Creek at Dupuyer, Mont., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	33	33	83	97	54	42	86	54
2.....	33	33	105	86	108	42	86	54
3.....	28	43	130	86	86	42	86	54
4.....	33	43	128	68	68	150	86	54
5.....	38	43	102	68	86	234	86	54
6.....	33	43	101	68	86	234	86	54
7.....	33	43	101	86	86	234	86	-----
8.....	38	42	79	68	86	234	86	-----
9.....	33	42	186	68	86	234	86	-----
10.....	33	42	185	68	68	199	86	-----
11.....	24	42	152	68	68	199	86	-----
12.....	24	42	183	54	68	199	68	-----
13.....	33	42	150	54	68	199	68	-----
14.....	33	42	121	54	68	199	68	-----
15.....	33	68	120	54	54	166	68	-----
16.....	33	68	96	54	54	135	68	-----
17.....	33	87	95	54	42	135	68	-----
18.....	33	110	118	68	42	108	68	-----
19.....	33	136	93	68	42	108	68	-----
20.....	38	136	92	54	42	108	68	-----
21.....	43	110	92	54	42	108	68	-----
22.....	43	110	72	54	42	108	68	-----
23.....	33	135	90	54	42	108	68	-----
24.....	33	135	112	54	42	108	54	-----
25.....	43	134	111	54	42	108	54	-----
26.....	43	134	110	54	42	108	54	-----
27.....	43	107	108	42	42	108	42	-----
28.....	43	84	108	42	42	108	42	-----
29.....	43	83	108	42	42	86	54	-----
30.....	43	106	108	42	42	86	54	-----
31.....	-----	83	-----	42	42	-----	54	-----

NOTE.—Daily discharge determined as follows: Apr. 1 to May 5, from rating curve fairly well defined; June 27 to Nov. 11, from curve fairly well defined between 5 and 100 second-feet. Indirect method for shifting channels used May 6 to June 26.

Monthly discharge of Dupuyer Creek at Dupuyer, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			<i>a</i> 10	615	D.
February.....			<i>a</i> 5	278	D.
March.....			<i>a</i> 20	1,230	D.
April.....	43	24	35.4	2,110	C.
May.....	136	33	77.5	4,770	C.
June.....	186	72	115	6,840	C.
July.....	97	42	60.6	3,730	B.
August.....	108	42	58.9	3,620	B.
September.....	234	42	141	8,390	B.
October.....	86	42	70	4,300	B.
November.....			<i>a</i> 40	2,380	D.
December.....			<i>a</i> 20	1,230	D.
The year.....			54.4	39,500	

a Estimated.

DRY FORK OF MARIAS RIVER NEAR VALIER, MONT.

Location.—In the SW. $\frac{1}{4}$ sec. 36, T. 29 N., R. 5 W., about 9 miles southeast of Valier and 5 miles south of the dam of the Lake Francis Reservoir.

Records available.—March 19, 1911, to December 31, 1911.

Drainage area.—About 120 square miles.

Gages.—Bristol automatic and an inclined staff gage on the left bank. The Bristol gage has a range of 8 feet.

Channel.—Shifting; bed of stream composed of sand and gravel.

Discharge measurements.—At low and medium stages made by wading; during high stages it may be necessary to use floats.

Winter flow.—Affected by ice.

Diversions.—Appropriations amounting to nearly 1,200 second-feet have been filed on Dry Fork and its branches.

Discharge measurements of Dry Fork of Marias River near Valier, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 16	C. S. Heidel.....	<i>a</i> 2.60	32	Sept. 7	R. M. Templeton....	3.30	<i>b</i> 228
19	do.....	<i>a</i> 3.30	153	Oct. 5	C. S. Heidel.....	2.60	58
May 11	do.....	1.47	0.99	9	do.....	2.20	17.9
June 27	do.....	1.74	9.8	9	do.....	2.20	18.7
Aug. 5	R. Richards.....	1.74	10.3	Nov. 24	R. M. Templeton....	<i>a</i> 2.50	28.0

a Ice present.

b Float measurement.

Daily gage height, in feet, of Dry Fork of Marias River near Valier, Mont., for 1911.

[W. R. Hunt, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		1.9	1.6		1.6	0.9	1.15	2.2	2.2	2.2
2.		1.9	1.6		1.9	1.7	1.15	2.2	2.2	2.2
3.			1.6		1.9	2.75	1.15	3.2	2.1	2.3
4.			1.6	1.5	1.65	2.4	1.6	3.2	2.1	2.3
5.			1.6	1.5	1.55	1.9	3.8	2.9	2.4	2.2
6.			1.6	1.6	1.4	1.7	4.3	2.4	2.2	2.2
7.			1.6	1.7	1.3	1.9	3.3	2.2	2.2	2.2
8.			1.6	1.9	1.2	2.0	3.8	2.2	2.3	2.2
9.		1.8	1.6	1.8	1.15	1.9	2.8	2.2	2.1	2.2
10.		1.8	1.6	1.6	1.1	2.0	2.6	2.2	2.2	2.2
11.		1.7	1.47	1.5	1.0	1.9	2.5	2.1	2.2	2.2
12.		1.8		1.5	.9	1.8	2.4	2.1	2.2	2.2
13.		1.8		1.5	.9	1.6	2.4	2.2	2.3	2.2
14.		1.7		1.5	.9	1.55	2.35	2.2	2.2	2.2
15.		1.7	4.0	1.5	.9	1.5	2.3	2.2	2.2	2.2
16.	2.6	1.6		1.5	.9	1.45	2.25	2.2	2.2	2.2
17.		1.6	2.6	1.5	.9	1.4	2.2	2.2	2.2	2.2
18.		1.6		1.5	.9	1.35	2.2	2.1	2.2	2.2
19.	3.3	1.6		1.4	.9	1.3	2.2	2.1	2.2	2.2
20.	3.1	1.5		1.3	.9	1.25	2.2	2.2	2.2	2.2
21.	2.6	1.5	2.0	1.0	.9	1.25	2.2	2.3	2.2	2.3
22.	2.1	1.55		1.0	.9	1.25	2.2	2.3	2.2	2.3
23.	2.0	1.55		1.0	.9	1.25	2.3	2.2	2.2	2.3
24.	2.4	1.6		1.0	.9	1.2	2.4	2.1	2.2	2.2
25.	2.0	1.6		2.0	.9	1.2	2.4	2.1	2.3	2.2
26.	2.0	1.6	1.9	1.8	.9	1.2	2.35	2.1	2.2	2.2
27.	1.8	1.6		1.7	.9	1.2	2.3	2.2	2.2	2.2
28.	1.8	1.6	2.1	1.65	.9	1.2	2.3	2.1	2.3	2.1
29.	1.8	1.6		1.55	.9	1.2	2.2	2.3	2.3	2.1
30.	1.8	1.6		1.5	.9	1.2	2.2	2.2	2.2	2.1
31.	1.9				.9	1.2		2.0		

NOTE.—Gage heights distorted by ice Mar. 16 to 22 and Nov. 5 to Dec. 30.

Daily discharge, in second-feet, of Dry Fork of Marias River near Valier, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		24	3.8	20	3.8	0.0	0.0	19	19
2.		24	3.8	14	24	8	.0	19	19
3.		23	3.8	8	24	133	.0	139	12
4.		22	3.8	1.3	5.9	83	3.8	139	12
5.		21	3.8	1.3	2.6	24	326	97	12
6.		19	3.8	3.8	.0	8	429	36	12
7.		18	3.8	8	.0	24	230	19	12
8.		16	3.8	24	.0	35	326	19	12
9.		15	3.8	15	.0	24	141	19	12
10.		15	3.8	3.8	.0	35	110	19	19
11.		8	.9	1.3	.0	24	46	12	19
12.		15	1.0	1.3	.0	15	36	12	19
13.		15	1.0	1.3	.0	3.8	36	19	19
14.		8	50	1.3	.0	2.6	32	19	19
15.		8	366	1.3	.0	1.3	27	19	20
16.	32	3.8	238	1.3	.0	.6	23	19	20
17.	72	3.8	110	1.3	.0	.0	19	19	21
18.	112	3.8	91	1.3	.0	.0	19	12	22
19.	153	3.8	72	.0	.0	.0	19	12	23
20.	134	1.3	53	.0	.0	.0	19	19	24
21.	84	1.3	35	.0	.0	.0	19	27	25
22.	35	2.6	33	.0	.0	.0	19	27	26
23.	35	2.6	31	.0	.0	.0	27	19	27
24.	83	3.8	28	.0	.0	.0	36	12	28
25.	35	3.8	26	35	.0	.0	36	12	25
26.	35	3.8	24	15	.0	.0	32	12	20
27.	15	3.8	35	8	.0	.0	27	19	20
28.	15	3.8	46	5.9	.0	.0	27	12	15
29.	15	3.8	40	2.6	.0	.0	19	27	15
30.	15	3.8	33	1.3	.0	.0	19	19	10
31.	24		27		.0	.0		6.5	

NOTE.—Daily discharge determined from two rating curves: Mar. 23 to Sept. 10, well-defined, and Sept. 11 to Nov. 30, fairly well defined. Discharge estimated Mar. 16 to 22 and Nov. 5 to 30. Discharge interpolated on other days for which gage heights are missing.

Monthly discharge of Dry Fork of Marias River near Valier, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
March 16-31.....	153	15.0	55.9	1,770	C.
April.....	24	1.3	10.0	595	B.
May.....	366	0.9	44.5	2,740	B.
June.....	35	0	5.91	352	B.
July.....	24	0	1.95	120	B.
August.....	133	0	13.5	836	B.
September.....	429	0	70.1	4,170	C.
October.....	139	6.5	28.4	1,750	C.
November.....	28	10	18.6	1,110	D.
December.....			10	615	D.
The period.....				14,100	

NOTE.—Mean for December estimated.

TETON RIVER AT STRABANE,¹ MONT.

Location.—In the SE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 35, T. 25 N., R 7 W., 1 mile north of Peeble's ranch, 16 miles above Chouteau, Mont., at Strabane post office.

Records available.—November 26, 1904, to December 31, 1906; January 16, 1908, to December 31, 1911.

Drainage area.—140 square miles.

Gage.—The original gage was spiked to a post on the left bank about 40 feet above the bend of Kroff's irrigation ditch. On March 9, 1905, it was moved by the observer to a point 250 feet upstream to avoid the effect of the dam erected at the head of the ditch below. On May 8, 1905, the gage was referred to the bench marks and it was found that the datum had been raised 0.7 foot in moving; the difference between the level of the water surface at the old site and that at the new was 0.20 foot; on May 8, 1906, the gage was again moved $1\frac{1}{2}$ miles upstream to Mr. Bjornstad's ranch and set at an entirely different datum. The station was discontinued during 1907, and when it was reestablished in 1908 a standard chain gage was installed on the left bank. On March 23, 1911, a new station was established one-half mile downstream from old gage.

Channel.—Shifts at high stages; current swift.

Discharge measurements.—At flood stages, made from cable one-fourth mile above the gage; at low stages, by wading at various sections.

Winter flow.—Not affected by ice.

Diversions and storage.—Practically no water is diverted above the station, but the ordinary flow below the station is appropriated and used for irrigation. An irrigation project now being constructed under the Carey Act will store the flood water of Teton River in the reservoir about 5 miles north of the gaging section. The capacity of the reservoir is 90,000 acre-feet, and it can be increased to 210,000 acre-feet by raising the top of the dam 20 feet. The reservoir will serve 120,000 acres of land on the north side of the river. The water will be diverted half a mile above the gage.

Accuracy.—Accurate determination of discharge during high stages is difficult because of the shifting channel.

¹ Station was described in earlier reports as "Teton River near Bellevue, Mont." Post office was moved from Bellevue to Strabane in 1910.

Discharge measurements of Teton River at Strabane, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 21 ^a	A. S. Heidel.....	3.05	24	June 21	W. A. Lamb.....	3.90	177
Mar. 23	do.....	3.05	46	Aug. 8	R. Richards.....	3.55	128
May 13	B. E. Jones.....	3.96	198	Oct. 19	B. E. Jones.....	3.48	110
May 17	do.....	4.66	518				

^a Ice conditions.*Daily gage height, in feet, of Teton River at Strabane, Mont., for 1911.*

[Belle Peebles, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		3.05	3.40	4.30	3.80	3.75	3.30	3.50	3.45	3.20
2.....		3.05	3.40	4.40	3.80	3.75	3.30	3.50	3.45	3.20
3.....		3.00	3.45	4.60	3.70	3.75	3.35	3.45	3.50	3.20
4.....		2.95	3.45	4.80	3.70	3.80	3.40	3.45	3.50	3.15
5.....		2.95	3.90	4.50	3.65	3.75	3.40	3.45	3.45	3.15
6.....		2.95	4.10	4.35	3.65	3.70	3.40	3.50	3.45	3.15
7.....		2.90	4.40	3.30	3.65	3.60	3.45	3.50	3.40	3.15
8.....		2.95	4.15	4.30	3.65	3.55	3.45	3.55	3.40	3.10
9.....		2.95	4.10	4.40	3.65	3.50	3.45	3.55	3.35	3.05
10.....		3.00	4.00	4.40	3.85	3.50	3.50	3.50	3.35	3.05
11.....		3.00	4.00	4.50	3.85	3.50	3.50	3.50	3.30	3.05
12.....		3.00	3.95	4.40	3.90	3.40	3.50	3.45	3.30	3.10
13.....		2.95	4.00	4.30	3.90	3.45	3.55	3.45	3.20	3.15
14.....		2.95	4.30	4.20	3.85	3.45	3.55	3.45	3.20	3.15
15.....		2.95	4.60	4.35	3.85	3.40	3.50	3.45	3.15	3.15
16.....		2.90	5.00	4.30	3.80	3.40	3.50	3.45	3.05	3.10
17.....		2.90	4.70	4.32	3.75	3.45	3.50	3.45	3.05	3.10
18.....		2.90	4.50	4.25	3.75	3.45	3.55	3.50	3.10	3.10
19.....		3.00	4.40	4.20	3.75	3.45	3.55	3.50	3.20	3.10
20.....		3.00	4.30	3.95	3.70	3.40	3.50	3.50	3.30	3.05
21.....		3.05	4.30	3.90	3.70	3.40	3.50	3.55	3.30	3.05
22.....		3.05	4.30	3.95	3.70	3.35	3.55	3.60	3.30	3.05
23.....	3.05	3.10	4.20	4.00	3.65	3.35	3.55	3.60	3.40	3.05
24.....	3.05	3.25	4.25	4.00	3.65	3.35	3.60	3.60	3.45	3.00
25.....	3.10	3.22	4.25	4.05	3.65	3.30	3.55	3.60	3.45	3.00
26.....	3.10	3.55	4.25	4.00	3.60	3.30	3.55	3.60	3.40	3.00
27.....	3.08	3.55	4.25	3.95	3.60	3.25	3.50	3.55	3.30	3.00
28.....	3.00	3.55	4.20	3.92	3.65	3.25	3.50	3.55	3.30	3.00
29.....	3.00	3.45	4.11	3.90	3.65	3.25	3.45	3.55	3.25	2.95
30.....	3.00	3.45	4.05	3.80	3.70	3.30	3.45	3.50	3.25	2.90
31.....	3.05		4.15		3.70	3.30		3.50		2.90

Daily discharge, in second-feet, of Teton River at Strabane, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		47	96	315	168	158	80	112	104	66
2.....		47	96	365	168	158	80	112	104	66
3.....		41	104	490	148	158	88	104	112	66
4.....		36	104	620	148	168	96	104	112	60
5.....		36	190	425	139	158	96	104	104	60
6.....		36	237	340	139	148	96	112	104	60
7.....		30	237	315	139	130	104	112	96	60
8.....		36	254	315	139	121	104	121	96	53
9.....		36	237	365	139	112	104	121	88	47
10.....		41	212	365	179	112	112	112	88	47
11.....		41	212	425	179	112	112	112	80	47
12.....		41	201	365	190	96	112	104	80	53
13.....		36	212	315	190	104	121	104	66	60
14.....		36	315	272	179	104	121	104	66	60
15.....		36	490	340	179	96	112	104	60	60
16.....		30	750	315	168	96	112	104	47	53
17.....		30	555	325	158	104	112	104	47	53
18.....		30	425	294	158	104	121	112	53	53
19.....		41	365	272	158	104	121	112	66	53
20.....		41	315	201	148	96	112	112	80	47
21.....		47	315	190	148	96	112	121	80	47
22.....		47	315	201	148	88	121	130	80	47
23.....	47	53	272	212	139	88	121	130	96	47
24.....	47	73	204	212	139	88	130	130	104	41
25.....	53	69	294	224	139	80	121	130	104	41
26.....	53	121	294	212	130	80	121	130	96	41
27.....	51	121	294	201	130	73	112	121	80	41
28.....	41	121	272	194	139	73	112	121	80	41
29.....	41	104	240	190	139	73	104	121	73	36
30.....	41	104	224	168	148	80	104	112	73	30
31.....	47	254	.....	.....	148	80	.....	112	.....	30

NOTE.—Daily discharge determined from a rating curve fairly well defined below 215 second-feet.

Monthly discharge of Teton River at Strabane, Mont., for 1911.

[Drainage area, 140 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accu- racy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....			a 35	0.250	0.29	2,150	D.
February.....			a 30	.214	.22	1,670	D.
March.....			38.4	.274	.32	2,360	C.
April.....	121	30	53.6	.383	.43	3,190	B.
May.....	750	96	280	2.00	2.31	17,200	B.
June.....	620	168	301	2.15	2.40	17,900	B.
July.....	190	130	154	1.10	1.27	9,470	B.
August.....	168	73	108	.771	.89	6,040	B.
September.....	130	80	109	.779	.87	6,490	B.
October.....	130	104	114	.814	.94	7,010	B.
November.....	112	47	84.0	.600	.67	5,000	B.
December.....	66	30	50.5	.361	.42	3,110	B.
The year.....			113	.807	11.03	82,200	

a Estimated.

NOTE.—Mean discharge for period Mar. 1 to 22, estimated at 35 second-feet.

DEEP CREEK NEAR CHOTEAU, MONT.

Location.—At Hugh Robinson's ranch, in the SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 15, T. 15 N., R. 5 W., 5 miles southwest of Choteau, Mont.

Records available.—March 24, 1911, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Standard chain on right bank.

Channel.—Clean and fairly permanent; bed composed of gravel; gravel bar about 50 feet below the gage forms the control.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—A few small ditches divert water from the creek.

Accuracy.—Records fair.

Discharge measurements of Deep Creek near Choteau, Mont., in 1910—11.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
1910.		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 2	U. S. R. S. Engineers.	1.10	28.7	May 14	B. E. Jones.....	5.91	84
10	.....do.....	1.10	25.1	18	.....do.....	6.60	259
17	.....do.....	1.05	24.4	June 21	W. A. Lamb.....	6.10	117
				Aug. 7	R. Richards.....	6.04	95
1911.				Oct. 19	B. E. Jones.....	5.70	42
Mar. 24 ^a	J. C. Beebe.....	5.87	76	25	W. A. Lamb.....	5.70	42

^a New gage—new datum.

Daily gage height, in feet, of Deep Creek near Choteau, Mont., for 1911.

[Hugh Robinson, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		5.7	5.8	6.1	6.35	5.8	5.6	5.7	5.6
2.....		5.7	5.7	6.2	6.15	5.8	5.5	5.75	5.55
3.....		5.7	5.7	6.3	6.2	6.0	5.6	5.85	5.55
4.....		5.6	5.8	6.4	6.15	6.0	5.8	5.75	5.55
5.....		5.6	5.8	6.4	6.0	6.05	6.3	5.8	5.7
6.....		5.6	6.0	6.3	6.05	6.3	6.3	5.7	5.75
7.....		5.6	6.0	6.3	5.9	6.1	6.3	5.7	5.7
8.....		5.7	6.0	6.4	6.0	6.1	6.0	5.7	5.7
9.....		5.7	6.0	6.5	6.0	6.05	6.0	5.7	5.9
10.....		5.7	6.0	6.3	5.8	5.9	5.85	5.8	6.0
11.....		5.7	6.0	6.4	5.8	6.0	5.9	5.65	5.9
12.....		5.7	5.9	6.2	5.8	5.8	5.8	5.65	.....
13.....		5.7	5.9	6.3	5.8	5.8	5.75	5.65	.....
14.....		5.7	5.8	7.0	5.8	5.8	5.75	5.65	.....
15.....		5.6	6.6	6.5	5.8	5.8	5.7	5.75	.....
16.....		5.6	7.3	6.7	6.4	5.7	5.8	5.65	.....
17.....		5.7	6.9	6.3	6.1	5.8	5.7	5.65	.....
18.....		5.7	6.6	6.2	6.0	5.65	5.8	5.65	.....
19.....		5.7	6.4	6.1	5.9	5.75	5.7	5.65	.....
20.....		5.6	6.3	6.1	5.95	5.6	5.8	5.75	.....
21.....		5.6	6.3	6.1	5.9	5.7	5.7	5.65	.....
22.....		5.7	6.3	6.15	5.8	5.6	5.8	5.65	.....
23.....		5.7	6.2	6.2	5.9	5.7	5.7	5.65	.....
24.....	5.9	5.7	6.3	6.4	5.8	5.6	5.75	5.7	.....
25.....	5.8	5.8	6.2	6.35	5.8	5.6	5.75	5.75	.....
26.....	5.8	5.8	6.3	6.2	5.8	5.6	5.75	5.6	.....
27.....	5.7	5.8	6.4	6.1	5.8	5.7	5.8	5.65	.....
28.....	5.7	5.9	6.3	6.15	5.7	5.6	5.7	5.65	.....
29.....	5.7	5.8	6.2	6.05	5.8	5.7	5.7	5.7	.....
30.....	5.7	5.8	6.1	6.2	5.7	5.6	5.7	5.75	.....
31.....	5.7	.....	6.1	.....	5.75	5.6	.....	5.65	.....

NOTE.—Gage heights, Nov. 9 to 11, distorted by ice.

Daily discharge, in second-feet, of Deep Creek near Choteau, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		43	58	118	176	58	30	43	30
2.....		43	43	142	130	58	18	50	24
3.....		43	43	162	142	96	30	67	24
4.....		30	58	196	130	96	58	50	24
5.....		30	58	196	96	107	162	58	43
6.....		30	96	162	107	162	162	43	50
7.....		30	96	162	76	118	162	43	43
8.....		43	96	196	96	118	96	43	43
9.....		43	96	227	96	107	96	43	
10.....		43	96	162	58	76	67	58	
11.....		43	96	196	58	96	76	36	
12.....		43	76	142	58	58	58	36	
13.....		43	76	162	58	58	50	36	
14.....		43	58	425	58	58	50	36	
15.....		30	260	227	58	58	43	50	
16.....		30	582	296	196	43	58	36	
17.....		43	378	162	118	58	43	36	
18.....		43	260	142	96	36	58	36	
19.....		43	196	118	76	50	43	36	
20.....		30	162	118	86	30	58	50	
21.....		30	162	118	76	43	43	36	
22.....		43	162	130	58	30	58	36	
23.....		43	142	142	76	43	43	36	
24.....	76	43	162	196	58	30	50	43	
25.....	58	58	142	176	58	30	50	50	
26.....	58	58	162	142	58	30	50	30	
27.....	43	58	196	118	58	43	58	36	
28.....	43	76	162	130	43	30	43	36	
29.....	43	58	142	107	58	43	43	43	
30.....	43	58	118	142	43	30	43	50	
31.....	43		118		50	30		36	

NOTE.—Daily discharge determined from a well-defined curve.

Monthly discharge of Deep Creek near Choteau, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
March 24-31.....	76	43	51	810	B.
April.....	76	30	43.1	2,560	B.
May.....	582	43	147	9,040	B.
June.....	425	107	170	10,100	B.
July.....	196	43	84.0	5,160	B.
August.....	162	30	62.0	3,810	B.
September.....	162	18	63.3	3,770	B.
October.....	67	30	42.5	2,610	B.
November.....	50		27.7	1,650	C.
December.....			a 15.0	922	D.
The period.....				40,400	

a Estimated.

NOTE.—Mean discharge for period Nov. 12 to 30 estimated at 25 second-feet.

MUSSELSHELL RIVER BASIN.

NORTH FORK OF MUSSELSHELL RIVER NEAR DELPINE, MONT.

Location.—In the SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 35, T. 10 N., R. 9 E., at a proposed dam site 3 miles above Delpine, Mont., and about 16 miles northeast of Martinsdale, Mont.

Records available.—May 19, 1909, to December 31, 1911.

Drainage area.—Not measured.

Gage.—A staff near left bank nailed to foot log which spans the stream; datum unchanged.

Channel.—Gravel.

Discharge measurements.—Made from foot log or by wading.

Diversions and storage.—Several ditches take water for irrigation. The drainage area above the station affords an excellent reservoir site; 28,000 acre-feet of water may be stored with a 130-foot dam at the station.

Discharge measurements of North Fork of Musselshell River near Delpine, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 16	C. S. Heidel.....	1.76	7.8	June 5	C. S. Heidel.....	1.89	25
Apr. 9	.....do.....	1.76	18.9	Aug. 3	.....do.....	1.57	9.5
May 5	.....do.....	1.77	17.9	Oct. 28	.....do.....	1.54	7.9

Daily gage height, in feet, of North Fork of Musselshell River near Delpine, Mont., for 1911.

[Thomas Harbor, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1		2.05	1.71	1.97	1.64	1.52	1.43	1.34
2		1.80	1.72	1.81	1.62	1.66	1.43	1.34
3		1.75	1.70	1.77	1.62	1.57	1.43	1.39
4		1.75	1.70	1.91		1.62	1.43	1.39
5		1.80	1.70	1.89	1.62	1.57	1.41	1.39
6		1.80	1.71	1.81	1.60		1.38	1.39
7		1.70	1.78	1.88	1.57	1.57	1.38	1.39
8		1.68	1.78	1.96	1.55	1.57	1.38	1.39
9		1.76	1.80	1.99	1.52	1.55	1.36	1.39
10		1.71	1.80	1.83	1.52	1.52	1.33	1.39
11		1.70	1.75	1.86	1.52	1.53	1.33	1.39
12		1.73	1.78	1.82	1.52	1.50	1.33	1.39
13		1.71	1.76	1.83	1.52	1.50	1.34	1.41
14		1.70	1.75	1.86	1.47	1.50	1.33	1.41
15		1.60	1.90	1.91	1.52	1.48	1.33	1.39
16	1.60	1.62	1.75	1.88	1.55	1.46	1.33	1.39
17	1.60	1.65	1.78	1.81	1.57	1.46	1.33	1.39
18	1.40	1.68	1.76	1.76	1.57	1.43	1.33	1.39
19	1.85	1.65	1.75	1.77	1.57	1.43	1.33	1.39
20	2.07	1.68	1.66	1.76	1.57	1.43	1.33	1.39
21	2.15	1.71	1.69	1.69	1.59	1.43	1.34	
22	2.30	1.74	1.71	1.69	1.57	1.43		
23	2.45	1.71	1.71	1.61	1.57	1.43	1.34	
24	2.25	1.80	1.91	1.61	1.57	1.44	1.34	
25	2.20	1.72	2.09		1.55	1.45	1.34	
26	2.15	1.81	2.04	1.66	1.49	1.44		
27	1.73	1.90	1.98	1.66	1.49	1.43	1.34	
28	1.70	1.74	1.81	1.66	1.52	1.44	1.34	
29	1.75	1.72	1.84	1.66	1.52	1.43	1.34	
30	2.05	1.70	1.79	1.69	1.52	1.43	1.34	
31	2.10		1.77		1.52	1.43		

Daily discharge, in second-feet, of North Fork of Musselshell River near Delpine, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		36	16	30	12	7.6	5.6	4.1
2.....		20	16	21	11	13	5.6	4.1
3.....		18	15	18	11	9.1	5.6	4.8
4.....		18	15	27	11	11	5.6	4.8
5.....		20	15	25	11	9.1	5.2	4.8
6.....		20	16	21	10	9.1	4.7	4.8
7.....		15	19	25	9.1	9.1	4.7	4.8
8.....		14	19	30	8.5	9.1	4.7	4.8
9.....		18	20	31	7.6	8.5	4.4	4.8
10.....		16	20	22	7.6	7.6	4.0	4.8
11.....		15	18	24	7.6	7.9	4.0	4.8
12.....		16	19	21	7.6	7	4.0	4.8
13.....		16	18	22	7.6	7	4.1	5.2
14.....		15	18	24	6.4	7	4.0	5.2
15.....		10	26	27	7.6	6.6	4.0	4.8
16.....	10	11	18	25	8.5	6.2	4.0	4.8
17.....	10	12	19	21	9.1	6.2	4.0	4.8
18.....	5	14	18	18	9.1	5.6	4.0	4.8
19.....	23	12	18	18	9.1	5.6	4.0	4.8
20.....	38	14	13	18	9.1	5.6	4.0	4.8
21.....	44	16	14	14	9.7	5.6	4.1	.....
22.....	57	17	16	14	9.1	5.6	4.1	.....
23.....	71	16	16	10	9.1	5.6	4.1	.....
24.....	52	20	27	10	9.1	5.8	4.1	.....
25.....	48	16	39	12	8.5	6.0	4.1	.....
26.....	44	21	35	13	6.8	5.8	4.1	.....
27.....	16	26	31	13	6.8	5.6	4.1	.....
28.....	15	17	21	13	7.6	5.8	4.1	.....
29.....	18	16	22	13	7.6	5.6	4.1	.....
30.....	36	15	20	14	7.6	5.6	4.1	.....
31.....	40		18		7.6	5.6		.....

NOTE.—Daily discharge determined from a rating curve fairly well defined below 32 second-feet. Discharge interpolated for days for which gage heights are missing.

Monthly discharge of North Fork of Musselshell River near Delpine, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			7.0	430	D.
February.....			6.0	333	D.
March.....	71		17.5	1,080	C.
April.....	36	10	17.0	1,010	B.
May.....	39	13	19.8	1,220	B.
June.....	31	10	19.8	1,180	B.
July.....	12	6.4	8.71	536	B.
August.....	13	5.6	7.11	437	B.
September.....	5.6	4.0	4.37	260	B.
October.....	5.2	4.1	4.67	287	C.
November.....			4.5	268	D.
December.....			4.5	277	D.
The year.....			10.1	7,320	

NOTE.—Means for January, February, November, and December estimated. Discharge Mar. 1 to 15 estimated at 5 second-feet per day, and Oct. 21 to 31 at 4.5 second-feet.

NORTH FORK OF MUSSELSHELL RIVER NEAR MARTINSDALE, MONT.

Location.—In sec. 6, T. 8 N., R. 12 E., half a mile above the junction of the North and South Forks, at the ranch of Martin J. Settle, 4 miles north of Martinsdale.

Records available.—May 10, 1907, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Chain attached to left bank just above observer's private wagon bridge; datum unchanged.

Channel.—Composed of gravel; may shift somewhat during high-water, as current is swift.

Discharge measurements.—Made from the private wagon bridge or by wading.

Winter flow.—Affected by ice.

Storage.—Under a Carey Act project the water of the North Fork, which is practically all appropriated, will be stored at a point about 20 miles above the station and used to irrigate land between Martinsdale and Harlowton.

Accuracy.—Records obtained during open season are very good.

Discharge measurements of North Fork of Musselshell River near Martinsdale, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
Feb. 17	C. S. Heidel.....	<i>Feet</i> (a)	<i>Sec.-ft.</i> 18.4	June 4	C. S. Heidel.....	<i>Feet.</i> 4.28	<i>Sec.-ft.</i> 152
Apr. 8	.....do.....	3.50	37	July 28	.....do.....	3.15	9.4
May 6	.....do.....	3.78	74	Oct. 27	.....do.....	3.66	55

^a Ice conditions.

Daily gage height, in feet, of North Fork of Musselshell River near Martinsdale, Mont., for 1911.

[Martin J. Settle, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		3.6	3.7	4.4	3.45	3.3	3.25	3.35	3.6
2.....		3.7	3.7	4.8	3.5	3.45	3.25	3.35	3.6
3.....		3.6	3.7	4.5	3.45	3.45	3.3	3.35	3.55
4.....		3.6	3.7	4.4	3.4	3.45	3.3	3.35	3.45
5.....		3.5	3.8	4.25	3.4	3.65	3.3	3.4	3.4
6.....		3.5	3.8	4.15	3.4	3.9	3.3	3.4	3.45
7.....		3.5	3.8	4.1	3.35	3.75	3.3	3.35	3.45
8.....		3.5	3.8	4.0	3.35	3.55	3.3	3.35	3.45
9.....		3.6	3.7	4.0	3.35	3.5	3.3	3.35	3.65
10.....		3.65	3.7	3.85	3.3	3.65	3.25	3.35	3.9
11.....		3.65	3.6	3.85	3.3	3.5	3.25	3.35	4.2
12.....		3.5	3.6	3.8	3.25	3.45	3.25	3.35	3.9
13.....		3.5	3.6	3.75	3.2	3.4	3.3	3.35	3.85
14.....		3.5	3.6	3.75	3.5	3.35	3.25	3.35	3.9
15.....		3.5	3.7	3.7	3.5	3.4	3.25	3.35	4.5
16.....		3.6	4.0	3.85	3.1	3.4	3.25	3.35	4.5
17.....		3.65	3.8	3.7	3.25	3.4	3.25	3.35	3.95
18.....		3.65	3.8	3.7	3.25	3.35	3.25	3.35	.....
19.....		3.6	3.75	3.65	3.25	3.35	3.3	3.4	.....
20.....	3.9	3.6	3.7	3.6	3.15	3.3	3.3	3.4	.....
21.....	4.0	3.7	3.65	3.65	3.2	3.3	3.3	3.4	.....
22.....	3.9	3.75	3.6	3.7	3.25	3.3	3.3	3.4	.....
23.....	3.9	3.7	3.65	3.6	3.25	3.35	3.35	3.4	.....
24.....	4.0	3.65	4.0	3.45	3.2	3.35	3.35	3.4	.....
25.....	3.8	3.7	4.65	3.4	3.15	3.35	3.35	3.45	.....
26.....	3.6	3.7	4.6	3.4	3.15	3.35	3.35	3.55	.....
27.....	3.6	3.8	4.45	3.4	3.15	3.35	3.35	3.55	.....
28.....	3.4	3.9	4.3	3.45	3.15	3.3	3.35	3.55	.....
29.....	3.0	3.8	4.3	3.5	3.1	3.3	3.35	3.7	.....
30.....	3.7	3.7	4.3	3.45	3.45	3.3	3.35	3.45	.....
31.....	3.7	.....	4.25	.....	3.3	3.25	.....	3.45	.....

NOTE.—Gage heights Nov. 9 to 17 distorted by ice.

Daily discharge, in second-feet, of North Fork of Musselshell River near Martinsdale, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		48	60	173	32	19	16	23	48
2.....		60	60	248	37	32	16	23	48
3.....		48	60	191	32	32	19	23	42
4.....		48	60	173	27	32	19	23	32
5.....		37	74	146	27	54	19	27	27
6.....		37	74	129	27	89	19	27	32
7.....		37	74	121	23	67	19	23	32
8.....		37	74	105	23	42	19	23	32
9.....		48	60	105	23	37	19	23	.....
10.....		54	60	82	19	54	16	23	.....
11.....		54	48	82	19	37	16	23	.....
12.....		37	48	74	16	32	16	23	.....
13.....		37	48	67	12	27	19	23	.....
14.....		37	48	67	37	23	16	23	.....
15.....		37	60	60	37	27	16	23	.....
16.....		48	105	82	7	27	16	23	.....
17.....		54	74	60	16	27	16	23	.....
18.....		54	74	60	16	23	16	23	.....
19.....		48	67	54	16	23	19	27	.....
20.....	89	48	60	48	9.5	19	19	27	.....
21.....	105	60	54	54	12	19	19	27	.....
22.....	89	67	48	60	16	19	19	27	.....
23.....	89	60	54	48	16	23	23	27	.....
24.....	105	54	105	32	12	23	23	27	.....
25.....	74	60	218	27	9.5	23	23	32	.....
26.....	48	60	209	27	9.5	23	23	42	.....
27.....	48	74	182	27	9.5	23	23	42	.....
28.....	27	89	155	32	9.5	19	23	42	.....
29.....	3	74	155	37	7	19	23	60	.....
30.....	60	60	155	32	32	19	23	32	.....
31.....	60	.....	146	.....	19	16	.....	32	.....

NOTE.—Daily discharge determined from a fairly well defined rating curve.

Monthly discharge of North Fork of Musselshell River near Martinsdale, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			20	1,230	D.
February.....			18	1,000	D.
March.....	105		41.0	2,520	C.
April.....	89	37	52.2	3,110	B.
May.....	218	48	89.3	5,490	B.
June.....	248	27	83.4	4,960	B.
July.....	37	7	19.6	1,210	B.
August.....	89	16	30.6	1,880	B.
September.....	23	16	19.1	1,140	B.
October.....	60	23	27.9	1,720	B.
November.....			28.1	1,670	C.
December.....			20	1,230	D.
The year.....	248		37.5	27,200	

NOTE.—Means for January, February, and December estimated; mean for period Mar. 1 to 19 estimated at 25 second-feet; mean for period Nov. 9 to 30 estimated at 25 second-feet.

MUSSELSHELL RIVER AT HARLOWTON, MONT.

Location.—In sec. 26, T. 8 N., R. 15 E., at the highway bridge 1 mile south of Harlowton. Takes place of station formerly maintained at Shawmut.

Records available.—July 11, 1907, to December 31, 1911.

Drainage area.—Not measured.

Gages.—The original gage was destroyed in October, 1908; on April 10, 1909, a temporary staff gage was installed which read 0.73 foot too high. On May 24, 1909, a standard chain gage was placed on the upstream side of the new public highway bridge at a datum 0.52 foot higher than the bench mark and the datum of the bench mark was raised 0.52 foot. All gage heights for 1909 were corrected to the new datum.

Channel.—Bed of stream composed of sand and gravel; will probably shift in flood.

Discharge measurements.—Made from bridge or by wading.

Diversions.—A large part of the valley is irrigated and many small ditches take water from the Musselshell; practically the entire flow of the stream is appropriated. A minimum discharge of 2 second-feet is recorded during the irrigation season at this station.

Discharge measurements of Musselshell River at Harlowton, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 14 ^a	C. S. Heidel.....	0.80	54	July 27	C. S. Heidel.....	—0.02	11
Apr. 7	.....do.....	.91	118	Oct. 26	.....do.....	.81	80
June 3	.....do.....	4.10	2,580				

^a Ice at gage.

Daily gage height, in feet, of Musselshell River at Harlowton, Mont., for 1911.

[W. G. Yamamoto, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		0.92	1.25	2.70	1.12	0.35	0.44	0.70	0.48
2.....		.98	1.20	3.55	1.08	.52	.35	.70	.55
3.....		1.08	1.20	4.05	.98	.55	.32	.70	.65
4.....		1.10	1.20	3.75	.92	.58	.52	.70	.65
5.....		1.10	1.20	3.30	.88	.72	.66	.70	.72
6.....		1.00	1.25	3.05	.80	1.15	.70	.70	.75
7.....		.98	1.60	2.85	.80	1.00	.70	.70	.75
8.....		.95	1.60	2.70	.80	1.00	.70	.70	.52
9.....		.98	1.60	2.60	.80	1.00	.70	.70	.55
10.....		1.01	1.68	2.50	.78	1.00	.70	.70	.55
11.....		1.04	1.58	2.40	.75	.95	.69	.70	.50
12.....	0.90	1.01	1.45	2.30	.68	.95	.65	.70	.50
13.....	.90	1.00	1.40	2.25	.64	.90	.65	.70	
14.....	.90	.95	1.45	2.20	.60	.82	.64	.70	
15.....	.90	.95	1.98	2.30	.54	.78	.62	.70	
16.....	.90	.90	2.40	2.20	.50	.75	.60	.72	
17.....	.90	.92	2.20	2.15	.48	.75	.59	.74	
18.....	1.00	.98	2.05	2.00	.45	.72	.52	.75	
19.....	1.12	1.00	1.95	1.95	.40	.70	.49	.75	
20.....	1.18	1.00	1.75	1.80	.35	.70	.45	.78	
21.....	1.30	1.00	1.68	1.75	.30	.66	.59	.78	
22.....	1.50	1.02	1.60	1.70	.22	.65	.68	.78	
23.....	1.50	1.18	1.70	1.65	.15	.60	.65	.80	
24.....	1.40	1.20	1.95	1.55	.10	.60	.65	.80	
25.....	1.38	1.15	2.35	1.48	.05	.60	.68	.80	
26.....	1.25	1.15	2.65	1.28	.00	.60	.70	.80	
27.....	1.20	1.28	2.60	1.20	— .02	.60	.70	.82	
28.....	1.10	1.40	2.40	1.18	— .04	.55	.70	.82	
29.....	1.08	1.40	2.30	1.15	— .05	.55	.70	.72	
30.....	1.02	1.30	2.30	1.15	— .10	.50	.70	.65	
31.....	.98		2.30		+ .55	.50		.56	

Daily discharge, in second-feet, of Musselshell River at Harlowton, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		110	220	1,200	168	30	38	68	42
2.....		125	200	2,010	154	46	30	68	50
3.....		154	200	2,540	125	50	28	68	62
4.....		160	200	2,210	110	53	46	68	62
5.....		160	200	1,760	101	71	63	68	71
6.....		130	220	1,520	85	180	68	68	76
7.....		125	370	1,340	85	130	68	68	76
8.....		118	370	1,200	85	130	68	68	46
9.....		118	370	1,110	85	130	68	68	50
10.....		133	412	1,020	82	130	68	68	50
11.....		142	360	940	76	118	67	68	44
12.....	105	133	300	860	65	118	62	68	44
13.....	105	130	280	820	60	105	62	68	
14.....	105	118	300	780	55	89	60	68	
15.....	105	118	616	860	48	82	58	68	
16.....	105	105	940	780	44	76	55	71	
17.....	105	110	780	740	42	76	54	75	
18.....	130	125	665	630	39	71	46	76	
19.....	168	130	595	595	34	68	43	76	
20.....	192	130	460	490	30	68	39	82	
21.....	240	130	412	460	27	63	54	82	
22.....	320	136	370	430	22	62	65	82	
23.....	320	192	430	400	18	55	62	85	
24.....	280	200	595	345	16	55	62	85	
25.....	272	180	900	312	14	55	65	85	
26.....	220	180	1,160	232	12	55	68	85	
27.....	200	232	1,110	200	11	55	68	89	
28.....	160	280	940	192	10	50	68	89	
29.....	154	280	860	180	10	50	68	71	
30.....	136	240	860	180	8	50	68	62	
31.....	125		860		50	50		51	

NOTE.—Daily discharge determined from a rating curve fairly well defined below 320 second-feet.

Monthly discharge of Musselshell River at Harlowton, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			a 45	2,770	D.
February.....			a 50	2,780	D.
March.....	320		131	8,060	C.
April.....	280	105	154	9,160	B.
May.....	1,160	200	534	32,800	C.
June.....	2,540	180	878	52,200	C.
July.....	168	8	57.1	3,510	B.
August.....	180	30	78.1	4,800	B.
September.....	68	28	58.0	3,450	B.
October.....	89	51	73.1	4,490	B.
November.....			46.0	2,740	C.
December.....			a 40.0	2,460	D.
The year.....			179	129,000	

a Estimated.

NOTE.—Discharge Mar. 1-11 estimated at 65 second-feet and Nov. 13 to 30 at 40 second-feet.

CHECKERBOARD CREEK NEAR DELPINE, MONT.

Location.—In the SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 4, T. 9 N., R. 9 E., $2\frac{1}{2}$ miles above the junction of Checkerboard Creek with Musselshell River, 8 miles from Delpine post office, and 21 miles from Martinsdale, Mont.

Records available.—May 26, 1909, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Staff, nailed to a foot log near the right bank. This was superseded on April 9, 1911, by a vertical staff set at a different datum about 40 feet downstream at a better section.

Channel.—Gravel.

Discharge measurements.—Made from foot log or by wading.

Winter flow.—Affected by ice.

Diversions.—It is proposed to divert the water from this creek over a small divide into the reservoir on the North Fork of Musselshell River. The creek is about 12 miles long and has no tributaries.

Discharge measurements of Checkerboard Creek near Delpine, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 16	C. S. Heidel	0.30	3.0	June 5	C. S. Heidel	3.00	41
Apr. 9 ^a	do	.52	7.4	Aug. 3	do	2.18	5.6
Apr. 9	do	2.34	7.7	Oct. 28	do	2.08	3.7
May 5	do	2.47	13.1				

^a Last measurement at old gage.

Daily gage height, in feet, of Checkerboard Creek near Delpine, Mont., for 1911.

[Thomas Harbor, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1				3.30	2.20	2.19	2.15	2.15
2		0.50	2.28	3.15	2.20	2.30	2.15	2.15
3		.50	2.31			2.18	2.15	
4		.50	2.30	3.20			2.15	2.12
5		.50	2.47	3.00	2.18		2.15	
6		.50	2.55	2.98	2.18		2.15	2.10
7		.50	2.60	2.98	2.18	2.18	2.15	2.10
8		.50	2.70	2.95	2.18	2.18		2.12
9		2.34	2.71	2.97	2.20	2.18		
10			2.75	2.80	2.20	2.18	2.15	2.12
11		2.20	2.61	2.72	2.22	21.8		
12		2.23	2.60	2.75	2.23	2.18	2.15	2.12
13		2.25	2.47	2.71	2.25	2.18		
14		2.22	2.50	2.62	2.25	2.18	2.15	2.12
15		2.21	2.80	2.68	2.25	2.16		
16	0.30	2.22	2.75	2.62	2.25	2.16	2.15	2.12
17	.30	2.25			2.25		2.15	
18	.30	2.23	2.70	2.60	2.25	2.16		2.12
19	.35	2.18	2.70	2.62	2.25	2.15	2.15	
20	.40		2.71	2.60	2.23			2.10
21	.40	2.18	2.52	2.60	2.23	2.15	2.15	
22	.50	2.20		2.55	2.22	2.15		
23	.50	2.23	2.60	2.50	2.22	2.15	2.15	
24	.50	2.18	2.75	2.40	2.22	2.15	2.15	
25	.50	2.24	2.80		2.21	2.15		
26	.50	2.26	2.85	2.37	2.20	2.15	2.15	
27	.50	2.33	2.83	2.37	2.20	2.15		
28	.50	2.25	2.80	2.38		2.15	2.15	2.08
29	.50	2.27	2.80	2.40	2.19	2.15	2.15	
30	.50	2.26	2.83	2.38		2.15	2.15	
31	.50		2.85			2.15		

Daily discharge, in second-feet, of Checkerboard Creek near Delpine, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		7.0	7.4	64	5.8	5.6	4.9	4.9
2.....		7.0	7.6	52	5.8	8.0	4.9	4.9
3.....		7.0	8.2	54	5.6	5.4	4.9	4.6
4.....		7.0	8.0	56	5.6	5.4	4.9	4.4
5.....		7.0	13	41	5.4	5.4	4.9	4.2
6.....		7.0	16	40	5.4	5.4	4.9	4.0
7.....		7.0	18	40	5.4	5.4	4.9	4.0
8.....		7.0	22	38	5.4	5.4	4.9	4.4
9.....		9.0	23	39	5.8	5.4	4.9	4.4
10.....		7.4	25	28	5.8	5.4	4.9	4.4
11.....		5.8	18	23	6.2	5.4	4.9	4.4
12.....		6.5	18	25	6.5	5.4	4.9	4.4
13.....		6.9	13	23	6.9	5.4	4.9	4.4
14.....		6.2	14	19	6.9	5.4	4.9	4.4
15.....		6.0	28	21	6.9	5.1	4.9	4.4
16.....	3.0	6.2	25	19	6.9	5.1	4.9	4.4
17.....	3.0	6.9	24	18	6.9	5.1	4.9	4.4
18.....	3.0	6.5	22	18	6.9	5.1	4.9	4.4
19.....	4.0	5.4	22	19	6.9	4.9	4.9	4.2
20.....	5.0	5.4	23	18	6.5	4.9	4.9	4.0
21.....	5.0	5.4	15	18	6.5	4.9	4.9	4.0
22.....	7.0	5.8	16	16	6.2	4.9	4.9	4.0
23.....	7.0	6.5	18	14	6.2	4.9	4.9	3.9
24.....	7.0	5.4	25	10.5	6.2	4.9	4.9	3.9
25.....	7.0	6.7	28	9.9	6.0	4.9	4.9	3.8
26.....	7.0	7.1	31	9.8	5.8	4.9	4.9	3.8
27.....	7.0	8.8	30	9.8	5.8	4.9	4.9	3.7
28.....	7.0	6.9	28	10.5	5.7	4.9	4.9	3.7
29.....	7.0	7.3	28	10.5	5.6	4.9	4.9	3.7
30.....	7.0	7.1	30	10.5	5.6	4.9	4.9	3.7
31.....	7.0	.....	31	.....	5.6	4.9	.....	3.7

NOTE.—Daily discharge determined as follows: Mar. 16 to Apr. 8 (old section) and Apr. 9 to Oct. 28 (new section) from rating curves fairly well defined. Discharge interpolated for days for which gage heights are missing.

Monthly discharge of Checkerboard Creek near Delpine, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	.....	.....	3.0	184	D.
February.....	.....	.....	3.0	167	D.
March.....	7.0	.....	4.5	277	C.
April.....	9.0	5.4	6.71	399	B.
May.....	31.0	7.4	20.5	1,260	B.
June.....	64.0	9.8	25.8	1,540	B.
July.....	6.9	5.4	6.09	374	B.
August.....	8.0	4.9	5.24	322	B.
September.....	4.9	4.9	4.90	292	B.
October.....	4.9	3.7	4.18	257	C.
November.....	.....	.....	3.5	208	D.
December.....	.....	.....	3.5	215	D.
The year.....	64	.....	7.58	5,500	

NOTE.—Means for January, February, November, and December estimated; mean for period Mar. 1-15 estimated at 3.0 second-feet.

SOUTH FORK OF MUSSELHELL RIVER NEAR MARTINSDALE, MONT.

Location.—In the S. $\frac{1}{2}$ sec. 12, T. 8 N., R. 11 E., near the public highway, $1\frac{1}{2}$ miles northeast of Martinsdale, near the blacksmith's shop of the Martinsdale Sheep Co., at a point about $1\frac{1}{2}$ miles above the original site, which was near the ranch of M. J. Settle.

Records available.—June 19, 1907, to April 28, 1908 (old station); April 28, 1908, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Staff nailed to tree on the right bank; datum unchanged. The datum of this gage bears no determined relation to the datum of the gage at the original station.

Channel.—Bed of stream is chiefly gravel and is clean and nonshifting.

Discharge measurements.—Made by wading near the gage or from a bridge 150 feet below.

Winter flow.—Affected by ice.

Diversions.—Many small ditches take water from the creek and during the irrigating season all the water is diverted.

Accuracy.—Open season records good.

Discharge measurements of South Fork of Musselshell River near Martinsdale, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 17	C. S. Heidel.....	(a)	6.8	June 4	C. S. Heidel.....	5.75	1,180
Apr. 8	do.....	1.75	41	July 27	do.....	0.90	3.2
May 6	do.....	3.01	174	Oct. 27	do.....	1.55	25

^a Ice conditions.

Daily gage height, in feet, of South Fork of Musselshell River near Martinsdale, Mont., for 1911.

[J. G. Wallace, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		2.05	2.4	4.5	2.1	0.8	1.15	1.3
2.....		2.35	2.4	5.8	2.0	0.9	1.5	1.4
3.....		2.05	2.3	5.8	1.95	0.9	1.5	1.4
4.....		1.55	2.5	5.8	1.9	1.5	1.3	1.4
5.....		1.5	2.5	5.7	1.8	1.5	1.3	1.45
6.....		1.65	2.6	5.1	1.25	1.5	1.35	1.45
7.....		1.65	3.3	4.9	1.4	1.3	1.3	1.4
8.....		1.75	3.2	4.8	1.3	1.4	1.3	1.5
9.....		2.0	3.5	4.8	1.0	1.5	1.3	1.5
10.....		2.0	3.3	4.4	1.0	1.6	1.3	1.5
11.....		2.15	3.3	4.2	1.0	1.6	1.25	1.5
12.....		2.0	3.0	4.0	1.0	1.65	1.2	1.5
13.....		1.9	3.3	4.0	0.95	1.6	1.2	1.5
14.....		1.8	3.3	4.2	0.8	1.65	1.2	1.5
15.....		1.8	4.0	3.9	0.8	1.5	1.2	1.5
16.....		1.8	4.9	3.9	0.8	1.5	1.2	1.5
17.....		1.9	4.2	3.7	0.8	1.4	1.2	1.55
18.....		1.9	4.0	3.0	0.8	1.4	1.25	1.55
19.....	2.05	2.0	3.7	3.1	0.85	1.4	1.25	1.55
20.....	2.1	2.0	5.5	3.1	0.8	1.45	1.25	1.5
21.....	2.65	2.2	3.3	3.0	0.8	1.45	1.25	1.5
22.....	2.75	2.2	3.2	2.9	0.8	1.3	1.2	1.5
23.....	2.05	2.3	3.2	2.0	0.8	1.35	1.25	1.5
24.....	2.05	2.3	3.6	2.8	0.8	1.35	1.25	1.4
25.....	2.0	2.3	4.8	2.5	1.5	1.3	1.25	1.4
26.....	1.05	2.4	4.6	2.4	1.0	1.2	1.25	1.45
27.....	1.05	2.45	4.6	2.35	0.9	1.2	1.25	1.55
28.....	1.55	2.5	4.4	2.3	0.9	1.25	1.25	1.55
29.....	1.85	2.5	4.3	2.2	0.9	1.2	1.25	1.55
30.....	1.4	2.5	4.2	2.15	0.85	1.15	1.3	1.6
31.....	1.55		4.0		0.85	1.15		1.75

Daily discharge, in second-feet, of South Fork of Musselshell River near Martinsdale, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.		66	104	555	71	2	9.5	15
2.		98	104	1,260	62	3	24	19
3.		66	92	1,260	58	3	24	19
4.		27	116	1,260	53	24	15	19
5.		24	116	1,200	45	24	15	22
6.		34	128	846	13	24	17	22
7.		34	231	740	19	15	15	24
8.		41	214	690	15	19	15	24
9.		62	268	690	5	24	15	24
10.		62	231	516	5	30	15	24
11.		76	231	447	5	30	13	24
12.		62	183	390	5	34	11	24
13.		53	231	390	4	30	11	24
14.		45	231	447	2	34	11	24
15.		45	390	363	2	24	11	24
16.		45	740	363	2	24	11	24
17.		53	447	312	2	19	11	27
18.		53	390	183	2	19	13	27
19.	66	62	312	198	2.5	19	13	27
20.	71	62	1,080	198	2	22	13	24
21.	134	81	231	183	2	22	13	24
22.	148	81	214	168	2	15	11	24
23.	66	92	214	62	2	17	13	24
24.	66	92	289	154	2	17	13	19
25.	62	92	690	116	24	15	13	19
26.	6.5	104	597	104	5	11	13	22
27.	6.5	110	597	98	3	11	13	27
28.	27	116	516	92	3	13	13	27
29.	49	116	480	81	3	11	13	27
30.	19	116	447	76	2.5	9.5	15	30
31.	27		390		2.5	9.5		41

NOTE.—Daily discharge determined from 1910 rating curve that is well defined.

Monthly discharge of South Fork of Musselshell River near Martinsdale, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January			^a 10	615	D.
February			^a 7	389	D.
March	148		35.8	2,200	C.
April	116	24	69.0	4,110	A.
May	1,080	92	339	20,800	A.
June	1,260	62	448	26,700	A.
July	71	2	13.7	842	A.
August	34	2	18.5	1,140	A.
September	24	9.5	13.8	821	A.
October	41	15	24.0	1,480	A.
November			^a 18.0	1,070	D.
December			^a 12.0	738	D.
The year	1,260	2	84.1	60,900	

^a Estimated.

NOTE.—Discharge Mar. 1 to 18 estimated at 20 second-feet.

AMERICAN FORK NEAR HARLOWTON, MONT.

Location.—At the Shaw & Elliott ranch, 5 miles southeast of Harlowton, Mont., a few miles above the junction of the American Fork with the Musselshell.

Records available.—July 28, 1907, to December 31, 1911.

Gage.—Chain fastened to upper rail of small wagon bridge; datum unchanged.

Channel.—Bed composed of sand and clay; shifts only at extremely high stages.

Discharge measurements.—Made from the bridge or by wading.

Winter flow.—Affected by ice.

Storage.—The basin of the American Fork affords some good storage sites and by holding back the spring flood waters, which are derived from the melting snow on the mountains, much more land can be put under irrigation.

Accuracy.—Open season records good.

Discharge measurements of American Fork near Harlowton, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
Feb. 14	C. S. Heidel.....	<i>Feet.</i> (<i>a</i>)	<i>Sec.-ft.</i>	June 3	C. S. Heidel.....	<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 7	.....do.....	1.32	0.9 3.2	Oct. 26	.....do.....	3.77 1.20	544 2.5

^a Ice conditions.

Daily gage height, in feet, of American Fork near Harlowton, Mont., for 1911.

[Jesse Cunningham, observer]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		1.3	1.3	2.9	1.15	.....	.....	1.2	1.15
2.....		1.3	1.3	3.65	1.15	1.15	.....	1.2	1.15
3.....		1.3	1.25	3.75	1.15	1.05	.....	1.15	1.15
4.....		1.3	1.25	3.7	1.05	1.15	.....	1.2	1.15
5.....		1.3	1.25	3.6	1.45	1.15	.....	1.25	1.15
6.....		1.3	1.2	3.55	0.95	1.1	1.45	1.2	.....
7.....		1.3	1.2	3.55	1.05	1.05	1.05	1.25	.....
8.....		1.2	1.2	2.75	1.15	1.15	1.1	1.2	.....
9.....		1.25	1.25	2.75	1.45	1.2	1.15	1.2	.....
10.....		1.3	1.3	2.5	0.95	1.15	1.1	1.2	.....
11.....		1.25	1.3	2.4	0.95	1.15	1.1	1.25	.....
12.....		1.25	1.3	2.55	0.95	1.1	1.1	1.2	.....
13.....		1.25	1.2	2.35	0.95	1.1	1.05	1.15	.....
14.....		1.25	1.25	2.4	0.9	1.05	1.05	1.2	.....
15.....		1.25	1.45	2.35	0.9	1.05	1.05	1.2	.....
16.....		1.2	2.65	2.4	0.9	0.95	0.95	1.1	.....
17.....		1.25	2.55	2.2	0.9	0.9	0.95	1.2	.....
18.....		1.3	2.4	2.0	1.0	0.9	1.45	1.2	.....
19.....		1.3	2.1	1.85	0.95	0.85	1.45	1.2	.....
20.....		1.3	1.9	1.85	0.95	.....	1.05	1.1	.....
21.....		1.25	1.85	1.8	0.9	.....	1.05	1.2	.....
22.....		1.3	1.8	1.85	0.8	.....	1.05	1.2	.....
23.....		1.35	1.55	1.75	0.85	.....	1.1	1.15	.....
24.....		1.35	1.8	1.75	0.8	.....	1.1	1.2	.....
25.....		1.3	2.5	1.1	.....	0.9	1.15	1.2	.....
26.....	1.35	1.25	2.65	1.1	.....	0.95	1.2	1.2	.....
27.....	1.3	1.35	2.85	1.2	0.5	1.05	1.15	1.1	.....
28.....	1.3	1.4	2.6	1.2	.....	1.05	1.15	1.1	.....
29.....	1.3	1.35	2.6	1.3	.....	0.95	1.2	1.1	.....
30.....	1.3	1.3	2.4	1.2	.....	0.85	1.2	1.1	.....
31.....	1.35	.....	2.55	.....	.....	.....	.....	1.15	.....

Daily discharge, in second-feet, of American Fork near Harlowton, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		3.5	3.5	220	1.8	0.9	1.8	2.0	1.8
2.....		3.5	3.5	490	1.8	1.8	3.0	2.0	1.8
3.....		3.5	2.8	535	1.8	1.2	4.2	1.8	1.8
4.....		3.5	2.8	510	1.2	1.8	5.4	2.0	1.8
5.....		3.5	2.8	470	8.0	1.8	6.7	2.8	1.8
6.....		3.5	2.0	450	.8	1.5	8.0	2.0	-----
7.....		3.5	2.0	450	1.2	1.2	1.2	2.8	-----
8.....		2.0	2.0	182	1.8	1.8	1.5	2.0	-----
9.....		2.8	2.8	182	8.0	2.0	1.8	2.0	-----
10.....		3.5	3.5	130	.8	1.8	1.5	2.0	-----
11.....		2.8	3.5	112	.8	1.8	1.5	2.8	-----
12.....		2.8	3.5	140	.8	1.5	1.5	2.0	-----
13.....		2.8	2.0	104	.8	1.5	1.2	1.8	-----
14.....		2.8	2.8	112	.7	1.2	1.2	2.0	-----
15.....		2.8	8.0	104	.7	1.2	1.2	2.0	-----
16.....		2.0	160	112	.7	.8	.8	1.5	-----
17.....		2.8	140	81	.7	.7	.8	2.0	-----
18.....		3.5	112	54	1.0	.7	8.0	2.0	-----
19.....		3.5	67	37	.8	.6	8.0	2.0	-----
20.....		3.5	42	37	.8	.6	1.2	1.5	-----
21.....		2.8	37	32	.7	.6	1.2	2.0	-----
22.....		3.5	32	37	.5	.6	1.2	2.0	-----
23.....		4.8	13	28	.6	.7	1.5	1.8	-----
24.....		4.8	32	28	.5	.7	1.5	2.0	-----
25.....		3.5	130	1.5	.0	.7	1.8	2.0	-----
26.....	4.8	2.8	160	1.5	.0	.8	2.0	2.0	-----
27.....	3.5	4.8	208	2.0	.0	1.2	1.8	1.5	-----
28.....	3.5	6.0	150	2.0	.0	1.2	1.8	1.5	-----
29.....	3.5	4.8	150	3.5	.0	.8	2.0	1.5	-----
30.....	3.5	3.5	112	2.0	.0	.6	2.0	1.5	-----
31.....	4.8	-----	140	-----	.0	.6	-----	1.8	-----

NOTE.—Daily discharge determined from a rating curve that is fairly well defined. Discharge interpolated for days for which gage heights are missing.

Monthly discharge of American Fork near Harlowton, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			α 1.00	61	D.
February.....			α .90	50	D.
March.....	4.8		1.57	97	D.
April.....	6.0	2.0	3.45	205	C.
May.....	208	2.0	55.9	3,440	C.
June.....	535	1.5	155	9,220	C.
July.....	8.0	.0	1.20	74	C.
August.....	2.0	.6	1.13	69	C.
September.....	8.0	.8	2.58	154	C.
October.....	2.8	1.5	1.95	120	C.
November.....			α 1.00	60	D.
December.....			α 1.00	61	D.
The year.....	535		18.8	13,600	

α Estimated.

NOTE.—Discharge Mar. 1 to 25 estimated at 1 second-foot.

8173°—wsp 306—14—8

LEBO CREEK NEAR HARLOWTON, MONT.

Location.—Near the Shaw & Elliott ranch, 5 miles southeast of Harlowton, half a mile above the junction of the creek with American Fork.

Records available.—July 28, 1907, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Staff on the right bank, nailed to the pile of the small wagon bridge; its datum is the same as that of the gage on the American Fork.

Channel.—Contains growth of grass.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—The water of the stream is used for irrigation.

Accuracy.—Records only fair as gage heights are affected by backwater caused by grass in the stream bed.

Lebo Creek is about 20 miles long, is fed by springs, and its flow is nearly uniform.

Discharge measurements of Lebo Creek near Harlowton, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 14 ^a	C. S. Heidel.....		21	July 27	C. S. Heidel.....	.98	7.3
Apr. 7	do.....	1.28	24	Oct. 26	do.....	1.40	22
June 3	do.....	1.85	42				

^a Creek frozen at gage.

Daily gage height, in feet, of Lebo Creek near Harlowton, Mont., for 1911.

[Neva Clark, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		1.2	1.15	1.9	1.0	1.15	1.25	1.25	1.45
2.....		1.2	1.1	2.15	1.0	1.15	1.3	1.25	1.35
3.....		1.15	1.5	1.85	.95	1.15	1.35	1.25	1.25
4.....		1.2	1.1	1.7	.9	1.2	1.35	1.25	1.25
5.....		1.15	1.1	1.65	.9	1.2	1.3	1.25	1.15
6.....		1.25	1.1	1.6	.9	1.25	1.4	1.25	.....
7.....		1.3	1.1	1.55	.95	1.15	1.35	1.25	.....
8.....		1.25	1.0	1.4	1.0	1.3	1.35	1.25	.....
9.....		1.2	1.1	1.4	.95	1.45	1.3	1.15	.....
10.....		1.2	1.15	1.35	.9	1.4	1.25	1.15	.....
11.....		1.1	1.5	1.3	.9	1.35	1.25	1.15	.....
12.....		1.1	1.5	1.35	.9	1.45	1.25	1.15	.....
13.....		1.1	1.1	1.4	1.5	1.4	1.25	1.15	.....
14.....		1.1	1.1	1.4	1.0	1.45	1.25	1.15	.....
15.....		1.1	1.1	1.45	1.5	1.45	1.25	1.15	.....
16.....		1.0	1.25	1.55	1.0	1.4	1.25	1.15	.....
17.....		1.0	1.15	1.5	.95	1.4	1.25	1.25	.....
18.....		1.0	1.1	1.4	.8	1.4	1.25	1.25	.....
19.....		1.0	1.1	1.4	.8	1.4	1.25	1.25	.....
20.....		1.1	1.5	1.4	.8	1.35	1.2	1.25	.....
21.....		1.1	1.5	1.45	.75	1.35	1.25	1.25	.....
22.....		1.15	1.5	1.4	.65	1.3	1.25	1.25	.....
23.....		1.15	1.2	1.35	.65	1.3	1.3	1.25	.....
24.....		1.15	1.3	1.35	.65	1.3	1.3	1.3	.....
25.....		1.1	2.6	1.2	.7	1.35	1.25	1.3	.....
26.....									
27.....	1.4	1.1	2.6	1.2	.75	1.35	1.25	1.4	.....
28.....	1.3	1.15	2.1	1.15	1.0	1.35	1.2	1.4	.....
29.....	1.3	1.2	2.5	1.1	.95	1.35	1.2	1.45	.....
30.....	1.25	1.2	1.8	1.0	.95	1.3	1.25	1.45	.....
31.....	1.3	1.1	1.8	1.5	1.45	1.3	1.25	1.4	.....
	1.2	.....	1.6	.....	1.25	1.3	.....	1.35	.....

NOTE.—Daily discharge determined as follows: Mar. 26 to May 24, from curve poorly defined; May 25 to June 2, by indirect method for shifting channels; June 3 to Nov. 5, from curve fairly well defined.

Daily discharge, in second-feet, of Lebo Creek near Harlowton, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		21	19	50	8	12	16	16	24
2.		21	17	64	8	12	18	16	20
3.		19	33	40	7	12	20	16	16
4.		21	17	34	6	14	20	16	16
5.		19	17	32	6	14	18	16	12
6.		23	17	30	6	16	22	16	.....
7.		25	17	28	7	42	20	16	.....
8.		23	14	22	8	18	20	16	.....
9.		21	17	22	7	24	18	12	.....
10.		21	19	20	6	22	16	12	.....
11.		17	33	18	6	20	16	12	.....
12.		17	33	20	6	24	16	12	.....
13.		17	17	22	26	22	16	12	.....
14.		17	17	22	8	24	16	12	.....
15.		17	17	24	26	24	16	12	.....
16.		14	23	28	8	22	16	12	.....
17.		14	19	26	7	22	16	16	.....
18.		14	17	22	4	22	16	16	.....
19.		14	17	22	4	22	16	16	.....
20.		17	33	22	4	20	14	16	.....
21.		17	33	24	3	20	16	16	.....
22.		19	33	22	1.5	18	16	16	.....
23.		19	21	20	1.5	18	18	16	.....
24.		19	25	20	1.5	18	18	18	.....
25.		17	88	14	2	20	16	18	.....
26.	29	17	88	14	3	20	16	22	.....
27.	25	19	64	12	8	20	14	22	.....
28.	25	21	80	11	7	20	14	24	.....
29.	23	21	45	8	7	18	16	24	.....
30.	25	17	45	26	24	18	16	22	.....
31.	21	.....	34	.....	16	18	.....	20	.....

Monthly discharge of Lebo Creek near Harlowton, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January	.....	.....	a 10	615	D.
February	.....	.....	a 15	833	D.
March	.....	.....	a 20	1,230	D.
April	25	14	18.6	1,110	C.
May	88	14	31.3	1,920	C.
June	64	8	24.6	1,460	B.
July	26	1.5	7.82	481	B.
August	24	12	18.9	1,160	B.
September	22	14	16.9	1,010	B.
October	24	12	16.3	1,000	B.
November	.....	.....	a 12	714	D.
December	.....	.....	a 10	615	D.
The year	88	.....	16.8	12,100	.....

a Estimated.

FLATWILLOW CREEK NEAR FLATWILLOW, MONT.

Location.—At Flatwillow Ranch Co.'s ranch, 8 miles above Flatwillow and 30 miles north of Roundup.

Records available.—May 3 to December 31, 1911.

Drainage area.—Not measured.

Gage.—Staff gage, marked to tenths of feet, nailed to a timber driven into bed of stream and braced to the banks; below the wagon bridge near the ranch buildings.

Channel.—Likely to shift; current very sluggish.

Discharge measurements.—At high stages made from a footbridge behind house; at low water made by wading around a bend below house.

Winter flow.—Affected by ice.

Diversions.—Much water is diverted above the gage during the irrigating season.

A canal to divert water into the storage reservoir of the Flatwillow Carey project heads about a mile above the station.

Discharge measurements of Flatwillow Creek near Flatwillow, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 3	C. S. Heidel	3.15	23
June 1	do.	6.71	253
July 26	do.	2.59	4.5
Oct. 25	do.	3.15	29

Daily gage height, in feet, of Flatwillow Creek near Flatwillow, Mont., for 1911.

[Lee Akers, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		6.8	3.6	2.8	2.8	2.7	3.1	3.2
2		7.1	3.6	2.9	2.8	2.7	3.0	3.2
3	3.13	7.2	3.4	3.1	2.7	2.7	3.0	3.3
4	3.10	7.2	3.3	3.2	2.7	2.8	3.0	3.3
5	3.11	6.9	3.3	3.2	2.7	2.8	3.0	3.3
6	3.11	6.5	3.1	3.3	2.8	2.9	3.0	3.2
7	3.08	6.2	3.1	3.5	2.8	2.8	3.0	3.3
8	3.12	5.9	3.3	3.6	2.9	2.9	3.0	
9	3.18	5.8	3.3	3.7	2.9	2.9	3.0	
10	3.12	5.8	3.3	3.7	2.9	2.9	3.0	
11	3.11	5.6	3.2	3.6	2.9	2.9	3.0	
12	3.00	5.5	2.9	3.6	2.8	3.0	3.0	
13	3.02	5.3	2.9	3.4	2.8	2.9	3.0	
14	2.86	5.2	2.8	3.4	2.7	3.0	3.1	
15	3.85	5.1	2.9	3.3	2.6	3.2	3.1	
16	6.2	5.1	2.9	3.2	2.6	3.2	2.9	
17	4.3	4.8	2.8	3.2	2.6	3.3	2.9	3.2
18	4.0	4.6	2.8	3.6	2.6	3.4	2.9	3.0
19	3.9	4.4	2.8	3.4	2.7	3.4	2.9	3.2
20	3.8	4.2	2.9	3.4	2.8	3.4	3.0	3.1
21	3.8	4.1	2.8	3.4	2.8	3.2	3.0	3.1
22	3.9	4.2	2.8	3.4	2.8	3.1	3.0	3.1
23	3.8	4.2	2.8	3.3	2.8	3.0	3.0	3.1
24	4.3	4.1	2.8	3.3	2.8	3.1	3.1	3.1
25	5.2	4.0	2.7	3.3	2.8	3.0	3.1	3.1
26	6.6	4.0	2.6	3.3	2.8	3.1	3.3	3.1
27	6.6	3.9	2.6	3.3	2.7	2.9	3.3	3.1
28	6.2	3.9	2.6	3.2	2.7	2.9	3.3	3.1
29	6.2	3.8	2.7	3.1	2.7	2.8	3.3	3.1
30	6.1	3.7	2.7	3.1	2.7	2.9	3.2	3.1
31	6.2		2.7	2.8		3.0		3.1

NOTE.—Gage heights distorted by ice Nov. 24 to Dec. 31.

Daily discharge, in second-feet, of Flatwillow Creek near Flatwillow Mont., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	25	260	47	12	12	8	24
2.....	25	284	47	16	12	8	20
3.....	25	292	37	24	8	8	20
4.....	24	292	32	28	8	12	20
5.....	24	268	32	28	8	12	20
6.....	24	236	24	32	12	16	20
7.....	23	212	24	42	12	12	20
8.....	25	191	32	47	16	16	20
9.....	27	184	32	52	16	16	20
10.....	25	184	32	52	16	16	20
11.....	24	170	28	47	16	16	20
12.....	20	163	16	47	12	20	20
13.....	21	149	16	37	12	16	20
14.....	14	142	12	37	8	20	24
15.....	14	135	16	32	5	28	24
16.....	212	135	16	28	5	28	16
17.....	85	115	12	28	5	32	16
18.....	67	103	12	47	5	37	16
19.....	62	91	12	37	8	37	16
20.....	57	79	16	37	12	37	20
21.....	57	73	12	37	12	28	20
22.....	62	79	12	37	12	24	20
23.....	57	79	12	32	12	20	20
24.....	85	73	12	32	12	24	20
25.....	142	67	8	32	12	20	20
26.....	244	67	5	32	12	24	20
27.....	244	62	5	32	8	16	20
28.....	212	57	5	28	8	16	20
29.....	212	57	8	24	8	12	20
30.....	205	52	8	24	8	16	20
31.....	212	.....	8	12	.....	20	.....

NOTE.—Daily discharge determined from a rating curve not well defined. Discharge estimated for days for which gage heights are missing.

Monthly discharge of Flatwillow Creek near Flatwillow, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	244	14	82.4	5,070	C.
June.....	292	52	145.0	8,630	C.
July.....	47	5	19.0	1,170	C.
August.....	52	12	33.3	2,050	C.
September.....	16	5	10.4	619	C.
October.....	37	8	19.8	1,220	C.
November.....	24	16	19.9	1,180	C.
December.....	.....	.....	α 20.0	1,230	D.
The period.....	.....	.....	.....	21,200	.....

α Estimated.

MILK RIVER BASIN.

SOUTH FORK OF MILK RIVER NEAR BROWNING, MONT.

Location.—At Richard Croff's ranch, about 40 miles northeast of Browning, Mont., and about 6 miles south of the Canadian boundary line.

Records available.—April 28, 1905, to December 31, 1911.

Drainage area.—283 square miles.

Gage.—Chain. During the high water of June, 1908, the gage was washed out and was not replaced until July 31, 1908, when the new chain gage was installed at the original site and datum.

Channel.—Permanent.

Discharge measurements.—Made from a cable installed at the time of the installation of the new gage.

Winter flow.—Affected by ice.

Flood discharge.—The river overflows its banks at gage height of 12 feet; highwater marks show that the flood of June, 1908, reached a stage of 15.4 feet on the gage. The flood width was 850 feet and the cross section about 2,600 square feet.

Diversions.—A number of small ditches divert water to irrigate meadow lands in the river bottom; a considerable amount of this water returns to the stream as seepage and waste. No storage is used above the station.

Accuracy.—Records excellent except during the winter months.

Discharge measurements of South Fork of Milk River near Browning, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
May 9	B. E. Jones	<i>Feet.</i> 3.54	<i>Sec.-ft.</i> 180
Aug. 29	do.	2.71	44

Daily gage height, in feet of South Fork of Milk River near Browning, Mont., for 1911.

[R. J. Croff, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1		3.42	3.5	3.9	3.01	2.55	2.95
2		3.45	3.6	3.55	2.96	2.5	2.95
3		3.55	3.6	3.5	3.26	2.45	2.95
4		3.55	3.6	3.4	3.06	3.25	3.05
5		3.75	3.5	3.38	3.21	4.35	3.1
6		3.9	3.5	3.32	3.04	4.35	3.05
7		3.75	3.4	3.16	3.16	4.25	2.95
8		3.5	3.6	3.03	3.21	4.15	2.95
9		3.6	3.7	2.98	3.16	3.8	2.9
10		3.5	3.45	2.98	3.08	3.55	2.9
11		3.5	3.39	2.97	3.12	3.27	2.9
12		3.42	3.34	2.95	2.94	3.15	2.9
13		3.48	3.29	2.89	2.94	3.05	2.9
14		4.2	3.29	2.87	2.76	3.0	2.9
15		4.75	3.27	2.87	2.76	2.95	2.9
16		6.3	3.21	2.89	2.71	2.95	2.9
17		5.15	3.19	3.22	2.71	2.95	2.9
18		4.2	3.14	3.07	2.69	2.95	2.9
19		3.95	3.09	3.27	2.64	2.95	2.9
20		3.8	2.99	3.22	2.61	2.93	2.9
21		3.7	3.18	2.97	2.63	2.9	2.9
22		3.7	3.55	2.97	2.6	3.0	2.95
23	3.9	3.75	3.3	2.95	2.65	3.05	2.95
24	3.9	3.7	4.3	2.95	2.63	3.17	2.95
25	4.0	3.8	5.95	2.89	2.6	3.25	2.9
26	4.15	3.9	4.8	2.82	2.6	3.2	2.45
27	4.0	3.9	3.85	2.77	2.65	3.13	2.45
28	3.65	3.9	3.9	2.77	2.65	2.97	2.55
29	3.5	3.75	3.8	2.72	2.6	3.05	2.7
30	3.42	3.6	3.55	2.79	2.67	2.95	2.65
31		3.55		2.99	2.55		2.65

Daily discharge, in second-feet, of South Fork of Milk River near Browning, Mont., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		154	172	273	80	28	72
2.....		161	195	184	73	23	72
3.....		184	195	172	122	20	72
4.....		184	195	150	88	120	86
5.....		133	172	146	113	400	94
6.....		273	172	134	85	400	86
7.....		133	150	104	104	372	72
8.....		172	195	84	113	342	72
9.....		195	220	76	104	246	65
10.....		172	161	76	91	184	65
11.....		172	148	75	97	124	65
12.....		154	138	72	71	102	65
13.....		168	128	64	71	86	65
14.....		357	128	61	48	79	65
15.....		520	124	61	48	72	65
16.....		1,040	113	64	43	72	65
17.....		648	109	115	43	72	65
18.....		357	101	90	41	72	65
19.....		286	92	124	36	72	65
20.....		246	78	115	33	69	65
21.....		220	108	75	35	65	65
22.....		220	184	75	32	79	72
23.....	273	233	130	72	37	86	72
24.....	273	220	386	72	35	106	72
25.....	300	246	918	64	32	120	65
26.....	342	273	536	55	32	111	20
27.....	300	273	260	49	37	99	20
28.....	208	273	273	49	37	75	28
29.....	172	233	246	44	32	86	42
30.....	154	195	184	51	39	72	37
31.....		184		78	28		37

NOTE.—Daily discharge determined from a well-defined rating curve.

Monthly discharge of South Fork of Milk River near Browning, Mont., for 1911.

[Drainage area, 283 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
April 23-30.....			253	.894	0.27	4,010	A.
May.....	1,040	133	267	.943	1.09	16,400	A.
June.....	918	78	207	.731	.82	12,300	A.
July.....	273	44	94.3	.333	.38	5,800	A.
August.....	122	28	60.6	.214	.25	3,730	A.
September.....	400	20	128	.452	.50	7,620	A.
October.....	94	20	62.5	.221	.25	3,840	A.
The period.....						53,700	

MILK RIVER AT HAVRE, MONT.

Location.—In SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 5, T. 32 N., R. 16 E., at the highway bridge over Milk River at Havre, Mont.

Records available.—May 15, 1898, to December 31, 1911.

Drainage area.—About 7,300 square miles.

Gage.—Chain fastened to bridge rail on the downstream side; datum unchanged.

Channel.—Shifts.

Discharge measurements.—Made from bridge or by wading.

Winter flow.—From the last part of November to the first part of April the river at Havre is frozen entirely over and in portions of the cross sections it is usually frozen to the bottom.

Diversions.—An irrigation company in southern Alberta, Can., has been granted an appropriation of 500 second-feet of the low-water flow and 1,500 second-feet of the high-water flow, and a canal of 330 second-feet capacity has been partially constructed but no water has been diverted. There are no other important irrigation rights above Havre, but farther downstream are five large canal systems supplied directly from Milk River and irrigating about 22,000 acres. Preliminary steps toward the adjudication of the water rights of these various systems have been taken. A suit in behalf of the Fort Belknap Indians was decided in their favor with the result that they were given a prior right over the other canals to 125 second-feet, the priority of the other rights not being touched upon. Although no provision for storage has been made by the above claimants, the entire unappropriated flow of the stream has been filed upon by the United States Reclamation Service in connection with its Milk River irrigation project now under construction.

Accuracy.—Frequent discharge measurements are necessary to properly define the rating curve, and even with these the estimates are subject to considerable error. In years of low precipitation the flow ceases entirely and the water stands in pools for several months.

Discharge measurements of Milk River at Havre, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 15	W. A. Lamb.....	6.98	541	June 26	J. C. Beebe.....	7.22	745
28	J. C. Beebe.....	7.29	657	28	.....do.....	9.11	2,030
May 3	.....do.....	a 6.30	135	July 4	.....do.....	7.30	715
3	.....do.....	a 6.60	304	8	.....do.....	6.70	334
6	.....do.....	6.16	244	27	.....do.....	5.83	86
23	.....do.....	7.13	579	Aug. 2	.....do.....	5.72	78
30	.....do.....	6.72	366	31	R. Richards.....	5.48	42
June 17	.....do.....	6.11	174	Oct. 12	W. A. Lamb.....	6.50	253

a Sand bar under gage; gage height of no value.

Daily gage height, in feet, of Milk River at Havre, Mont., for 1911.

[U. S. Weather Bureau, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		6.8	7.1	6.6	7.3	5.7	5.4	6.3	6.2
2.....		6.8	6.9	6.6	8.3	5.7	5.4	6.5	
3.....		6.7	6.8	6.7	8.2	5.8	5.4	6.6	
4.....		6.7	6.3	6.7	7.4	5.8	5.4	6.6	6.1
5.....		6.6	6.1	6.6	7.1	5.7	8.7	6.9	6.2
6.....		6.2	6.4	6.5	7.1	5.9	9.6	7.2	6.1
7.....		6.1	6.1	6.3	7.1	5.9	10.3	7.1	6.2
8.....		6.8	6.1	6.4	6.8	6.0	9.0	6.5	
9.....	6.2	6.6	6.1	6.6	6.7	6.1	8.5	6.5	
10.....	5.9	6.5	6.4	6.7	6.6	6.1	8.1	6.4	
11.....	5.7	6.3	6.3	6.3	6.4	6.1	7.2	6.6	
12.....	5.7	6.4	6.5	6.3	6.3	6.3	6.9	6.5	
13.....	5.7	6.4	6.3	6.2	6.3	6.7	6.7	6.6	
14.....		6.8	6.2	6.1	6.2	6.4	7.3	6.5	
15.....		7.1	6.3	6.1	6.1	6.3	7.2	6.5	
16.....		6.9	6.4	6.3	6.1	6.4	7.0	6.4	
17.....		6.6	6.5	6.2	6.1	6.1	6.9	6.5	
18.....	6.2	6.5	6.6	6.2	6.0	6.0	6.7	6.4	
19.....	6.5	6.5	8.5	6.1	6.0	6.0	6.7	6.5	
20.....	6.7	6.4	8.2	6.1	5.9	5.9	6.6	6.3	
21.....	6.8	6.3	7.4	6.2	6.0	5.7	6.5	6.4	
22.....	7.2	6.3	7.2	6.2	5.9	5.7	6.6	6.4	
23.....	6.8	6.3	7.1	6.3	5.9	5.7	6.7	6.5	
24.....	7.8	6.2	6.8	6.2	5.9	5.6	6.7	6.4	
25.....	7.8	6.3	6.9	6.3	5.8	5.6	6.7	6.5	
26.....	7.6	6.5	6.8	6.7	5.8	5.6	6.6	6.4	
27.....	7.5	7.0	6.9	7.5	5.8	5.6	6.7	6.3	
28.....	7.3	7.2	6.8	9.5	5.8	5.5	6.4	6.2	
29.....	7.2	6.9	6.7	8.3	5.7	5.5	6.5	6.3	
30.....	7.1	7.0	6.9	7.8	5.7	5.4	6.3	6.1	
31.....	7.0		6.7		5.6	5.4		6.2	

Daily discharge, in second-feet, of Milk River at Havre, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	10	410	575	315	710	70	35	210	180
2.....	30	410	460	315	1,420	70	35	275	171
3.....	50	360	410	360	1,340	85	35	315	163
4.....	70	360	210	360	780	85	35	315	155
5.....	90	315	155	315	575	70	1,720	460	180
6.....	110	180	240	275	575	105	2,410	640	155
7.....	130	155	155	210	575	105	2,980	575	180
8.....	150	410	155	240	410	130	1,940	275	
9.....	180	315	155	315	360	155	1,570	275	
10.....	105	275	240	360	315	155	1,270	240	
11.....	70	210	210	210	240	155	640	315	
12.....	70	240	275	210	210	210	460	275	
13.....	70	240	210	180	210	360	360	315	
14.....	90	410	180	155	180	240	710	275	
15.....	110	575	210	155	155	210	640	275	
16.....	130	460	240	210	155	240	515	240	
17.....	150	315	275	180	155	155	460	275	
18.....	180	275	315	180	130	130	360	240	
19.....	275	275	1,570	155	130	130	360	275	
20.....	360	240	1,340	155	105	105	315	210	
21.....	410	210	780	180	130	70	275	240	
22.....	640	210	640	180	105	70	315	240	
23.....	410	210	575	210	105	70	360	275	
24.....	1,060	180	410	180	105	55	360	240	
25.....	1,060	210	460	210	85	55	360	275	
26.....	920	275	410	360	85	55	315	240	
27.....	850	515	460	850	85	55	360	210	
28.....	710	640	410	2,330	85	45	240	180	
29.....	640	460	360	1,420	70	45	275	210	
30.....	575	515	460	1,060	70	35	210	155	
31.....	515		360		55	35		180	

NOTE.—Daily discharge determined from a rating curve fairly well defined below 850 second-feet. Discharge interpolated for days for which gage heights are missing.

Monthly discharge of Milk River at Havre, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
March.....	1,060	.....	330	20,300	C.
April.....	640	155	329	19,600	B.
May.....	1,570	155	416	25,600	B.
June.....	2,330	155	394	23,400	B.
July.....	1,420	55	313	19,200	B.
August.....	360	35	115	7,070	B.
September.....	2,980	35	664	39,500	B.
October.....	640	155	281	17,300	B.
November.....	180	.....	97	5,770	C.
December.....	.....	.....	^a 40	2,460	D.
The period.....	.....	.....	.....	180,000	

^a Estimated.

NOTE.—Discharge Nov. 8 to 30 estimated at 75 second-feet per day.

MILK RIVER AT MALTA, MONT.

Location.—In the NW. $\frac{1}{4}$ sec. 17, T. 30 N., R. 30 E., at the highway bridge at Malta, Mont.

Records available.—July 31, 1902, to December 31, 1911.

Drainage area.—About 14,000 square miles.

Gage.—Chain fastened to handrail on downstream side of bridge; datum unchanged.

Channel.—Sandy; shifts during floods.

Discharge measurements.—Made from bridge or by wading.

Winter flow.—More or less ice present during winter months.

Diversions.—The entire run-off from the drainage area above does not pass the station, for between Havre and Malta seven irrigation canals, which irrigate about 25,000 acres of land, divert water from Milk River and its tributaries. The United States Reclamation Service has under construction a diversion dam at Dodson about 17 miles above the station, which will divert water for the irrigation of about 108,000 acres of land in Milk River valley. East of Malta there are two canals, one on each side, the combined discharge being 1,000 second-feet.

Discharge measurements of Milk River at Malta, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 14	J. C. Beebe.....	1.75	155	July 1	J. C. Beebe.....	4.38	1,560
29	do.....	1.62	115	2	do.....	4.13	1,380
May 18	do.....	1.47	67	3	do.....	3.56	972
June 13	do.....	2.05	208	31	do.....	1.24	34
30	do.....	1.02	17.9	Oct. 10	W. A. Lamb.....	2.98	557

Daily gage height, in feet, of Milk River at Malta, Mont., for 1911.

[H. P. Clark, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1		2.35	1.27	2.75	4.4	1.20	1.20	2.75	
2		2.45	2.40	2.60	3.9	1.13	1.15	2.70	1.80
3		2.25	2.40	2.55	3.35	1.10	1.15	2.70	
4		2.15	2.45	2.40	3.1	1.07	1.25	2.65	1.95
5		2.05	2.35	2.35	3.5	1.05	1.45	2.65	2.15
6		1.95	2.20	2.25	3.45	1.05	5.2	2.70	
7		1.90	2.05	2.25	2.95	1.03	7.0	2.85	1.55
8		1.85	1.95	2.30	2.85	1.80	10.2	2.80	
9		1.75	1.83	2.15	2.85	0.97	12.3	2.95	
10		1.75	1.75	2.05	2.75	1.00	12.8	3.05	
11		1.75		2.00	2.50	0.97	11.4	2.85	
12		1.75		2.00	2.10	1.03	8.4	2.70	
13		1.85	1.50	2.00	1.90	1.10	6.2	2.70	
14		1.75	1.50	1.90	1.57	1.15	5.0	2.65	
15		1.70	1.50	1.80	1.35	1.15	4.5	2.65	
16		1.70	1.47	1.67	1.30	1.70	4.4	2.55	
17		1.70	1.40	1.50	1.27	2.00	4.0	2.55	
18		1.55	1.57	1.27	1.20	2.07	3.75	2.45	
19		1.55	1.63	1.20	1.23	2.00	3.40	2.50	
20		1.60	1.85	1.13	1.25	1.90	3.15	2.35	
21		1.45	1.80	1.10	1.20	1.95	3.05	2.35	
22		1.25	3.30	1.05	1.20	1.80	2.95	2.35	
23			3.45	.95	1.15	1.65	2.90	2.35	
24			3.10	1.65	1.25	1.63	2.75	2.30	
25	3.25	1.15	2.85	1.45	1.30	1.60	2.80		
26	3.05	1.35	2.75	1.35	1.15	1.63	2.85	2.25	
27	2.65	1.45	3.90	1.25	1.10	2.05	3.15	2.30	
28	3.25	1.55	4.0	1.15	2.10	1.87	3.15		
29	3.15	1.63	4.0	1.00	1.50	1.50	3.05	2.35	
30	2.25	1.63	3.35	3.20	1.30	1.35	2.90		
31	1.75		3.05		1.25	1.33		2.20	

Daily discharge, in second-feet, of Milk River at Malta, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1		309	44	472	1,540	36	36	472	199
2		346	327	405	1,210	29	31	448	141
3		274	327	385	825	26	31	448	161
4		241	346	327	660	24	42	426	181
5		210	309	309	930	22	68	426	241
6		181	257	274	895	22	2,100	448	164
7		167	210	274	572	20	3,320	520	86
8		154	181	291	520	141	5,250	495	
9		129	149	241	520	16	6,540	572	
10		129	129	210	472	18	6,860	630	
11		129	112	195	365	16	5,980	520	
12		129	94	195	225	20	4,160	448	
13		154	76	195	167	26	2,780	448	
14		129	76	167	89	31	1,960	426	
15		117	76	141	54	31	1,620	426	
16		117	71	110	47	117	1,540	385	
17		117	60	76	44	195	1,280	385	
18		86	89	44	36	216	346	300	
19		86	102	36	39	195	860	365	
20		95	154	29	42	167	692	309	
21		68	141	26	36	181	630	309	
22		42	790	22	36	141	572	309	
23		39	895	15	31	106	545	309	
24		35	660	106	42	102	472	291	
25	758	31	520	68	47	95	495	282	
26	630	54	472	54	31	102	520	274	
27	426	68	1,210	42	26	210	692	291	
28	758	86	1,280	31	225	159	692	300	
29	692	102	1,280	18	76	76	630	309	
30	274	102	825	725	47	54	545	283	
31	129		630		42	51		257	

NOTE.—Daily discharge determined from a rating curve well defined below 2,500 second-feet. Discharge interpolated for days for which gage heights are missing.

Monthly discharge of Milk River at Malta, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
March.....	758	129	246	15, 100	C.
April.....	346	31	131	7, 800	B.
May.....	1, 280	44	384	23, 600	B.
June.....	725	15	183	10, 900	B.
July.....	1, 540	26	319	19, 600	B.
August.....	216	16	85.3	5, 240	B.
September.....	6, 860	31	1, 730	103, 000	C.
October.....	630	257	392	24, 100	B.
November.....	199	.....	104	6, 190	C.
December.....	.....	.....	α 50	3, 070	D.
The period.....	.....	.....	.....	219, 000	.....

α Estimated.

NOTE.—Discharge estimated Mar. 1 to 24 at 165 second-feet per day. Nov. 8 to 30 at 85 second-feet.

MILK RIVER NEAR HINSDALE, MONT.

Location.—At the highway bridge over Milk River about 1 mile from Hinsdale, Mont., a point 46 miles from the junction of Milk River with the Missouri.

Records available.—May 13, 1908, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Chain fastened to upstream side of highway bridge; datum unchanged.

Discharge measurements.—Made from bridge or by wading.

Winter flow.—Stream frozen entirely across and to a considerable depth from late in November until the first of April.

Diversions.—No water is diverted between the station at Hinsdale and that at Malta. The flow of the stream has, however, been appropriated by the United States Reclamation Service in connection with the Milk River project, and will be diverted at a point 9 miles east of Hinsdale to irrigate land in lower Milk River valley.

Discharge measurements of Milk River near Hinsdale, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 15	J. C. Beebe.....	3.48	775	July α 2	J. C. Beebe.....	3.06	633
20	do.....	2.92	480	2	do.....	4.51	1, 400
May 17	do.....	2.00	180	Oct. 9	W. A. Lamb.....	4.06	1, 020
June 16	do.....	2.42	254				

α Water just beginning to rise. Measurement of no use for discharge curve.

Daily gage height, in feet, of Milk River near Hinsdale, Mont., for 1911.

[Goldie Wooldridge, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		3.6	2.5	3.95	2.6	2.1	1.6	5.7	2.6
2.....		3.7	2.45	3.9	4.4	1.7	1.55	8.2	2.6
3.....		3.25	2.7	3.25	4.6	1.3	1.55	9.1	2.55
4.....		3.3	2.8	3.25	4.2	1.3	1.35	14.6	2.55
5.....		3.45	2.8	3.25	4.2	1.3	8.15	9.4	2.5
6.....		3.35	2.75	3.25	4.1	1.3	10.8	6.1	2.5
7.....		3.4	2.7	3.25	3.9	1.2	20.2	5.4	2.45
8.....		3.35	2.7	3.2	3.4	1.2	18.2	4.3	
9.....		3.4	2.55	3.05	3.4	1.2	16.6	4.0	
10.....		3.25	2.3	2.85	3.2	1.1	14.4	3.9	
11.....		3.35	2.35	2.55	2.9	1.1	12.1	3.7	
12.....		3.4	2.4	2.55	2.6	1.0	11.3	3.6	
13.....		3.25	2.2	2.75	2.35	1.5	9.5	3.4	
14.....		3.3	2.0	2.55	2.25	1.3	9.6	3.3	
15.....		3.45	2.05	2.55	2.05	1.3	8.2	3.25	
16.....		3.85	2.05	2.35	2.05	1.2	6.8	3.2	
17.....		4.15	2.0	2.15	2.05	1.2	6.5	3.15	
18.....		3.85	2.0	2.15	2.55	1.2	5.9	3.1	
19.....		3.15	2.0	2.15	2.35	1.2	5.1	3.0	
20.....		2.9	1.7	2.15	1.85	2.3	4.7	3.0	
21.....	2.95	2.9	1.7	2.15	1.35	2.0	4.5	2.9	
22.....	3.0	2.9	1.55	2.15	1.25	1.95	4.1	2.9	
23.....	3.65	3.0	1.8		1.35	1.95	3.7	2.9	
24.....	4.0	3.0	2.15	2.3	1.35	1.85	3.7	2.9	
25.....	3.65	2.95	2.15	6.6	1.35	1.75	3.6	2.9	
26.....	3.65	2.8	2.9	4.6	1.45	1.7	3.5	2.8	
27.....	4.0	2.7	3.3	3.3	1.35	1.65	3.2	2.8	
28.....	4.15	2.6	3.95	3.1	1.35	1.65	3.1	2.75	
29.....	4.2	2.55	6.0	2.85	1.35	1.55	3.3	2.7	
30.....	3.65	2.5	5.95	2.7	2.45	1.45	3.6	2.6	
31.....	3.7		5.2		2.35	1.7		2.5	

Daily discharge, in second-feet, of Milk River near Hinsdale, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		825	315	1,020	355	177	63	2,170	330
2.....		880	298	990	1,300	78	56	4,130	330
3.....		640	395	640	1,430	32	56	4,850	312
4.....		665	435	640	1,170	32	36	9,250	312
5.....		742	435	640	1,170	32	4,090	5,090	295
6.....		690	415	640	1,110	32	6,210	2,470	295
7.....		715	395	640	990	24	13,700	1,940	276
8.....		690	395	615	715	24	12,100	1,180	
9.....		715	335	542	715	24	10,800	1,000	
10.....		640	245	455	615	18	9,090	940	
11.....		690	262	335	475	18	7,250	830	
12.....		715	280	335	355	13	6,610	775	
13.....		640	210	415	262	50	5,170	675	
14.....		665	147	335	228	32	5,250	625	
15.....		742	162	335	162	32	4,130	602	
16.....		962	162	262	162	24	3,010	580	
17.....		1,140	147	194	162	24	2,770	558	
18.....		962	147	194	335	24	2,320	535	
19.....		590	147	194	262	24	1,740	490	
20.....		475	78	194	108	245	1,460	490	
21.....	498	475	78	194	36	147	1,320	450	
22.....	520	475	56	194	28	134	1,060	450	
23.....	852	520	97	220	36	134	830	450	
24.....	1,050	520	194	245	36	108	830	450	
25.....	852	498	194	2,850	36	88	775	450	
26.....	852	435	475	1,430	45	78	725	410	
27.....	1,050	395	665	665	36	70	580	410	
28.....	1,140	355	1,020	565	36	70	535	390	
29.....	1,170	335	2,400	455	36	56	625	370	
30.....	852	315	2,360	395	298	45	775	330	
31.....	880		1,830		262	78		295	

NOTE.—Daily discharge determined as follows: Mar. 21 to Sept. 6, well-defined rating curve; Sept. 7 to Nov. 7, from poorly defined curve.

Monthly discharge of Milk River near Hinsdale, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
March.....			507	31,200	C.
April.....	1,140	315	637	37,900	A.
May.....	2,400	56	477	29,300	A.
June.....	2,850	194	561	33,400	A.
July.....	1,430	28	418	25,700	A.
August.....	245	13	63.5	3,900	A.
September.....	13,700	36	3,470	206,000	C.
October.....	9,250	295	1,410	86,700	C.
November.....			220	13,100	D.
December.....			a 50	3,070	D.
The period.....				470,000	

a Estimated.

NOTE.—Discharge Mar. 1 to 20 estimated at 300 second-feet per day; Nov. 8 to 30 estimated at 150 second-feet.

NORTH FORK OF MILK RIVER NEAR BROWNING, MONT.

Location.—At Alexander Dubray's ranch, 35 miles north of Browning, and about 2 miles south of the Canadian boundary line.

Records available.—May 8, 1911, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Staff gage nailed to a post on right bank.

Channel.—Liable to shift.

Discharge measurements.—Made by wading at convenient sections near the gage.

Winter flow.—Stream freezes over during the winter; winter gage heights have no value.

Accuracy.—Results are only fair. Estimates of daily and monthly discharge are not published, as no high-water measurements have been made.

Discharge measurements of North Fork of Milk River near Browning, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 8	B. E. Jones.....	4.93	31	June 25	W. A. Lamb.....	5.12	54
9	.....do.....	4.97	34	Aug. 28	B. E. Jones.....	4.74	20
June 8	.....do.....	4.87	30				

Daily gage height, in feet, of North Fork of Milk River near Browning, Mont, for 1911.

[B. F. Lowry, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		5.0	5.0	4.85	4.5	4.9	4.9
2.....		4.95	4.9	4.85	4.55	4.9	4.9
3.....		4.95	4.9	4.85	5.1	4.9	4.9
4.....		4.9	4.9	4.85	5.45	4.9	4.9
5.....		4.9	4.85	4.93	6.9	4.9	4.9
6.....		4.95	4.85	4.9	6.9	4.9	4.9
7.....		4.9	4.7	4.95	6.85	4.9	4.9
8.....	4.95	4.85	4.7	4.95	6.8	4.9	
9.....	5.0	4.95	4.7	5.0	5.8	4.9	
10.....	4.93	4.8	4.7	4.95	5.75	4.9	
11.....	4.9	4.8	4.7	4.85	5.65	4.9	
12.....	4.95	4.8	4.65	4.7	4.9	4.9	
13.....	5.0	4.85	4.65	4.7	4.9	4.9	
14.....	5.1	4.8	4.6	4.7	4.9	4.9	
15.....	6.25	4.8	4.6	4.65	4.9	4.9	
16.....	5.35	4.8	4.6	4.6	4.9	4.9	
17.....	5.0	4.8	4.7	4.6	4.9	4.9	
18.....	5.1	4.8	4.75	4.6	4.9	4.9	
19.....	5.0	4.8	4.75	4.55	4.9	4.9	
20.....	4.95	4.8	4.8	4.55	4.9	4.9	
21.....	4.95	4.8	4.8	4.55	5.1	4.9	
22.....	4.95	4.85	4.8	4.5	5.1	4.9	
23.....	5.0	5.0	4.75	4.5	4.9	4.9	
24.....	5.0	5.1	4.75	4.5	4.9	4.9	
25.....	5.05	5.1	4.7	4.55	4.9	4.9	
26.....	5.05	5.15	4.7	4.55	4.9	4.9	
27.....	5.0	5.15	4.65	4.5	4.9	4.9	
28.....	4.95	5.1	4.65	4.55	4.9	4.9	
29.....	4.9	5.05	4.7	4.55	4.9	4.9	
30.....	4.9	5.05	4.95	4.5	4.9	4.9	
31.....	4.95		4.85	4.5		4.9	

NORTH FORK OF MILK RIVER NEAR CHINOOK, MONT.

Location.—In sec. 3, T. 33 N., R. 19 E., at a point about $4\frac{1}{2}$ miles north of Chinook, Mont., about 7 miles above the junction of the North Fork with the main stream.

Records available.—April 22, 1905, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Chain on the left bank near the house of the observer.

Channel.—Sandy and shifting.

Discharge measurements.—Made by wading or at the cable near the gage.

Winter flow.—Ice present; gage readings impracticable.

Diversions.—Three canals, which divert in the aggregate about 20 second-feet, take out above the station; several small pumping plants, which supply water for irrigating the bottom land along the river valley, also operate above the station. Below the station the Matheson and Cook canals divert water for irrigating land in Milk River Valley near the mouth of the North Fork. The aggregate appropriation for these canals is 78 second-feet.

Accuracy.—Results may be considered reliable as a fair rating curve has been constructed. The greater part of the run-off occurs during floods caused by heavy rains in the spring and early summer. In the fall the channel is often dry.

Discharge measurements of North Fork of Milk River near Chinook, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 11	J. C. Beebe	0.80	34	May 27	J. C. Beebe	0.89	41
22	do	1.83	190	June 12	do	.46	9.9
May 1	do	1.19	63	20	do	.29	3.4
8	do	1.24	79	26	do	.23	2.0
12	do	1.06	59	July 8	do	.27	3.5
22	do	.70	24	Oct. 12	W. A. Lamb	.80	44

Daily gage height, in feet, of North Fork of Milk River near Chinook, Mont., for 1911.

[Mrs. R. B. Snedecor, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Sept.	Oct.	Nov.
1.		1.36	1.12	0.82	0.20		0.90	0.62
2.		1.18	1.08	.85	.19		.94	.64
3.		1.08	1.02	.84	.18		.91	.66
4.		1.02	1.00	.82	.18	0.85	.88	.68
5.		.95	1.05	.78	.16	4.6	.84	.70
6.		1.00	1.05	.72	.15	9.6	.81	.71
7.		.92	1.05	.70	.15	10.0	.80	.72
8.		.72	1.20	.68	.35	5.8	.84	.72
9.		.86	1.20	.59	.48	4.2	.85	.72
10.		.80	1.19	.54	.51	3.2	.85	.72
11.		.85	1.16	.50	.45	2.60	.84	.72
12.		.89	1.08	.50	.34	2.20	.81	
13.		.92	.96	.48	.28	1.85	.80	
14.		.99	.91	.45	.24	1.65	.79	
15.		.96	.95	.44	.20	1.45	.78	
16.		1.50	1.04	.42	.19	1.28	.76	
17.		1.60	1.08	.41	.16	1.18	.74	
18.		1.39	.91	.38	.15	1.12	.72	
19.		1.22	.88	.30	.14	1.08	.70	
20.		1.20	.81	.29	.11	.99	.70	
21.		1.60	.76	.28	.08	.92	.72	
22.		1.90	.74	.26		.94	.74	
23.	0.55	1.60	.79	.25		.98	.74	
24.	.61	1.70	.81	.24		1.65	.72	
25.	.52	1.50	.84	.23		2.00	.70	
26.	.70	1.60	.90	.22		1.90	.69	
27.	.90	1.32	.90	.20		1.80	.68	
28.	.85	1.30	.88	.19		1.60	.66	
29.	1.25	1.28	.86	.18		1.30	.65	
30.	1.28	1.20	.85	.20		.95	.64	
31.	1.40		.84				.62	

Daily discharge, in second-feet, of North Fork of Milk River near Chinook, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Sept.	Oct.	Nov.
1.		95	64	35	2.0	0	52	29
2.		72	60	37	1.9	0	56	31
3.		60	53	36	1.8	0	53	32
4.		53	51	35	1.8	48	50	34
5.		46	56	31	1.6	1,040	47	35
6.		51	56	27	1.5	3,060	44	36
7.		43	56	25	1.5	3,220	43	37
8.		27	74	24	6	1,500	47	37
9.		38	74	18	12	895	48	37
10.		33	73	15	14	560	48	37
11.		37	69	13	10	392	47	37
12.		40	60	13	5.6	285	44	
13.		43	47	12	3.6	200	43	
14.		50	42	10	2.8	156	42	
15.		47	46	10	2.0	120	41	
16.		117	55	9	1.9	94	40	
17.		135	60	8.5	1.6	82	38	
18.		100	42	7.2	1.5	74	37	
19.		77	39	4.0	1.4	70	35	
20.		74	34	3.8	1.1	60	35	
21.		135	30	3.6	.8	54	37	
22.		206	28	3.2	0	56	38	
23.	16	135	32	3.0	0	59	38	
24.	19	156	34	2.8	0	156	37	
25.	14	117	36	2.6	0	235	35	
26.	25	135	41	2.4	0	211	34	
27.	41	90	41	2.0	0	188	34	
28.	37	87	39	1.9	0	146	32	
29.	80	84	38	1.8	0	97	32	
30.	84	74	37	2.0	0	56	31	
31.	101		36		0		29	

NOTE.—Daily discharge determined from rating curves as follows: Mar. 23 to July 21, fairly well defined below 115 second-feet; Sept. 4 to Nov. 11, poorly defined.

Monthly discharge of North Fork of Milk River near Chinook, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January			a 0	0	
February			a 0	0	
March	101		19.1	1,170	C.
April	206	27	81.9	4,870	B.
May	74	28	48.5	2,980	B.
June	37	1.8	13.3	791	B.
July	14	0	2.46	151	B.
August	0	0	0	0	
September	3,220	0	437	26,000	C.
October	56	29	40.9	2,510	C.
November	37		28.6	1,700	C.
December			a 10.0	615	
The year	3,220	0	56.4	40,800	

a Estimated.

NOTE.—Discharge Mar. 1 to 22 estimated at 8 second-feet per day; Nov. 12 to 30, 25 second-feet. Stream dry July 22 to Sept. 3.

BEAVER CREEK NEAR SACO,¹ MONT.

Location.—In sec. 35, T. 31 N., R. 32 E., at Craig's ranch, 3 miles south of Ashfield, Mont., near Saco, the nearest post office, and about 18 miles from Malta.

Records available.—July 5, 1903, to November 4, 1911.

¹ Station described in earlier reports as "Beaver Creek near Ashfield, Mont."

Drainage area.—Not measured.

Gage.—Staff. The gage was first established at bridge No. 455 of the Great Northern Railway, half a mile west of Ashfield; it was moved to its present location, 2½ miles farther upstream, December 31, 1903.

Channel.—The stream carries little water except at the times of the spring floods or heavy rains; during the summer months the channel is obstructed by a dense growth of weeds and willows, which have to be cleared out occasionally. At medium and high stages a second channel, known as Beaver Creek Overflow, receives the stream above the station, fills a depression to the west of the main channel, and reenters at a point some distance below the gage.

Discharge measurements.—Made from a cable or by wading.

Winter flow.—Ice present during the winter months.

Diversions.—Water is diverted from Beaver Creek by small ditches leading from the stream and by small pumping plants near the banks.

Accuracy.—Results are only fair, as the growth of weeds and willows in the channel makes the construction of a permanent rating curve difficult. Daily discharge given for days with gage heights only; no monthly estimates have been made.

Discharge measurements of Beaver Creek near Saco, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 14	J. C. Beebe.....	2.42	15.8	June 30	J. C. Beebe.....	4.09	79
June 13	.....do.....	2.39	19.8	July 31	.....do.....	2.78	31
24	.....do.....	3.00	39	Oct. 10	W. A. Lamb.....	3.40	61

Daily gage height, in feet, of Beaver Creek near Saco, Mont., for 1911.

[Mrs. W. P. Craig, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.						2.50	.....	1.90	1.55
2.						2.25	.....	1.80	1.55
3.						2.15	.....	2.50	1.55
4.						2.00	.....	2.95	1.55
5.						1.90	2.10	3.9	.....
6.						1.85	3.25	4.8	.....
7.						1.75	4.3	.....	.....
8.						1.70	9.6	.....	.....
9.		2.32				1.65	10.2	.....	.....
10.		2.22				.....	9.8	3.20	.....
11.		2.07				.....	8.2	2.75	.....
12.		2.02				.....	7.5	2.55	.....
13.				2.38		.....	7.2	2.35	.....
14.		2.42		2.23		.....	6.4	2.15	.....
15.				2.13		.....	6.0	2.00	.....
16.				2.08		.....	5.6	2.00	.....
17.				2.04		.....	5.2	2.00	.....
18.				1.98		.....	4.8	2.00	.....
19.				1.98		.....	4.2	2.00	.....
20.				1.98		.....	3.8	1.90	.....
21.				1.98		.....	3.35	1.90	.....
22.				1.88		.....	3.05	1.90	.....
23.	5.7			1.88		.....	2.90	1.90	.....
24.	4.9			3.00		.....	2.85	1.80	.....
25.	4.1			2.12		.....	2.70	1.75	.....
26.	3.8			3.15		.....	2.45	1.60	.....
27.	3.6			4.8		.....	2.30	1.60	.....
28.	3.40		3.90	6.6	2.95	.....	2.20	1.60	.....
29.	3.10		9.00	5.3	3.10	.....	2.15	1.60	.....
30.	2.75		11.40	4.0	3.15	.....	1.95	1.60	.....
31.	2.70		12.00	.....	2.90	.....	.....	1.60	.....

Daily discharge, in second-feet, of Beaver Creek near Saco, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.						21		6.0	0.5
2.						14		4.0	.5
3.						11		21	.5
4.						8.0		37	.5
5.						6.0	10	77	
6.						5.0	49	122	
7.						3.2	97		
8.						2.5	438		
9.						1.8	486		
10.		16 13					454	47	
11.		9.0					339	29	
12.		8.4					290	22	
13.				17			269	16	
14.		19		13			214	11	
15.				11			190	8.0	
16.				9.6			166	8.0	
17.				9.6			142	8.0	
18.				7.6			122	8.0	
19.				7.6			92	8.0	
20.				7.6			72	6.0	
21.				7.6			53	6.0	
22.				5.4			41	6.0	
23.		172		5.4			35	6.0	
24.		127		39			33	4.0	
25.		87		10			27	3.2	
26.		72		45			20	1.0	
27.		63		122			15	1.0	
28.		55		77	227	37	12	1.0	
29.		43		395	148	43	11	1.0	
30.		29		582	82	45	7	1.0	
31.		27		630		35		1.0	

BEAVER CREEK OVERFLOW NEAR BOWDOIN, MONT.

Location.—In the SW. $\frac{1}{4}$ sec. 17, T. 30 N., R. 32 E., at John Turmell's ranch, 14 miles from Malta, Mont.

Records available.—June 29, 1903, to August 30, 1906; May 2, 1908, to December 31, 1910; March 20 to November 11, 1911.

Gage.—Staff; datum unchanged.

Channel.—Water flows in this channel only when Beaver Creek is high; during the remainder of the season the water is standing in pools and fluctuations in water level are due wholly to local rains and to evaporation.

Discharge measurements.—At flood stages made at a bridge half a mile below the gage; low-water measurements are made by wading near the gage.

Accuracy.—Records poor. Lack of measurements in 1911 has prevented the making of estimates of daily and monthly discharge.

Discharge measurements of Beaver Creek overflow near Bowdoin, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
June 13	J. C. Beebe	<i>Feet.</i> 4.46	<i>Sec.-ft.</i> 0
Oct. 10	W. A. Lamb	4.47	10

Daily gage height, in feet, of Beaver Creek overflow near Bowdoin, Mont., for 1911.

[Henry Turmell, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1		3.8	3.1	9.0	4.9	4.1	3.1	3.7	3.5
2		3.7	3.1	7.9	4.8	4.0	3.0	3.6	3.5
3		3.7	3.0	6.8	4.7	3.9	3.0	4.4	3.4
4		3.6	3.0	6.6	4.5	3.8	3.0	4.7	3.4
5		3.5	3.0	5.3	4.3	3.8	3.0	4.1	3.4
6		3.5	3.0	4.8	4.1	3.7	3.3	5.7	3.4
7		3.5	2.9	4.3	3.8	3.7	4.1	5.5	3.4
8		3.4	2.9	4.2	3.8	3.7	7.1	4.9	3.4
9		3.5	2.9	4.2	3.7	3.6	9.2	4.7	3.4
10		3.5	2.9	4.1	3.6	3.5	9.1	4.4	3.3
11		3.6	2.9	4.0	3.6	3.5	9.1	4.3	3.3
12		3.6	2.8	4.3	3.6	3.5	9.1	4.1	
13		3.6	2.8	4.5	3.5	3.4	8.4	3.9	
14		3.7	2.8	4.5	3.5	3.4	7.9	3.8	
15		3.8	2.8	4.4	3.3	3.4	6.5	3.8	
16		4.0	2.8	4.3	3.3	3.4	6.3	3.7	
17		3.9	2.8	4.1	3.3	3.4	6.1	3.7	
18		3.7	2.7	4.0	3.2	3.4	5.8	3.7	
19		3.5	2.7	3.8	3.2	3.4	5.4	3.7	
20	2.4	3.4	2.7	3.8	3.2	3.3	5.0	3.6	
21	2.4	3.4	2.7	3.8	3.1	3.3	4.9	3.6	
22	4.2	3.4	2.7	3.7	3.1	3.3	4.7	3.6	
23	5.2	3.4	2.7	3.7	3.1	3.3	4.5	3.6	
24	5.1	3.4	2.7	6.5	3.1	3.3	4.3	3.6	
25	4.9	3.4	2.7	6.0	3.1	3.2	4.1	3.5	
26	4.5	3.3	2.8	8.1	3.0	3.2	4.0	3.5	
27	4.4	3.3	2.8	7.1	3.0	3.2	3.9	3.5	
28	4.3	3.3	4.7	5.7	3.0	3.1	3.8	3.5	
29	4.1	3.2	8.6	5.3	2.9	3.1	3.7	3.5	
30	4.0	3.1	9.0	4.8	4.3	3.1	3.7	3.5	
31	3.9		9.2		4.3	3.1		3.5	

PORCUPINE CREEK AT NASHUA, MONT.

Location.—In the center of the NW. $\frac{1}{4}$ sec. 25, T. 28 N., R. 40 E., at the road crossing at Nashua, Mont.

Records available.—July 11, 1908, to October 31, 1911.

Drainage area.—Not measured.

Gage.—Staff, nailed to tree on right bank at the road crossing.

Channel.—Dry in late summer and in winter.

Discharge measurements.—Made by wading near gage.

Diversions and storage.—The water of this stream is neither diverted nor stored.

Discharge measurements of Porcupine River at Nashua, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 19	J. C. Beebe	3.61	14.5
May 16	do	3.20	1.5
June 15	do	3.01	0.4
Oct. 8	W. A. Lamb	5.55	82

Daily gage height, in feet, of Porcupine Creek at Nashua, Mont., for 1911.

[Mrs. B. H. Burger, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Sept.	Oct.	Nov.
1.		2.0	3.3	3.45	2.7		3.8	4.0
2.		2.0	3.3	3.4	2.6		3.8	3.8
3.		2.0	3.25	3.5	2.6		4.0	
4.		1.9	3.25	3.45	2.5			
5.		1.9	3.25	3.4	2.5			
6.		2.0	3.25	3.3	2.5	8.0	8.1	
7.		2.0	3.2	3.3	2.5		6.4	
8.		2.0	3.2	3.25	2.4		5.3	
9.		1.9	3.2	3.2		9.0	5.1	
10.		1.9	3.2	3.15		7.6	4.9	
11.		4.5	3.15	3.1		6.0	4.6	
12.		3.5	3.15	3.1		5.2	4.4	
13.		4.3	3.15	3.05		4.8	4.3	
14.		3.4	3.15	3.05			4.2	
15.		3.1	3.1	3.05			4.2	
16.			3.2	3.0		7.0	4.1	
17.			3.2	3.0		6.0	4.0	
18.			3.2	3.0		5.2	4.0	
19.	2.4		3.1	2.95		4.8	3.9	
20.	2.4	3.6	3.1	2.95		4.6	3.8	
21.	2.3	3.6	3.1	2.9		4.4	3.8	
22.	2.3	3.7	3.1	2.9		4.2	3.8	
23.	2.3	3.6	3.1	2.9		4.2	3.8	
24.	2.2	3.45	3.2	2.85		4.2	3.8	
25.	2.2	3.4	3.2	2.8		4.1	3.8	
26.	2.0	3.4	3.25	2.8		4.0	3.8	
27.	2.2	3.35	3.3	2.65		3.9	3.7	
28.	2.4	3.3	3.7	2.5		3.8	3.7	
29.	2.3	3.3	3.6	2.5		3.8	3.7	
30.	2.2	3.25	3.6	2.6		3.8	3.7	
31.	2.1		3.6				3.7	

Daily discharge, in second-feet, of Porcupine Creek at Nashua, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	Sept.	Oct.	Day.	Mar.	Apr.	May.	June.	Sept.	Oct.
1.		1.0	4.0	7.8	0	18	16.		25	2.0	0.5	142	28
2.		1.0	4.0	6.5	0	18	17.		22	2.0	.5	101	24
3.		1.0	3.0	9.0	0	24	18.		19	2.0	.5	68	24
4.		.5	3.0	7.8	0	347	19.	8.5	16	1.0	.2	52	21
5.		.5	3.0	6.5	0	265	20.	8.5	12	1.0	.2	45	18
6.		1.0	3.0	4.0	183	187	21.	6.0	12	1.0	.0	38	18
7.		1.0	2.0	4.0	347	117	22.	6.0	15	1.0	.0	31	18
8.		1.0	2.0	3.0	347	72	23.	6.0	12	1.0	.0	31	18
9.		.5	2.0	2.0	224	64	24.	4.0	7.8	2.0	.0	31	18
10.		.5	2.0	1.5	167	56	25.	4.0	6.5	2.0	.0	28	18
11.		83	1.5	1.0	101	45	26.	1.0	6.5	3.0	.0	24	18
12.		43	1.5	1.0	68	38	27.	4.0	5.2	4.0	.0	21	15
13.		74	1.5	.8	52	34	28.	8.5	4.0	15	.0	18	15
14.		59	1.5	.8	265	31	29.	6.0	4.0	12	.0	18	15
15.		28	1.0	.8	265	31	30.	4.0	3.0	12	.0	18	15
							31.	2.0		12			

NOTE.—Daily discharge determined from two rating curves that are fairly well defined, applicable Mar. 19 to Apr. 15 and Apr. 20 to Oct. 31, respectively.

Monthly discharge of Porcupine Creek at Nashua, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
Mar. 19-31	8.5	1.0	5.3	137	B.
April.....	83	.5	14.8	881	B.
May.....	15	1.0	3.48	214	B.
June.....	9.0	.0	1.95	116	B.
July.....	.0	.0	.00	0	
August.....	.0	.0	.00	0	
September.....	347	.0	89.5	5,330	B.
October.....	α 347	15	53.1	3,260	B.

 α Maximum crest Oct. 4, 491 second-feet.

NOTE.—Stream dry June 21 to Sept. 5.

PRIVATE CANALS IN MILK RIVER VALLEY.**GENERAL FEATURES.**

Since 1905 a number of stations have been maintained on private canals in Milk River valley for the purpose of ascertaining the extent of private water rights. With the exception of Rock Creek Canal, which is near Hinsdale, in Valley County, these canals are located in Chouteau County and are used to irrigate lands in the vicinity of Harlem and Chinook.

The canals are all built on small grades and in soil which is easily eroded. In many of them silt has been deposited, and nearly all of them contain a growth of weeds and moss. At low stages the water is uniformly sluggish. In order to divert water into the laterals checks are erected in the main canals, and these checks often produce back-water effects for long distances above. They were put up under a great variety of conditions, and as a result velocities are found to differ widely at the same gage height during the season. In order to establish the correct relation between gage height and discharge it is necessary to make several rating curves for the same canal station. Frequent discharge measurements are necessary to obtain reliable results. Staff gages are located on all canals and most measurements are made by wading.

PARADISE VALLEY CANAL NEAR CHINOOK, MONT.

Location.—Near the head gate at Rudolph Friede's ranch; reached by driving along the south river road from Chinook.

Records available.—June, 1903, to August 31, 1911.

Discharge measurements.—Made by wading.

Discharge measurements of Paradise Valley canal near Chinook, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 24	J. C. Beebe.....	1.41	11.2	June 11 ^a	J. C. Beebe.....	1.25	15.9
May 2	.....do.....	1.38	12	22	.....do.....	0.91	0.5
9	.....do.....	1.51	15.7	29	.....do.....	1.32	5.0
13	.....do.....	1.77	21	July 5	.....do.....	1.30	3.0
20	.....do.....	1.42	8.6	28	.....do.....	1.32	1.8
26	.....do.....	1.25	5.3	Aug. 1	.....do.....	1.71	7.1

^a Gage height distorted by changing stage.*Daily gage height, in feet, and discharge, in second-feet, of Paradise Valley canal near Chinook, Mont., for 1911.*

[Rudolph Friede, observer.]

Day.	Apr.		May.		June.		July.		Aug.		Sept.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....			1.31	9.3	1.20	4.0	1.44	7.5	1.79	10		
2.....			1.31	9.3	1.20	4.0	1.25	3.8	1.66	6.0		
3.....			1.50	15	1.18	3.7	1.70	16	1.66	6.0		
4.....			1.51	15	1.20	4.0	1.60	12	1.57	3.9		
5.....			1.52	16	1.21	4.2	1.26	3.9	1.57	3.9	1.05	
6.....			1.50	15	1.20	4.0	1.41	6.8	1.56	3.7	1.29	
7.....			1.40	12	1.09	2.4	1.42	7.0	1.51	2.7	1.18	
8.....			1.19	6.9	1.21	4.2	1.08	1.3	1.59	4.3	0.79	
9.....			1.50	15	1.26	5.2	0.64	0	1.58	4.1	0.52	
10.....			1.60	18	1.21	4.2	1.58	11	1.49	2.4	0.42	
11.....			1.58	13	1.25	5.0	1.82	21	1.33	.8	0.34	
12.....			1.49	11	1.57	13	1.72	17	1.19	0	0.31	
13.....			1.81	22	1.50	11	1.68	15	1.29	.4	0.30	
14.....			1.63	15	1.51	11	1.88	19	1.13	0	0.28	
15.....			1.72	19	1.36	7.2	1.72	12	1.15	0	0.26	
16.....			1.72	19	1.52	12	1.76	13	1.15	0	0.24	
17.....			1.71	18	1.52	12	1.64	9.2	1.12	0	0.24	
18.....			1.65	16	1.74	20	1.70	11	0.50	0	0.22	
19.....			1.74	20	1.52	12	1.76	13	0.43	0	0.20	
20.....			1.92	28	1.34	6.8	1.72	12	0.35	0		
21.....			1.38	7.6	0.96	.6	1.62	8.6	0.24	0		
22.....		5	1.45	9.5	0.92	.5	1.83	16	0.22	0		
23.....		11	1.42	8.6	1.17	3.6	1.65	9.5	0.20	0		
24.....	1.48	14	1.44	9.2	1.63	15	1.56	7.0		0		
25.....	1.50	15	1.27	5.4	1.70	18	1.56	7.0		0		
26.....	1.51	15	1.26	5.2	1.61	12	1.73	12		0		
27.....	1.50	15	1.22	4.4	2.04	32	1.58	7.5		0		
28.....	1.71	22	1.25	5.0	1.63	13	1.35	2.5		0		
29.....	1.72	23	1.24	4.8	1.85	22	1.45	4.5		0		
30.....	1.59	18	1.21	4.2	1.61	12	1.53	6.2		0		
31.....			1.21	4.2			1.69	11		0		

NOTE.—Daily discharge determined from a series of parallel curves. Discharge estimated Apr. 22 and 23.

Monthly discharge of Paradise Valley canal near Chinook, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April 22-30.....	23	5	15.3	273
May.....	28	4.2	12.3	756
June.....	32	.5	9.29	553
July.....	21	.0	9.78	601
August.....	10	.0	1.55	95.3
The year.....				2,280

NOTE.—Canal head gates open Apr. 22 and closed Aug. 14. No flow Jan. 1 to Apr. 21 and Aug. 15 to Dec. 31.

COOK CANAL NEAR CHINOOK, MONT.

Location.—About half a mile above a small wooden highway bridge on the road running parallel to the Great Northern Railway, about 3 miles east of Chinook.

Records available.—April 10, 1905, to July 31, 1911.

Gage.—Staff.

Discharge measurements.—Made from highway bridge.

Discharge measurements of Cook canal near Chinook, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 12	John C. Beebe.....	2.19	23	May 26	John C. Beebe.....	3.98	35
23	.....do.....	3.97	51	June 11	.....do.....	3.16	12.8
May 2	.....do.....	3.89	39	22	.....do.....	2.17	2.8
9	.....do.....	2.16	1.3	29	.....do.....	2.43	3.4
13	.....do.....	3.88	42	July 5	.....do.....	1.75	.0
20	.....do.....	3.83	30				

Daily gage height, in feet, and discharge, in second-feet, of Cook canal near Chinook, Mont., for 1911.

[Adam Jamison, observer.]

Day.	April.		May.		June.		July.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1.....			3.75	34	3.93	37	1.95	1.0
2.....			3.95	46	3.92	38	1.97	1.0
3.....			4.05	54	3.95	40	1.91	.8
4.....			3.88	42	3.92	38	1.83	.4
5.....			3.82	38	3.89	38	1.75	.2
6.....			3.90	43	3.75	30	1.65	.0
7.....			2.18	2.1	3.65	26	1.55	.0
8.....			2.15	2.0	3.50	22	1.50	.0
9.....			2.15	2.0	3.40	20	1.59	.0
10.....			2.20	2.2	3.30	17	2.00	1.2
11.....			2.13	1.8	3.20	15	2.45	3.8
12.....			3.98	49	3.00	11	2.43	3.6
13.....			3.88	42	2.95	10	2.29	2.7
14.....			3.95	44	2.85	8.8	2.15	2.0
15.....			3.95	42	2.75	7.2	2.01	1.2
16.....			3.85	35	2.62	5.8	1.81	.3
17.....			3.85	33	2.50	4.3	1.62	.0
18.....			3.85	32	2.35	3.1	1.55	.0
19.....			3.78	28	2.30	2.8	1.72	.1
20.....			3.72	25	2.25	2.5	1.70	.0
21.....			3.70	24	2.21	2.3	1.65	.0
22.....			3.65	22	2.23	2.4	1.50	.0
23.....	3.98	49	3.65	22	2.90	9.5	1.45	.0
24.....	4.00	50	3.85	30	2.20	2.2	1.30	.0
25.....	3.93	45	3.90	32	2.45	3.8	1.31	.0
26.....	3.85	40	3.95	34	2.52	4.5	1.25	.0
27.....	3.83	39	3.98	38	2.80	8.0	1.32	.0
28.....	4.02	52	3.98	38	2.78	7.7		
29.....	3.73	34	3.97	37	2.30	2.8		
30.....	3.75	34	4.07	47	2.09	1.6		
31.....			4.00	41				

NOTE.—Daily discharge determined from a series of parallel curves and the indirect method for shifting channels.

Monthly discharge of Cook canal near Chinook, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
March 30-31.....				^a 15
April.....			^b 42.9	^a 1,900
May.....	54	1.8	31.0	1,910
June.....	40	1.6	14.0	833
July.....	3.8	0	.59	36
The year.....				4,690

^a Estimated by ditch rider as follows: Mar. 30-31, 15 acre-feet. Apr. 1 to 22, 1,220 acre-feet.

^b Mean Apr. 23 to 30.

NOTE.—Canal gates opened April 23 and closed July 17.

MATHESON CANAL NEAR CHINOOK, MONT.

Location.—At a footbridge 200 feet below the headgate of the canal near the main road, $3\frac{1}{2}$ miles east of Chinook.

Records available.—April 10, 1905, to July 31, 1911.

Gage.—Staff.

Discharge measurements.—Made from footbridge or by wading.

Discharge measurements of Matheson canal near Chinook, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 12	J. C. Beebe.....	(^a) 8.7		May 20	J. C. Beebe.....	3.10	2.71
14	.....do.....	3.6	9.3	26	.....do.....	2.90	3.8
May 2	.....do.....	3.19	5.9	June 11	.....do.....	2.70	^b 1.3
9	.....do.....	3.42	7.1	22	.....do.....	2.29	^b 5.5
13	.....do.....	3.00	4.5	28	.....do.....	2.32	1.8

^a No gage.

^b Estimated.

Daily gage height, in feet, and discharge, in second-feet, of Matheson canal near Chinook, Mont., for 1911.

[Adam Jamison, observer.]

Day.	April.		May.		June.		July.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....			3.35	7.2	3.15	5.6	2.30	1.7
2.....			3.15	5.6	3.12	5.4	2.25	1.5
3.....			3.25	6.4	3.10	5.2	2.21	1.3
4.....			3.25	6.4	3.15	5.6	2.15	1.2
5.....			3.18	5.8	3.13	5.4	2.21	1.3
6.....			3.15	5.6	3.09	5.1	2.25	1.5
7.....			3.50	7.8	3.11	5.3	2.21	1.3
8.....			3.48	7.6	2.93	4.0	2.19	1.3
9.....			3.42	7.2	2.95	4.2	2.15	1.2
10.....			3.47	7.6	2.70	2.5	2.20	1.3
11.....			3.45	7.4	2.65	2.2	2.51	2.6
12.....			3.20	6.0	2.71	2.6	2.50	2.6
13.....			3.01	4.6	2.48	1.2	2.39	2.1
14.....			2.95	4.2	2.40	.9	2.32	1.8
15.....			2.59	.9	2.31	.6	2.29	1.7
16.....			2.42	1.0	2.30	.6	2.30	1.7
17.....			3.32	4.4	2.30	.6	2.25	1.5
18.....			3.20	3.4	2.30	.6	2.20	1.3
19.....			3.15	3.0	2.30	.6	2.15	1.2
20.....			3.12	2.8	2.30	.6	2.25	1.5
21.....			2.95	1.7	2.20	.3	2.13	1.1
22.....			2.95	1.7	2.29	.6	2.15	1.2
23.....	3.65	9.8	2.89	3.7	2.21	.3	2.23	1.4
24.....	3.67	9.9	2.80	3.1	2.25	.4	2.30	1.7
25.....	3.50	8.4	2.75	2.8	2.25	.4	2.21	1.3
26.....	3.60	9.3	2.85	3.4	2.22	1.4	2.20	1.3
27.....	3.52	10.0	3.15	5.6	2.21	1.3	.....	0
28.....	3.48	8.2	3.15	5.6	2.30	1.7	.....	0
29.....	3.45	8.0	3.10	5.2	2.30	1.7	.....	0
30.....	3.40	7.6	3.20	6.0	2.32	1.8	.....	0
31.....			3.20	6.0	.....	.....	.....	0

NOTE.—Daily discharge determined from a series of parallel curves.

Monthly discharge of Matheson canal near Chinook, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
March 27-31.....	.....	.....	.....	^a 30
April.....	.....	.....	^b 8.9	^a 491
May.....	7.8	0.9	4.83	297
June.....	5.6	.3	2.29	136
July.....	2.6	.0	1.28	78.7

^a Estimated by ditch rider as follows: Mar. 27-31, 30 acre-feet; Apr. 1-22, 350 acre-feet.

^b Mean Apr. 23-30.

HARLEM CANAL NEAR ZURICH, MONT.

Location.—About 500 feet below the headgates of the canal, $1\frac{1}{2}$ miles southeast of the Great Northern Railway section house at Zurich; reached by driving from Chinook.

Gage.—Staff.

Discharge measurements.—Made by wading.

Discharge measurements of Harlem canal near Zurich, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 12	J. C. Beebe	2.12	24	June 11	J. C. Beebe	1.61	33
24	do	3.79	67	22	do	2.79	33
May 2	do	3.85	70	29	do	3.31	50
9	do	3.70	69	July 5	do	3.14	40
13	do	3.94	82	8	do	1.78	5.2
20	do	3.90	72	Aug. 1	do	1.08	2.9
26	do	2.65	28				

Daily gage height, in feet, and discharge, in second-feet, of Harlem canal near Zurich, Mont., for 1911.

[Joel Lean, observer.]

Day.	March.		April.		May.		June.		July.		August.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.			3.80	78	3.85	70	2.98	38	3.64	60	1.14	3
2.			3.60	70	3.90	72		38	3.70	62	1.15	3
3.			3.00	49	3.90	72		39	3.64	58	1.11	3
4.			2.70	40	3.90	72	3.00	39	3.60	56	1.11	3
5.			2.00	22	3.80	70	3.00	43	3.14	40	1.10	3
6.			2.00	22	3.80	70	2.95	41	3.10	37	1.05	3
7.			3.60	70	3.85	71	3.00	43	1.00	0	1.06	3
8.			3.60	70	3.80	73	2.95	41	1.00	0	1.20	4
9.			3.80	78	3.70	68	2.70	36	2.70	25	1.30	5
10.			3.75	76	3.80	73	2.70	36	3.11	37	1.30	5
11.			3.70	74	3.80	73	2.65	34	3.20	40	1.35	5
12.			3.70	74	3.80	73	2.65	30	3.20	38	1.42	6
13.			3.60	70	3.94	82	2.65	30	3.04	32	1.45	6
14.			3.40	56	3.85	79	3.05	42	2.47	19	1.43	6
15.			3.35	61	3.86	79	3.00	40	2.25	14	1.35	5
16.			3.75	73	3.90	77	3.00	40	2.10	12	1.34	5
17.			3.80	75	3.80	73	2.95	38	2.13	14	1.32	5
18.			3.80	75	3.80	68	3.20	47	2.15	14	1.30	5
19.	1.50	13	3.75	73	3.80	68	3.25	48	2.18	15	1.29	5
20.	2.50	34	3.80	72	3.89	72	3.15	45	2.20	15	1.20	4
21.	2.70	39	3.80	72	3.75	66	2.95	38	2.20	15	1.20	4
22.	2.80	42	3.85	74	3.70	64	2.79	34	2.19	17	1.20	4
23.	2.80	42	3.80	72	3.68	64	2.75	32	2.19	17		
24.	2.90	46	3.80	69	3.60	61	3.00	40	2.20	17		
25.	3.40	63	3.80	69	3.55	59	3.10	43	2.18	16		
26.	3.40	63	3.85	71	2.65	30	3.60	61	2.00	13		
27.	3.50	67	3.90	73	2.55	27	3.50	57	1.50	7		
28.	3.70	74	3.90	72	2.60	31	3.46	56	1.29	5		
29.	3.70	74	3.80	68	2.60	31	3.31	50	1.28	5		
30.	3.80	78	3.85	70	2.60	31	3.55	59	1.25	4		
31.	3.80	78			3.00	40			1.20	4		

NOTE.—Daily discharge determined from a series of parallel curves.

Monthly discharge of Harlem canal near Zurich, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
March 19-31	78	13	54.8	1,410
April	78	22	66.3	3,950
May	82	27	63.2	3,890
June	61	30	41.9	2,490
July	62	0	22.8	1,400
August 1-22	6	3	4.3	188
The year				13,300

NOTE.—Canal headgates opened Mar. 19 and closed on Aug. 22. No flow for periods Jan. 1 to Mar. 18 and Aug. 23 to Dec. 31.

AGENCY DITCH NEAR HARLEM, MONT.

Location.—At the highway bridge about one-fourth mile below the headgate of the ditch, reached by driving southward from Harlem, Mont.

Records available.—July 14, 1905, to July 31, 1911.

Gage.—Staff.

Discharge measurements.—Made by wading.

Discharge measurements of Agency ditch near Harlem, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 13	J. C. Beebe	3.59	76	June 27	J. C. Beebe	4.12	56
26	do.	3.21	74	July 3	do.	4.10	83
May 5	do.		a 0.4	28	do.	0.55	.8
June 22	do.	3.98	49				

a Estimated.

Daily gage height, in feet, and discharge, in second-feet, of Agency ditch near Harlem, Mont., for 1911.

[J. E. Stevens, observer.]

Day.	April.		May.		June.		July.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1				0		0	4.20	77
2				0		0	4.20	81
3				0		0	4.08	82
4				0		0	4.00	79
5				0		0	3.75	71
6				0		0	3.70	71
7				0		0	3.90	77
8				0		0	3.90	77
9				0		0	3.90	77
10				0		0	3.85	78
11				0		0	3.64	71
12				0		0	3.60	70
13	3.59			0	3.85	67	3.52	67
14				0	4.08	74	3.80	78
15				0	4.09	70	3.50	68
16				0	3.95	66	3.40	65
17				0	3.80	61	3.30	62
18				0	3.80	57	3.46	69
19				0	3.90	60	2.70	45
20				0	4.00	60		
21				0	4.20	62		
22				0	4.20	62		
23				0	3.95	48		
24				0	3.90	46		
25				0	3.92	47		
26	3.21	74		0	3.94	50		
27	3.23	75		0	4.20	59		
28	3.24	75		0	4.40	70	0.55	
29	3.31	73		0	4.80	89		
30	3.43	77		0	4.50	82		
31				0				

NOTE.—Daily discharge determined by the indirect method for shifting channels.

Monthly discharge of Agency ditch near Harlem, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
• March 26-31.....				238
April.....			75.0	4,460
May.....	0	0	0	0
June.....	89	0	37.7	2,240
July.....	82		44.4	2,730

NOTE.—Discharge estimated, Apr. 1 to 25, as 75 second-feet, and as 1 second-foot per day July 20 to 31, on account of leakage through gates. Canal gates opened Mar. 26 and closed July 19.

PORT BELKNAP CANAL NEAR CHINOOK, MONT.

Location.—At the highway bridge about 500 feet below the head gates of the canal, 8 miles west of Chinook.

Records available.—June 21, 1903, to September 30, 1911.

Gages.—The high water of June, 1908, washed out both the bridge and the gage; a new gage was installed June 27, 1908, at a different datum within a few feet of the site of the old gage; a new bridge was built about one-fourth mile upstream from the site of the old one.

Discharge measurements.—Made by wading at a section about 300 feet below the gage.

Discharge measurements of Fort Belknap canal near Chinook, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 11	W. A. Lamb.....	2.14	50	June 20	J. C. Beebe.....	2.43	69
22	J. C. Beebe.....	2.96	104	26	.....do.....	2.20	55
May 1	.....do.....	3.00	110	29	.....do.....	1.56	26
8	.....do.....	2.86	97	July 8	.....do.....	1.87	33
12	.....do.....	2.71	94	27	.....do.....	2.23	48
22	.....do.....	2.16	51	Aug. 1	.....do.....	2.03	44
27	.....do.....	2.11	45	31	R. Richards.....	1.66	26
June 12	.....do.....	1.74	32				

Daily gage height, in feet, and discharge, in second-feet, of Fort Belknap canal near Chinook, Mont., for 1911.

[C. W. Hansen, observer.]

Day.	April.		May.		June.		July.		August.		September.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....			3.00	110	2.21	51	.....	28	2.00	43	1.15	16
2.....			3.00	110	2.21	51	.....	29	2.13	50	1.50	21
3.....			3.00	110	2.22	51	.....	30	2.15	50	1.30	17
4.....			3.00	110	2.22	51	.....	31	2.10	48	1.30	17
5.....			3.00	110	2.22	51	.....	32	2.02	44	0.40	8
6.....			2.70	86	2.00	43	.....	33	2.00	43	0.30	5
7.....			2.70	86	2.00	43	1.86	33	2.00	43	0.30	2
8.....			2.86	99	2.00	43	2.05	42	2.00	43	0.20	0
9.....			3.00	110	2.00	43	2.18	49	2.02	44	0.00	.....
10.....			3.00	110	.....	38	2.30	56	1.90	38	.....	.....
11.....			3.00	116	.....	34	2.28	55	2.00	43	.....	.....
12.....			2.71	95	1.70	30	2.28	55	1.70	30	.....	.....
13.....			2.70	94	1.70	30	2.23	52	1.80	34	.....	.....
14.....			2.70	94	1.70	30	2.18	49	1.80	34	.....	.....
15.....			2.70	94	1.60	27	2.26	54	1.78	30	.....	.....
16.....			3.00	116	1.60	27	2.38	61	1.77	30	.....	.....
17.....			3.00	116	2.00	43	2.46	66	1.50	21	.....	.....
18.....			3.00	110	2.00	43	2.40	58	1.80	31	.....	.....
19.....			2.70	86	2.40	65	2.41	59	1.65	26	.....	.....
20.....			2.70	86	2.40	65	2.38	57	1.70	27	.....	.....
21.....	2.97	158	2.80	94	2.50	72	2.40	58	1.70	27	.....	.....
22.....	2.97	158	2.16	51	2.50	72	2.36	56	1.78	30	.....	.....
23.....	2.97	158	2.56	76	2.60	79	2.30	52	1.84	33	.....	.....
24.....	2.80	94	2.56	76	2.62	80	2.34	54	1.90	35	.....	.....
25.....	2.70	86	2.66	80	2.62	80	2.34	54	1.87	34	.....	.....
26.....	2.60	79	2.66	80	2.00	43	2.28	51	1.88	34	.....	.....
27.....	2.80	94	2.11	45	2.10	48	2.24	48	1.90	35	.....	.....
28.....	2.70	86	2.11	45	1.70	30	2.22	47	1.70	27	.....	.....
29.....	2.60	79	2.11	45	1.70	30	2.18	45	1.20	16	.....	.....
30.....	2.80	94	2.11	45	1.60	27	2.10	48	1.21	16	.....	.....
31.....			2.21	51	.....	.....	2.04	45	1.15	16	.....	.....

Monthly discharge of Fort Belknap canal near Chinook, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
March 25-31.....				^a 450
April.....			^b 109	^b 4,250
May.....	116	45	88.3	5,430
June.....	80	27	47.3	2,810
July.....	66	28	48.0	2,950
August.....	50	16	34.0	2,090
September.....	21	0	2.9	171
The year.....				18,200

^a Estimated.

^b Mean given is mean from Apr. 21 to 30. Flow, Apr. 1 to 20, estimated 2,090 acre-feet.

NOTE.—Canal opened Mar. 25 and closed Sept. 8. No flow Jan. 1 to Mar. 24 and Sept. 8 to Dec. 31.

LITTLE PORCUPINE CREEK BASIN.

LITTLE PORCUPINE CREEK NEAR FRAZER, MONT.

Location.—In S. E. $\frac{1}{4}$ N. E. $\frac{1}{4}$ sec. 28, T. 27 N., R. 44 E., above the intake of the reservoir, about $1\frac{1}{2}$ miles above the site of the station maintained from 1908 to 1910 and about one-half mile north of Frazer.

Records available.—July 13, 1908, to September 30, 1910, at the original station; April 14, 1911, to October 31, 1911, at present site.

Drainage area.—Not measured.

Gage.—Staff; and about 2 miles farther upstream than that originally used.

Channel.—Shifting. On the date on which the station was reestablished in 1911 the channel was dry at the new gage but the stream was discharging 0.3 second-feet at the old gage, the water coming from springs near the gage. The channel was dry or water standing in pools until September 6.

Discharge measurements.—Made by wading.

Discharge measurements of Little Porcupine Creek near Frazer, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 19	John C. Beebe.....	2.97	0.73
May 16	do.....	2.80	0.1
Oct. 6	W. A. Lamb.....	3.98	40

^a Estimated.

Daily gage height, in feet, and discharge, in second-feet, of Little Porcupine creek near Frazer, Mont., for 1911.

[Dan Martin, observer.]

Day.	September.		October.		Day.	September.		October.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.		Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....		0	3.25	7.0	16.....	5.2	122	3.45	14
2.....		0	3.15	4.1	17.....	4.1	47	3.45	14
3.....		0	3.20	5.4	18.....	3.8	30	3.40	12
4.....		0	3.20	5.4	19.....	3.6	20	3.35	10
5.....		0	3.40	12	20.....	3.30	8.5	3.25	7.0
6.....	3.35	10	3.90	35	21.....	3.30	8.5	3.30	8.5
7.....	5.1	115	3.60	20	22.....	3.30	8.5	3.30	8.5
8.....	6.1	195	3.50	16	23.....	3.30	8.5	3.30	8.5
9.....	5.3	129	3.45	14	24.....	3.30	8.5	3.30	8.5
10.....	4.3	59	3.40	12	25.....	3.30	8.5	3.30	8.5
11.....	4.4	66	3.45	14	26.....	3.30	8.5	3.30	8.5
12.....	3.8	30	3.65	22	27.....	3.30	8.5	3.30	8.5
13.....	3.30	8.5	3.45	14	28.....	3.30	8.5	3.30	8.5
14.....	3.30	8.5	3.40	12	29.....	3.30	8.5	3.30	8.5
15.....	3.30	8.5	3.60	20	30.....	3.30	8.5	3.30	8.5
					31.....			3.30	8.5

NOTE.—Daily discharge determined from a poorly defined rating curve.

Monthly discharge of Little Porcupine Creek near Frazer, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu-racy.
	Maximum.	Minimum.	Mean.		
September.....	195	0	31.4	1,870	C.
October.....	35	4.1	11.7	719	B.

WOLF CREEK BASIN.

WOLF CREEK NEAR WOLF POINT, MONT.

Location.—In the SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 8, T. 27 N., R. 47 E., at William Smith's ranch, 2 $\frac{1}{2}$ miles northwest of Wolf Point, Mont.

Records available.—August 15, 1908, to December 31, 1911.

Drainage area.—Not measured.

Gage.—A staff near the house of the observer.

Channel.—Shifting.

Discharge measurements.—Made by wading near the gage.

Diversions.—A small irrigation ditch diverts water above the gage.

Discharge measurements of Wolf Creek near Wolf Point, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 18	J. C. Beebe	2.04	8.2	May 17	J. C. Beebe	1.83	1.9
18	do	2.04	8.1	June 15	do	1.81	.6
May 17	do	1.83	1.8	Oct. 8	W. A. Lamb	2.20	7.2

Daily gage height, in feet, of Wolf Creek near Wolf Point, Mont., for 1911.

[W. H. Smith, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		2.05	2.05	2.25	2.45	1.4	1.45	2.25	2.25
2.....		2.05	2.05	2.2	2.4	1.45	1.45	2.25	2.2
3.....		2.0	2.0	2.25	2.25	1.4	3.5	2.2	2.25
4.....		2.05	2.05	2.2	2.2	1.45	3.55	2.05	2.2
5.....		2.0	2.0	2.25	2.25	1.45	3.5	2.0	2.25
6.....		2.05	2.05	2.25	2.25	1.2	3.55	2.05	2.25
7.....		2.05	1.85	2.2	2.2	1.25	3.55	2.05	2.2
8.....		2.0	1.8	2.25	2.25	1.2	3.5	2.2	2.25
9.....		2.05	1.85	2.2	2.2	1.25	3.55	2.25	2.2
10.....		2.0	1.8	2.25	2.25	1.25	3.8	2.2	2.25
11.....		2.05	1.85	1.85	2.05	1.2	3.85	2.25	2.25
12.....		2.05	1.85	1.8	2.0	1.25	3.85	2.25	.....
13.....		2.0	1.8	1.85	1.65	1.2	3.8	2.2	.....
14.....		2.05	1.85	1.8	1.6	1.25	3.85	2.25	.....
15.....		2.0	1.8	1.85	1.65	1.25	3.8	2.2	.....
16.....		2.05	1.85	1.85	1.65	1.2	3.85	2.25	.....
17.....		2.05	1.85	1.8	1.6	1.25	3.65	2.25	.....
18.....		2.0	1.8	1.85	1.65	1.2	3.6	2.2	.....
19.....	4.4	2.05	1.85	1.8	1.6	1.25	3.65	2.25	.....
20.....	4.45	2.0	1.8	1.85	1.65	1.45	2.2	2.2	.....
21.....	4.4	2.05	1.85	2.45	1.65	1.4	2.25	2.25	.....
22.....	4.45	2.05	1.85	2.4	1.6	1.45	2.25	2.25	.....
23.....	4.45	2.0	1.8	2.45	1.45	1.4	2.2	2.2	.....
24.....	4.2	2.05	2.25	2.4	1.4	1.45	2.25	2.25	.....
25.....	4.25	2.0	2.2	2.45	1.45	1.45	2.2	2.2	.....
26.....	4.0	2.05	2.25	2.45	1.45	1.4	2.25	2.25	.....
27.....	4.05	2.05	2.25	2.2	1.4	1.45	2.25	2.25	.....
28.....	3.05	2.0	2.2	2.25	1.45	1.4	2.2	2.2	.....
29.....	3.0	2.05	2.25	2.2	1.4	1.45	2.25	2.25	.....
30.....	3.05	2.0	2.2	2.25	1.45	1.45	2.2	2.2	.....
31.....	2.05	.....	2.25	.....	1.45	1.4	.....	2.25	.....

Daily discharge, in second-feet, of Wolf Creek near Wolf Point, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		8.5	6.0	8.0	14	0.2	0.2	8.0	8.0
2.....		8.5	6.0	7.0	12	.2	.2	8.0	7.0
3.....		7.5	5.5	8.0	8.0	.2	79	7.0	8.0
4.....		8.5	6.0	7.0	7.0	.2	83	4.2	7.0
5.....		7.5	5.5	8.0	8.0	.2	79	3.5	8.0
6.....		8.5	6.0	8.0	8.0	.0	83	4.2	8.0
7.....		8.5	3.5	7.0	7.0	.0	83	4.2	7.0
8.....		7.5	3.0	8.0	8.0	.0	79	7.0	8.0
9.....		8.5	3.5	7.0	7.0	.0	83	8.0	7.0
10.....		7.5	3.0	8.0	8.0	.0	103	7.0	8.0
11.....		8.5	2.5	1.6	4.2	.0	107	8.0	8.0
12.....		8.5	2.5	1.3	3.5	.0	107	8.0	.....
13.....		7.5	2.0	1.6	.6	.0	103	7.0	.....
14.....		8.5	2.5	1.3	.5	.0	107	8.0	.....
15.....		7.5	2.0	1.6	.6	.0	103	7.0	.....
16.....		8.5	2.5	1.6	.6	.0	107	8.0	.....
17.....		8.5	2.5	1.3	.5	.0	93	8.0	.....
18.....		7.5	1.3	1.6	.6	.0	87	7.0	.....
19.....	150	8.0	1.6	1.3	.5	.0	93	8.0	.....
20.....	154	7.0	1.3	1.6	.6	.2	7.0	7.0	.....
21.....	150	8.0	1.6	14	.6	.2	8.0	8.0	.....
22.....	154	8.0	1.6	12	.5	.2	8.0	8.0	.....
23.....	154	7.0	1.3	14	.2	.2	7.0	7.0	.....
24.....	134	7.0	8.0	12	.2	.2	8.0	8.0	.....
25.....	138	6.5	7.0	14	.2	.2	7.0	7.0	.....
26.....	119	7.0	8.0	14	.2	.2	8.0	8.0	.....
27.....	122	7.0	8.0	7.0	.2	.2	8.0	8.0	.....
28.....	52	6.5	7.0	8.0	.2	.2	7.0	7.0	.....
29.....	49	6.0	8.0	7.0	.2	.2	8.0	8.0	.....
30.....	52	5.5	7.0	8.0	.2	.2	7.0	7.0	.....
31.....	8.5	.....	8.0	.....	.2	.2	.....	8.0	.....

NOTE.—Daily discharge determined as follows: Mar. 19 to Apr. 18, from a curve poorly defined; Apr. 19 to May 17, by indirect method for shifting channels; May 18 to Nov. 11, from curve well defined.

Monthly discharge of Wolf Creek near Wolf Point, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	0.0	0.0	0.00	0	
February.....	0	.0	.0	0	
March.....	154	.....	60.9	3,740	D.
April.....	8.5	5.5	7.65	455	C.
May.....	8.0	1.3	4.33	266	C.
June.....	14	1.3	6.66	396	B.
July.....	14	.2	3.29	202	B.
August.....	.2	.0	.11	6.8	B.
September.....	107	.2	55.4	3,300	B.
October.....	8.0	3.5	7.13	438	B.
November.....	.....	.....	5.97	355	
December.....	.....	.....	2.00	123	
The year.....	154	0	12.8	9,280	

NOTE.—Means for January, February, and December, estimated; mean for period Mar. 1 to 18, estimated at 25 second-feet; mean for period Nov. 12 to 30, estimated, at 5 second-feet.

POPLAR RIVER BASIN.

POPLAR RIVER NEAR POPLAR, MONT.

Location.—At the United States reclamation camp in the SW $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 5, T. 21 N., R. 51 E., 12 miles upstream from the station formerly maintained at Buershia's ranch, 6 miles north of Poplar, Mont.

Records available.—August 15, 1908, to June 30, 1911, at old site; May 2, 1911, to September 30, 1911, at present site.

Drainage area.—Not measured.

Gage.—Staff on right bank; datum unchanged at the present station.

Channel.—Shifts.

Discharge measurements.—Made by wading.

Winter flow.—Ice present.

Discharge measurements of Poplar River near Poplar, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 16	J. C. Beebe.....	3.85	234	June 15	J. C. Beebe.....	2.95	65
16	.....do.....	4.01	284	30	.....do.....	2.57	21
May 15	.....do.....	2.66	31	30 ^a	.....do.....	3.72	22
15	.....do.....	2.67	36	Oct. 9 ^a	W. A. Lamb.....	4.55	147
June 15	.....do.....	2.95	64				

^a Measurements at new station.

Daily gage height, in feet, and discharge, in second-feet, of Poplar River near Poplar, Mont., for 1911.

[Louis Obershaw, observer.]

April.		May.		June.		Day.	April.		May.		June.	
Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.		Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1....	3.35	136	3.15	99	16....	.....	2.85	52	2.95	66	
2....	3.35	136	3.25	117	17....	.....	2.75	40	.....	62	
3....	3.25	117	4.15	308	18....	.....	2.85	52	.....	58	
4....	3.25	117	4.35	358	19....	.....	2.85	52	.....	54	
5....	3.25	117	3.45	155	20....	.....	2.85	52	.....	52	
6....	3.15	99	3.35	136	21....	.....	2.75	40	.....	48	
7....	3.05	82	3.35	136	22....	.....	2.65	30	.....	46	
8....	2.85	52	3.35	136	23....	3.75	215	2.55	22	.....	44
9....	2.85	52	3.25	117	24....	3.85	235	2.55	22	.....	42
10....	2.85	52	3.25	117	25....	3.65	195	2.55	22	2.75	40
11....	2.75	40	3.25	117	26....	3.65	195	2.55	22	2.75	40
12....	2.75	40	3.15	99	27....	3.55	175	2.85	52	2.65	30
13....	2.75	40	3.05	82	28....	3.45	155	3.15	99	2.65	30
14....	2.85	52	3.05	82	29....	3.45	155	3.15	99	2.65	30
15....	2.75	40	2.95	66	30....	3.35	136	3.15	99	2.65	30
						31....	.....	3.15	99	.....	.....	.....

NOTE.—Daily discharge determined from a well-defined rating curve. Discharge interpolated June 17 to 24.

Monthly discharge of Poplar River near Poplar, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April 23-30.....	235	136	183	2,900
May.....	136	22	65.7	4,040
June.....	358	30	93.2	5,550

Daily gage height, in feet, and discharge, in second-feet, of Poplar River at United States Reclamation Service camp near Poplar, Mont., for 1911.

[B. M. Conner, observer.]

Day.	May.		June.		July.		August.		September.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1	.....	126	4.30	99	4.00	52	3.70	21	3.70	21
2	4.45	126	4.40	117	4.00	52	3.70	21	3.65	17
3	4.35	108	4.9	215	4.50	136	3.90	40	3.65	17
4	4.35	108	4.6	155	4.30	99	3.90	40	3.65	17
5	4.25	90	4.6	155	4.20	82	4.00	52	3.90	40
6	4.25	90	4.6	155	4.05	50	4.00	52	5.6	390
7	4.20	82	4.5	136	4.00	52	3.95	46	5.9	465
8	4.15	74	4.45	126	4.00	52	3.90	40	5.6	390
9	4.10	66	4.45	126	3.90	40	4.30	99	.....	365
10	4.10	66	4.40	117	3.90	40	4.10	66	.....	340
11	4.05	59	4.30	99	3.85	35	4.05	59	.....	315
12	4.00	52	4.30	99	3.85	35	4.00	52	.....	290
13	4.00	52	4.25	90	3.85	35	3.95	46	.....	265
14	3.95	46	4.20	82	3.85	35	3.90	40	.....	240
15	3.95	46	4.15	74	3.80	30	3.90	40	.....	215
16	4.00	52	4.10	66	3.80	30	3.85	35	.....	190
17	4.00	52	4.10	66	3.80	30	3.80	30	4.6	155
18	3.95	46	4.05	59	3.75	26	3.80	30	4.6	155
19	3.95	46	4.05	59	3.70	21	3.80	30	4.6	155
20	3.90	40	4.00	52	3.70	21	3.80	30	.....	147
21	3.90	40	3.95	46	3.70	21	3.80	30	.....	139
22	3.90	40	4.05	59	3.70	21	3.80	30	.....	131
23	3.90	40	3.95	46	3.80	30	.....	30	.....	123
24	3.90	40	3.90	40	3.80	30	.....	29	.....	115
25	3.90	40	3.90	40	3.75	26	.....	28	.....	107
26	4.10	66	3.90	40	3.70	21	.....	28	.....	99
27	4.30	99	3.90	40	3.75	26	.....	27	.....	91
28	4.25	90	3.85	35	3.75	26	.....	27	4.20	82
29	4.25	90	3.85	35	3.75	26	3.75	26	4.15	74
30	4.30	99	3.90	40	3.75	26	3.70	21	4.10	66
31	4.30	99	.....	.....	3.70	21	3.70	21	.....	.....

NOTE.—Daily discharge determined from curve based on two measurements and slope data. Discharge interpolated for days for which gage heights are missing.

Monthly discharge of Poplar River at United States Reclamation Service camp near Poplar, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May	126	40	70.0	4,300	C.
June	215	35	85.6	5,090	C.
July	136	21	39.9	2,450	C.
August	99	21	37.6	2,310	C.
September	465	17	174	10,400	C.

BIG MUDDY CREEK NEAR CULBERTSON, MONT.

Location.—In the SW. $\frac{1}{4}$ sec. 17, T. 29 N., R. 54 E., at Gustave Sholtz's ranch, 11 miles above the mouth of the stream and 8 miles above the site of the original station, which was discontinued because gage heights were affected by backwater from the Missouri.

Records available.—July 14, 1908, to July 19, 1909, at original station; July 19, 1909, to December 31, 1911, at present station.

Gage.—An inclined rod on left bank of stream near residence of observer; datum unchanged.

Channel.—Mud.

Discharge measurements.—Made by wading.

Winter flow.—Little if any flow during months of January, February, October, November, and December.

Accuracy.—Results at new station are good.

Discharge measurements of Big Muddy Creek near Culbertson, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 17	J. C. Beebe.....	4.74	162	June 14	J. C. Beebe.....	3.65	33
17	.....do.....	4.77	160	July 27	.....do.....	2.89	5.6
May 14	.....do.....	2.40	15.7	Oct. 5	W. A. Lamb.....	2.65	12

Daily gage height, in feet, of Big Muddy Creek near Culbertson, Mont., for 1911.

[Thos. Shields, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		3.45	2.5	2.8	3.75	2.95	3.65	2.5	2.4
2.....		3.45	2.4	2.8	3.65	2.95	3.55	2.5	2.4
3.....		4.35	2.4	2.9	3.65	3.15	3.6	2.5	2.4
4.....		4.7	2.4	2.9	3.65	3.25	3.65	2.6	2.3
5.....		5.3	2.4	2.9	3.45	3.25	3.65	2.7	2.3
6.....		5.3	2.4	2.9	3.45	3.45	3.7	2.95	2.3
7.....		5.8	2.5	3.35	3.45	3.35	3.65	3.05	2.3
8.....		4.8	2.5	3.35	3.35	3.35	3.65	3.35	
9.....		4.8	2.5	3.45	3.35	3.35	3.55	3.75	
10.....		4.7	2.5	3.55	3.25	3.35	3.25	4.45	
11.....		4.6	2.5	3.55	3.25	3.35	3.25	4.55	
12.....		4.3	2.5	3.65	3.25	3.3	3.15	4.25	
13.....		4.3	2.5	3.65	3.25	3.25	3.15	3.95	
14.....		4.5	2.3	3.65	3.25	3.25	3.95	3.45	
15.....		4.5	2.3	3.65	3.25	3.25	4.35	3.15	
16.....		4.7	2.3	3.55		3.25	4.45	3.05	
17.....		4.7	2.3	3.55		3.15	4.25	2.95	
18.....		4.9	2.3	3.45		3.15	3.95	2.85	
19.....		4.9	2.3	3.35		3.15	3.75	2.8	
20.....		4.9	2.3	3.35		3.15	3.55	2.7	
21.....		4.5	2.3	3.35		3.15	3.35	2.7	
22.....		4.15	2.3	3.45		3.05	3.15	2.6	
23.....		2.9	2.3	3.75		2.95	3.05	2.6	
24.....		2.8	2.3	3.75		2.85	2.95	2.5	
25.....		2.8	2.4	3.75		3.0	2.85	2.4	
26.....		2.7	2.5	3.75		2.95	2.8	2.4	
27.....	3.35	2.6	2.5	3.75	2.89	3.55	2.8	2.4	
28.....	3.35	2.6	2.5	3.75		3.55	2.7	2.4	
29.....	3.35	2.6	2.5	3.75		3.75	2.7	2.4	
30.....	3.35	2.5	2.6	3.75	2.85	3.75		2.4	
31.....	3.45		2.8		2.9	3.65		2.4	

Daily discharge, in second-feet, of Big Muddy Creek near Culbertson, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		33	8	12	39	6	58	8	6
2.		33	8	12	33	6	48	8	6
3.		112	8	12	33	12	52	8	6
4.		151	8	12	33	18	58	11	4
5.		220	8	12	22	18	58	14	4
6.		220	8	12	22	28	70	24	4
7.		280	14	23	22	24	58	28	4
8.		162	14	23	18	24	58	48	
9.		162	14	29	18	24	48	83	
10.		151	14	34	14	24	28	160	
11.		140	14	27	14	24	28	172	
12.		107	18	33	14	21	23	136	
13.		107	18	33	14	18	23	103	
14.		129	14	33	14	18	102	56	
15.		129	12	33	14	18	132	34	
16.		151	12	27	14	18	144	28	
17.		151	12	27	13	15	121	24	
18.		173	9	22	13	19	90	19	
19.		173	9	18	15	19	82	17	
20.		173	9	18	13	19	55	14	
21.		129	9	18	10	19	40	14	
22.		106	7	22	8	15	28	11	
23.		14	7	39	6	12	24	11	
24.		12	7	39	6	9	18	8	
25.		12	9	39	5	14	16	6	
26.		10	8	39	5	12	14	6	
27.	27	10	8	39	5	64	14	6	
28.	27	10	8	39	5	64	11	6	
29.	27	10	8	39	4.5	56	14	6	
30.	27	8	8	39	4.5	56	11	6	
31.	33		12		5	48		6	

NOTE.—Daily discharge determined from a series of parallel curves and by the indirect method for shifting channels. Discharge interpolated for days for which gage heights are missing.

Monthly discharge of Big Muddy Creek near Culbertson, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January			0	0	
February			0	0	
March			25.5	1,570	D.
April	280	8	109	6,490	C.
May	18	7	10.4	640	C.
June	39	12	26.8	1,590	C.
July	39	4.5	14.7	904	C.
August	64	6	23.9	1,470	C.
September	144	11	50.9	3,030	C.
October	172	6	34.9	2,150	C.
November			3.4	202	D.
December			0	0	
The year	280	0	24.9	18,000	

NOTE.—Discharge Mar. 1 to 26 estimated at 25 second-feet per day, and Nov. 8 to 30 at 3 second-feet.

YELLOWSTONE RIVER BASIN.

YELLOWSTONE RIVER AT CORWIN SPRINGS, MONT.

Location.—In the NE. $\frac{1}{4}$ sec. 30, T. 8 S., R. 8 E., in the canyon at Corwin Springs, Mont., 8 miles below Gardiner, the northern entrance to Yellowstone National Park.

Records available.—September 2, 1910, to December 31, 1911.

Drainage area.—2,630 square miles.

Gage.—Staff gage nailed to wooden pier (right bank) on lower side of highway bridge.

Channel.—Bed of stream rocky; free from vegetation.

Discharge measurements.—Made from the lower side of highway bridge.

Diversions.—No water is diverted from the Yellowstone above this station.

Discharge measurements of Yellowstone River at Corwin Springs, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
July 10	R. Richards.....	6.31	10,200
Aug. 17	B. E. Jones.....	3.40	3,450
Oct. 25	.....do.....	1.69	1,480
26	.....do.....	1.56	1,400

Daily gage height, in feet, and discharge, in second-feet, of Yellowstone River at Corwin Springs, Mont., for 1910.

[C. H. Wilks, jr., observer.]

Day.	September.		October.		November.		December.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1.....	.....	1,600	1.4	1,300	1.2	1,160	1.1	1,100
2.....	1.8	1,620	1.4	1,300	1.2	1,160	1.1	1,100
3.....	1.7	1,530	1.4	1,300	1.2	1,160	1.1	1,100
4.....	1.7	1,530	1.5	1,370	1.2	1,160	1.1	1,100
5.....	1.7	1,530	1.5	1,370	1.1	1,100	1.0	1,040
6.....	1.7	1,530	1.5	1,370	1.1	1,100	1.1	1,100
7.....	1.7	1,530	1.4	1,300	1.1	1,100	1.0	1,040
8.....	1.7	1,530	1.4	1,300	1.1	1,100	1.0	1,040
9.....	1.6	1,450	1.4	1,300	1.2	1,160	1.0	1,040
10.....	1.5	1,370	1.4	1,300	1.2	1,160	1.0	1,040
11.....	1.6	1,450	1.4	1,300	1.2	1,160	1.0	1,040
12.....	1.6	1,450	1.4	1,300	1.1	1,100	1.0	1,040
13.....	1.6	1,450	1.5	1,370	1.2	1,160	.....	.....
14.....	1.6	1,450	1.4	1,300	1.1	1,100	.....	.....
15.....	1.6	1,450	1.4	1,300	1.0	1,040	.....	.....
16.....	1.6	1,450	1.4	1,300	1.0	1,040	.....	.....
17.....	1.6	1,450	1.4	1,300	1.1	1,100	.....	.....
18.....	1.6	1,450	1.4	1,300	1.1	1,100	.....	.....
19.....	1.5	1,370	1.4	1,300	1.1	1,100	.....	.....
20.....	1.5	1,370	1.3	1,230	1.0	1,040	.....	.....
21.....	1.5	1,370	1.3	1,230	1.1	1,100	.....	.....
22.....	1.6	1,450	1.3	1,230	1.1	1,100	.....	.....
23.....	1.6	1,450	1.3	1,230	1.1	1,100	.....	.....
24.....	1.5	1,370	1.3	1,230	1.1	1,100	.....	.....
25.....	1.5	1,370	1.3	1,230	1.1	1,100	.....	.....
26.....	1.5	1,370	1.3	1,230	1.2	1,160	.....	.....
27.....	1.5	1,370	1.2	1,160	1.0	1,040	.....	.....
28.....	1.5	1,370	1.2	1,160	1.0	1,040	.....	.....
29.....	1.5	1,370	1.2	1,160	1.1	1,100	.....	.....
30.....	1.4	1,300	1.2	1,160	1.1	1,100	.....	.....
31.....	.....	.....	1.2	1,160	.....	.....	.....	.....

Daily gage height, in feet, of Yellowstone River at Corwin Springs, Mont., for 1911.

[C. H. Wilks, jr., observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		1.4	1.9	6.6	7.8	4.5	2.6	2.0	1.4	1.6
2		1.5	1.9	7.2	7.4	4.5	2.6	2.1	1.4	1.3
3		1.5	2.0	6.7	7.4	4.4	2.6	2.2	1.4	1.3
4		1.5	2.2	7.0	7.5	4.3	2.6	2.1	1.5	1.3
5		1.4	2.6	7.4	7.2	4.3	2.6	2.0	1.5	1.3
6		1.5	3.8	7.6	7.2	4.2	2.7	2.0	1.5	1.3
7		1.6	3.3	7.6	7.2	4.2	2.7	2.0	1.4	1.3
8	0.8	1.4	3.5	8.2	7.2	4.1	2.7	2.0	1.4	1.3
9	.8	1.4	4.2	8.4	7.0	4.0	2.7	1.9	1.4	1.3
10	.8	1.4	3.7	8.0	6.3	3.9	2.6	1.9	1.4	1.3
11	.8	1.4	3.3	8.4	6.2	3.8	2.5	1.9	1.3	1.3
12	.8	1.4	3.2	9.2	6.0	3.8	2.4	1.9	1.2	1.3
13	.8	1.3	3.9	10.2	6.1	3.7	2.4	1.9	1.4	1.2
14	.8	1.2	4.1	9.8	6.0	3.6	2.4	1.9	1.5	1.2
15	.8	1.2	4.7	9.4	5.9	3.5	2.4	2.0	1.6	1.3
16	.9	1.3	4.9	9.4	5.7	3.5	2.4	1.9	1.6	1.3
17	.9	1.4	4.2	9.0	5.6	3.4	2.3	1.9	1.5	1.2
18	1.0	1.4	4.0	9.0	5.6	3.4	2.2	1.8	1.5	1.2
19	1.0	1.5	3.7	9.2	5.4	3.3	2.2	1.8	1.5	1.1
20	1.1	1.5	3.4	9.2	5.4	3.2	2.2	1.7	1.6	1.3
21	1.2	1.6	3.3	9.4	5.3	3.2	2.1	1.7	1.5	1.2
22	1.2	1.7	3.7	9.7	5.2	3.1	2.1	1.7	1.5	1.2
23	1.2	1.6	3.9	9.4	5.1	3.0	2.1	1.7	1.4	1.3
24	1.3	1.6	4.6	9.0	4.9	3.0	2.1	1.7	1.4	1.2
25	1.3	1.6	5.0	8.2	4.8	3.0	2.2	1.7	1.4	1.2
26	1.2	1.7	5.6	7.9	4.7	3.0	2.2	1.6	1.5	1.4
27	1.2	1.9	4.7	7.8	4.9	2.9	2.1	1.6	1.5	1.2
28	1.2	2.0	4.3	8.2	4.8	2.8	2.1	1.6	1.3	1.2
29	1.2	2.0	4.1	7.8	4.7	2.8	2.1	1.5	1.4	-----
30	1.3	1.9	4.5	7.8	4.6	2.8	2.0	1.5	1.4	1.4
31	1.4	-----	5.4	-----	4.7	2.7	-----	1.5	-----	1.6

Daily discharge, in second-feet, of Yellowstone River at Corwin Springs, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		1,300	1,710	11,100	14,800	5,520	2,410	1,800	1,300	1,450
2		1,370	1,710	12,900	13,500	5,520	2,410	1,890	1,300	1,230
3		1,370	1,800	11,400	13,500	5,300	2,410	1,990	1,300	1,230
4		1,370	1,990	12,300	13,800	5,090	2,410	1,890	1,370	1,230
5		1,300	2,410	13,500	12,900	5,090	2,410	1,800	1,370	1,230
6		1,370	4,130	14,200	12,900	4,890	2,530	1,800	1,370	1,230
7		1,450	3,320	14,200	12,900	4,890	2,530	1,800	1,300	1,230
8		950	1,300	3,630	16,100	12,900	4,690	2,530	1,800	1,230
9	950	1,300	4,890	16,700	12,300	4,500	2,530	1,710	1,300	1,230
10	950	1,300	3,960	15,400	10,200	4,310	2,410	1,710	1,300	1,230
11	950	1,300	3,320	16,700	9,870	4,130	2,300	1,710	1,230	1,230
12	950	1,300	3,170	19,400	9,300	4,130	2,190	1,710	1,160	1,230
13	950	1,230	4,310	22,800	9,580	3,960	2,190	1,710	1,300	1,160
14	950	1,160	4,690	21,400	9,300	3,790	2,190	1,710	1,370	1,160
15	950	1,160	5,970	20,100	9,030	3,630	2,190	1,800	1,450	1,230
16	990	1,230	6,450	20,100	8,490	3,630	2,190	1,710	1,450	1,230
17	990	1,300	4,890	18,700	8,230	3,470	2,090	1,710	1,370	1,160
18	1,040	1,300	4,500	18,700	8,230	3,470	1,990	1,620	1,370	1,160
19	1,040	1,370	3,960	19,400	7,710	3,320	1,990	1,620	1,370	1,100
20	1,100	1,370	3,470	19,400	7,710	3,170	1,990	1,530	1,450	1,230
21	1,160	1,450	3,320	20,100	7,450	3,170	1,890	1,530	1,370	1,160
22	1,160	1,530	3,960	21,100	7,200	3,030	1,890	1,530	1,370	1,160
23	1,160	1,450	4,310	20,100	6,950	2,900	1,890	1,530	1,300	1,230
24	1,230	1,450	5,740	18,700	6,450	2,900	1,890	1,530	1,300	1,160
25	1,230	1,450	6,700	16,100	6,210	2,900	1,990	1,530	1,300	1,160
26	1,160	1,530	8,230	15,100	5,970	2,900	1,990	1,450	1,370	1,300
27	1,160	1,710	5,970	14,800	6,450	2,770	1,890	1,450	1,370	1,160
28	1,160	1,800	5,090	16,100	6,210	2,650	1,890	1,450	1,230	1,160
29	1,160	1,800	4,690	14,800	5,970	2,650	1,890	1,370	1,300	1,100
30	1,230	1,710	5,520	14,800	5,740	2,650	1,800	1,370	1,300	1,100
31	1,300	-----	7,710	-----	5,970	2,530	-----	1,370	-----	1,100

NOTE.—Daily discharge determined from a rating curve that is fairly well defined below 12,300 second-feet.

Monthly discharge of Yellowstone River at Corwin Springs, Mont., for 1910-11.

[Drainage area, 2,630 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1910.							
September.....	1,620	1,300	1,440	0.548	0.61	85,700	B.
October.....	1,370	1,160	1,270	.483	.56	78,100	B.
November.....	1,160	1,040	1,110	.422	.47	66,100	B.
December.....	1,100		995	.378	.44	61,200	C.
1911.							
January.....			a 900	.342	.39	55,300	
February.....			a 900	.342	.36	50,000	
March.....	1,300	950	1,050	.399	.46	64,600	B.
April.....	1,800	1,160	1,400	.532	.59	83,300	B.
May.....	8,230	1,710	4,370	1.66	1.91	269,000	B.
June.....	22,800	11,100	16,900	6.43	7.17	1,010,000	C.
July.....	14,800	5,740	9,280	3.53	4.07	571,000	B.
August.....	5,520	2,530	3,790	1.44	1.66	233,000	B.
September.....	2,530	1,800	2,160	.821	.92	129,000	B.
October.....	1,990	1,370	1,650	.627	.72	101,000	B.
November.....	1,450	1,160	1,330	.506	.56	79,100	B.
December.....	1,450	1,100	1,200	.456	.53	73,800	B.
The year.....			3,740	1.42	19.34	2,720,000	

a Estimated.

NOTE.—Means for periods Dec. 13 to 31, 1910, and March 1 to 7, 1911, estimated at 950 second-feet.

YELLOWSTONE RIVER AT HUNTLEY, MONT.

Location.—In the SW. $\frac{1}{4}$ sec. 24, T. 2 N., R. 27 E., at the new steel highway bridge 1 mile below Huntley, Mont., 1 mile below Pryor Creek. Station replaces that formerly maintained at Junction.

Records available.—October 1, 1907, to December 31, 1911.

Drainage area.—12,000 square miles.

Gage.—Chain fastened to bridge rail; datum unchanged.

Channel.—Shifts.

Discharge measurements.—Made from downstream side of bridge.

Winter flow.—River frozen entirely over in places during the winter, but during the coldest seasons open channels with floating ice are not of uncommon occurrence.

Diversions.—The Huntley canal, built by the United States Reclamation Service, takes water from the river about 2 miles above the gaging station; its normal capacity is 400 second-feet, and it supplies the water for 29,000 acres of land. Near Laurel are the headgates of the Billings Land & Irrigation Co.'s canal, which carries about 305 second-feet and irrigates 28,000 acres. Many small ditches take water from the tributaries of the Yellowstone, but few from the stream itself, owing to the variation of the stage of the water surface and consequent difficulty of diversion.

Accuracy.—Conditions for obtaining accurate data at this station are only fair and many discharge measurements are necessary to define a good rating curve.

Discharge measurements of Yellowstone River at Huntley, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	Sec.-ft.			Feet.	Sec.-ft.
May 17	W. A. Lamb.....	5.40	15,800	Aug. 10	B. E. Jones.....	4.14	9,940
June 15 ^a	R. Richards.....	10.92	47,200	Sept. 11	R. Richards.....	2.63	5,040
July 25	B. E. Jones.....	4.62	12,100				

a Surface velocities reduced by 0.90.

Daily gage height, in feet, of Yellowstone River at Huntley, Mont., for 1911.

[Arthur Foster, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.3	4.2	3.8	2.6	2.8	5.9	7.0	4.4	2.5	2.5	2.15	2.05
2.....	2.3	4.2	3.8	2.6	2.8	8.2	7.0	4.4	2.5	2.45	2.15	2.0
3.....	2.4	4.2	3.8	2.6	2.7	9.2	6.9	4.4	2.5	2.4	2.15	2.0
4.....	2.4	4.2	3.8	2.6	2.8	9.0	6.6	4.3	2.5	2.4	2.15	1.95
5.....	2.5	4.2	3.8	2.6	2.7	8.8	6.8	4.3	2.4	2.35	2.2	1.9
6.....	3.3	4.0	3.9	2.6	2.7	9.2	6.8	4.3	2.4	2.35	2.2	1.9
7.....	3.0	4.0	4.2	2.6	3.6	8.9	6.9	-----	2.5	2.3	2.4	1.9
8.....	3.0	4.0	4.7	2.6	4.0	9.0	7.0	-----	2.6	2.3	2.5	1.9
9.....	2.8	4.0	4.8	2.5	4.0	9.6	6.5	-----	2.6	2.3	3.2	1.9
10.....	2.7	4.0	5.0	2.4	4.0	9.2	6.4	-----	2.6	2.25	3.4	1.9
11.....	2.7	4.0	4.4	2.4	4.4	9.8	6.0	-----	2.6	2.25	3.6	1.9
12.....	2.7	4.2	4.1	2.4	4.0	10.6	5.8	-----	2.6	2.20	3.7	1.7
13.....	2.7	4.3	3.8	2.4	3.9	10.8	5.7	-----	2.6	2.20	3.7	1.7
14.....	2.7	4.0	3.6	2.4	3.8	11.0	5.4	-----	2.5	2.20	4.1	1.65
15.....	2.7	4.0	3.8	2.3	4.4	11.0	5.4	3.5	2.4	2.30	4.5	1.6
16.....	2.7	3.9	3.6	2.3	5.0	10.6	5.3	3.5	2.4	2.30	4.7	1.6
17.....	3.0	3.9	3.4	2.4	5.5	10.1	5.2	3.8	-----	2.30	5.5	1.6
18.....	3.1	3.8	3.0	2.3	5.1	9.80	5.2	3.6	-----	2.25	5.3	1.6
19.....	4.2	3.7	2.8	2.4	4.6	9.7	5.3	3.6	-----	2.25	5.2	1.6
20.....	4.0	3.7	2.6	2.4	4.2	10.0	5.2	3.0	-----	2.25	4.8	1.6
21.....	3.1	3.6	2.6	2.4	4.2	10.2	5.1	3.0	-----	2.2	4.5	1.6
22.....	3.5	3.5	2.6	2.4	4.1	9.6	5.1	3.0	-----	2.2	4.1	1.6
23.....	3.5	3.5	2.5	3.1	4.0	9.1	5.0	2.9	-----	2.2	3.0	1.6
24.....	3.7	3.6	2.5	3.0	3.8	8.8	5.0	2.9	-----	2.2	2.45	1.6
25.....	4.2	3.8	2.4	2.8	4.4	8.1	4.7	2.8	-----	2.25	2.4	1.6
26.....	4.2	3.8	2.4	2.6	5.8	7.9	4.4	2.8	-----	2.3	2.3	1.6
27.....	4.2	3.8	2.5	2.7	6.3	7.6	4.4	2.8	-----	2.2	2.1	1.6
28.....	4.2	3.8	2.4	3.10	5.8	7.4	4.4	2.7	-----	2.15	2.1	1.9
29.....	4.2	-----	2.5	3.10	5.3	7.1	4.4	2.7	-----	2.15	2.1	1.95
30.....	4.2	-----	2.6	3.0	5.1	7.0	4.4	2.7	-----	2.1	2.05	2.0
31.....	4.2	-----	2.6	-----	5.1	-----	4.4	2.6	-----	2.1	-----	2.0

NOTE.—Gage heights distorted by ice Jan. 1 to Mar. 13 and Nov. 7 to Dec. 31.

Daily discharge, in second-feet, of Yellowstone River at Huntley, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	2,500	4,900	5,500	18,300	24,200	11,000	4,600	4,600	3,640
2.....	3,000	4,900	5,500	31,200	24,200	11,000	4,600	4,460	3,640
3.....	3,000	4,900	5,200	37,000	23,700	11,000	4,600	4,320	3,640
4.....	4,000	4,900	5,500	35,800	22,000	10,600	4,600	4,320	3,640
5.....	4,000	4,900	5,200	34,600	23,100	10,600	4,320	4,190	3,730
6.....	5,000	4,900	5,200	37,000	23,100	10,600	4,320	4,190	3,780
7.....	5,000	4,900	8,000	35,200	23,700	10,000	4,600	4,050	-----
8.....	6,000	4,900	9,400	35,800	24,200	10,000	4,900	4,050	-----
9.....	6,000	4,600	9,400	39,300	21,500	9,000	4,900	4,050	-----
10.....	6,000	4,320	9,400	37,000	21,000	9,000	4,900	3,910	-----
11.....	7,000	4,320	11,000	40,500	18,800	9,000	4,900	3,910	-----
12.....	7,000	4,320	9,400	45,400	17,800	8,000	4,900	3,780	-----
13.....	7,000	4,320	9,050	46,700	17,300	8,000	4,900	3,780	-----
14.....	8,000	4,320	8,700	47,800	15,800	8,000	4,600	3,780	-----
15.....	8,700	4,050	11,000	47,900	15,800	7,650	4,320	4,050	-----
16.....	8,000	4,050	13,800	45,400	15,300	7,650	4,320	4,050	-----
17.....	7,320	4,320	16,300	42,300	14,800	8,700	4,340	4,050	-----
18.....	6,100	4,050	14,300	40,500	14,800	8,000	4,360	3,910	-----
19.....	5,100	4,320	11,900	39,900	15,300	8,000	4,380	3,910	-----
20.....	4,900	4,320	10,200	41,700	14,800	6,100	4,400	3,910	-----
21.....	4,900	4,320	10,200	42,900	14,300	6,100	4,420	3,780	-----
22.....	4,900	4,320	9,800	39,300	14,300	6,100	4,440	3,780	-----
23.....	4,600	6,400	9,400	36,400	13,800	5,800	4,460	3,780	-----
24.....	4,600	6,100	8,700	34,600	13,800	5,800	4,480	3,780	-----
25.....	4,320	5,500	11,000	30,600	12,400	5,500	4,500	3,910	-----
26.....	4,320	4,900	17,800	29,400	11,000	5,500	4,520	4,050	-----
27.....	4,600	5,200	20,400	27,700	11,000	5,500	4,540	3,780	-----
28.....	4,320	6,400	17,800	26,500	11,000	5,200	4,560	3,640	-----
29.....	4,600	6,400	15,300	24,800	11,000	5,200	4,580	3,640	-----
30.....	4,900	6,100	14,300	24,200	11,000	5,200	4,600	3,500	-----
31.....	4,900	-----	14,300	-----	11,000	4,900	-----	3,500	-----

NOTE.—Daily discharge determined from a rating curve fairly well defined between 2,000 and 48,000 second-feet. Discharge estimated Mar. 1 to 13, Aug. 7 to 14, and Sept. 17 to 30.

Monthly discharge of Yellowstone River at Huntley, Mont., for 1911.

[Drainage area, 12,000 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....			α 2,000	0.167	0.19	123,000	
February.....			α 2,200	.183	.19	122,000	
March.....	8,700	2,500	5,320	.443	.51	327,000	C.
April.....	6,400	4,050	4,870	.406	.45	290,000	B.
May.....	20,400	5,200	10,700	.892	1.03	658,000	B.
June.....	47,900	18,300	36,500	3.04	3.39	2,170,000	B.
July.....	24,200	11,000	17,000	1.42	1.64	1,050,000	B.
August.....	11,000	4,900	7,830	.652	.75	481,000	B.
September.....	4,900	4,320	4,560	.380	.42	271,000	B.
October.....	4,600	3,500	3,950	.329	.38	243,000	B.
November.....	3,780		3,140	.262	.29	187,000	C.
December.....			α 2,300	.192	.22	141,000	
The year.....	47,900		8,370	.698	9.46	6,060,000	

α Estimated.

NOTE.—Mean discharge Nov. 7 to 30 estimated at 3,000 second-feet.

YELLOWSTONE RIVER AT LOWER YELLOWSTONE DAM, AT INTAKE, MONT.

Location.—At the Lower Yellowstone diversion dam, at Intake and 18 miles below Glendive, Mont.

Records available.—Records by War Department and Department of Agriculture, 1893 to 1903; August 1, 1903, to December 31, 1911, by United States Geological Survey. Records January 1 to December 31, 1911, from observations at the present station, which replaces the one formerly maintained at Glendive.

Gage.—A chain gage on the north abutment of the dam. The gage readings show the depth of water on the crest of the dam.

Winter flow.—Affected by ice.

The dam.—The dam, a rock-filled timber-crib structure on a pile foundation, was completed January 29, 1910. It is 700 feet long, crosses the stream at right angles to the current, and will raise the low-water level of the river about 4 feet. The dam is specially designed to resist the destructive effects of ice by having an approach on a slope of 3 to 1, and the downstream face is ogee-shaped and protected by a heavy rock apron.

Diversions.—The Lower Yellowstone canal, which diverts water to irrigate 66,000 acres of land, has its headworks at the north abutment.

Accuracy.—A curve showing relation of gage heights at Glendive and at Lower Yellowstone dam was constructed. Using this curve of relation and discharge measurements made at Glendive, a discharge curve was constructed which is applicable to the gage heights of Lower Yellowstone dam, and should give fair results.

Daily gage height, in feet, of Yellowstone River over Lower Yellowstone dam, at Intake, Mont., for 1911.

[T. F. Hansford, observer.]

Day.	Jan.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.			1.7	1.85	4.6	5.6	3.4	2.3	1.8	1.6
2.			1.7	1.85	4.7	5.6	3.3	2.25	1.8	1.6
3.			1.7	1.85	5.0	5.4	3.5	2.2	1.9	1.6
4.			1.7	1.85	5.5	5.3	3.5	2.15	1.9	1.5
5.	0.5		1.7	1.9	5.6	5.2	3.5	2.15	1.9	1.55
6.			1.7	1.85	5.6	5.0	3.4	2.6	2.0	1.55
7.			1.7	1.85	5.5	4.9	3.4	3.3	1.9	1.55
8.		2.8	1.65	1.85	5.7	5.0	3.9	4.1	1.9	
9.	1.0	3.0	1.65	1.9	5.8	4.9	4.1	3.7	1.9	
10.		3.4	1.65	2.0	6.6	4.9	4.0	3.0	1.9	
11.		7.6	1.65	2.2	6.8	4.9	3.9	2.8	1.9	
12.	1.3	8.6	1.6	2.4	6.5	4.8	3.5	2.5	1.85	
13.		11.6	1.6	2.6	6.3	4.5	3.4	2.3	1.8	
14.		4.2	1.6	2.6	6.1	4.2	3.3	2.3	1.8	
15.		3.3	1.6	2.7	6.5	4.1	3.1	2.2	1.8	
16.	1.5	2.9	1.6	2.8	7.1	4.1	3.0	2.15	1.75	
17.		2.8	1.6	2.95	7.4	3.9	2.95	2.1	1.75	
18.	1.1	2.6	1.55	3.1	7.7	3.9	2.9	2.0	1.7	
19.		2.6	1.5	3.4	7.7	3.8	2.8	2.0	1.7	
20.		2.6	1.5	3.8	7.5	3.8	3.0	2.0	1.75	
21.	1.4	2.6	1.45	3.5	7.4	3.8	3.0	2.0	1.75	
22.		2.5	1.45	3.2	8.0	4.0	2.8	2.0	1.75	
23.		2.4	1.5	3.1	7.9	4.0	2.7	2.0	1.7	
24.		2.2	1.5	3.0	7.7	3.8	2.6	1.9	1.7	
25.	1.7	2.0	1.55	2.8	7.55	3.8	2.5	1.9	1.7	
26.		2.0	1.6	3.2	7.3	3.8	2.5	1.85	1.7	
27.		1.9	1.75	3.3	6.9	3.6	2.4	1.85	1.7	
28.		1.8	1.75	3.4	6.4	3.5	2.4	1.85	1.7	
29.	2.0	1.8	1.8	3.8	6.0	3.5	2.4	1.8	1.7	
30.		1.8	1.8	4.2	5.8	3.7	2.4	1.8	1.65	
31.		1.8		4.4		3.6	2.35		1.65	

NOTE.—Gage heights distorted by ice Jan. 1 to Mar. 15.

Daily discharge, in second-feet, of Yellowstone River over Lower Yellowstone dam, at Intake, Mont., for 1911.

[T. F. Hansford, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		6,490	6,740	29,600	42,200	17,700	9,540	6,740	5,760
2.		6,240	7,000	30,800	42,200	16,800	9,240	6,740	5,760
3.		6,240	7,000	34,300	39,400	18,600	8,940	7,260	5,760
4.		6,240	7,000	40,800	38,100	18,600	8,650	7,260	5,300
5.		6,240	7,260	42,200	36,800	18,600	8,650	7,260	5,530
6.		6,240	7,000	42,200	34,300	17,700	11,500	7,800	5,530
7.		6,240	7,000	40,800	33,100	17,700	16,800	7,260	5,530
8.		6,000	7,000	43,600	34,300	22,400	24,400	7,260	
9.		6,000	7,260	45,000	33,100	24,400	20,400	7,260	
10.		6,000	7,800	56,800	33,100	23,400	14,400	7,260	
11.		6,000	8,940	59,800	33,100	22,400	12,900	7,260	
12.		5,760	10,200	55,200	32,000	18,600	10,800	7,000	
13.		5,760	11,500	52,200	28,600	17,700	9,540	6,740	
14.		5,760	11,500	49,400	25,400	16,800	9,540	6,740	
15.		5,760	12,200	55,200	24,400	15,200	8,940	6,740	
16.	13,600	5,760	12,900	64,400	24,400	14,400	8,650	6,490	
17.	12,900	5,760	14,000	69,100	22,400	14,000	8,360	6,490	
18.	11,500	5,530	15,200	73,800	22,400	13,600	7,800	6,240	
19.	11,500	5,300	17,700	73,800	21,400	12,900	7,800	6,240	
20.	11,500	5,300	21,400	70,600	21,400	14,400	7,800	6,490	
21.	11,500	5,080	18,600	69,100	21,400	14,400	7,800	6,490	
22.	10,800	5,080	16,000	78,400	23,400	12,900	7,800	6,490	
23.	10,200	5,300	15,200	76,800	23,400	12,200	7,800	6,240	
24.	8,940	5,300	14,400	73,800	21,400	11,500	7,260	6,240	
25.	7,800	5,530	12,900	71,400	21,400	10,800	7,260	6,240	
26.	7,800	5,760	16,000	67,600	21,400	10,800	7,000	6,240	
27.	7,260	6,490	16,800	61,400	19,500	10,200	7,000	6,240	
28.	6,740	6,490	17,700	53,800	18,600	10,200	7,000	6,240	
29.	6,740	6,740	21,400	47,900	18,600	10,200	6,740	6,240	
30.	6,740	6,740	25,400	45,000	20,400	10,200	6,740	6,000	
31.	6,740		27,500		19,500	9,850		6,000	

Monthly discharge of Yellowstone River over Yellowstone dam, at Intake, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....			3,500	215,000
February.....			4,000	222,000
March.....	13,600	6,740	9,270	570,000
April.....	6,740	5,080	5,900	351,000
May.....	27,500	6,740	12,800	787,000
June.....	78,400	29,600	55,800	3,320,000
July.....	42,200	18,600	27,500	1,690,000
August.....	24,400	9,850	15,500	953,000
September.....	24,400	6,740	9,900	589,000
October.....	7,800	6,000	6,680	411,000
November.....	5,760		4,750	283,000
December.....			4,000	246,000
The period.....	78,400		13,300	9,640,000

NOTE.—Means for January, February, and December estimated. Daily discharge Mar. 1 to 15 estimated at 9,000 second-feet; discharge Nov. 8 to 30 at 4,500 second-feet.

Daily discharge, in second-feet, of Lower Yellowstone canal at Lower Yellowstone dam, at Intake, Mont., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		148	417	227	43	66	16.....	175	274	482	95	0	.....
2.....		148	417	202	47	66	17.....	100	185	482	45	30	.....
3.....		0	417	195	49	45	18.....	105	295	482	45	30	.....
4.....		0	440	185	50	42	19.....	105	295	482	45	30	.....
5.....		0	440	170	57	42	20.....	192	295	402	57	43	.....
6.....		0	455	155	66	147	21.....	192	295	295	49	53	.....
7.....		180	466	148	66	147	22.....	192	343	295	49	53	.....
8.....	168	180	466	103	0	99	23.....	192	353	265	48	53	.....
9.....	168	97	466	103	0	99	24.....	187	365	265	84	66	.....
10.....	168	97	466	0	0	40	25.....	184	377	265	74	66	.....
11.....	95	97	468	94	0	.....	26.....	131	313	265	49	66	.....
12.....	95	127	468	95	0	.....	27.....	111	123	265	49	66	.....
13.....	168	210	455	95	0	.....	28.....	111	377	295	49	66	.....
14.....	168	255	468	95	0	.....	29.....	111	353	227	49	66	.....
15.....	168	255	482	95	0	.....	30.....	111	390	235	45	75	.....
							31.....	118		227	57	.....	.....

NOTE.—Estimates of daily discharge of canal furnished by United States Reclamation Service. Canal opened May 8 and closed Oct. 10. No water in canal June 3 to 6, Aug. 10, and Sept. 8 to 16.

Monthly discharge of Lower Yellowstone canal at Lower Yellowstone dam, at Intake, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
May 8-31.....	192	95	146	6,950
June.....	390	0	214	12,700
July.....	482	227	388	23,900
August.....	227	0	92.0	5,660
September.....	75	0	38.0	2,280
October 1-10.....	147	40	79.3	1,570
The year.....				53,000

NORTH FORK OF BIG TIMBER CREEK NEAR BIG TIMBER, MONT.

Location.—In the SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 26, T. 3 N., R. 13 E., 1 mile above the Tintinger ranch, 15 miles northwest of Big Timber, Mont., just above the junction with the South Fork.

Records available.—May 6, 1907, to December 31, 1911.

Drainage area.—40 square miles.

Gage.—Staff on left bank; datum unchanged.

Channel.—Bed composed of boulders and coarse gravel; probably permanent.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—Several ditches above the station divert water to irrigate approximately 300 acres of land; a large ditch appropriating 50,000 inches of water (including both forks) heads just below the gage. The water rights of Big Timber Creek have never been adjudicated.

Storage.—Two lakes at the head of the North Fork offer excellent reservoir sites.

It is proposed to utilize the flow of the North Fork in connection with a project under the Carey Act.

Accuracy.—Results obtained during the open season good.

Discharge measurements of North Fork of Big Timber Creek near Big Timber, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
Mar. 29	C. S. Heidel	<i>Feet.</i> 0.91	<i>Sec.-ft.</i> 17.1
May 27	.....do.....	1.63	80
July 18	R. Richards	1.48	67
Aug. 24	C. S. Heidel	1.04	24.5

Daily gage height, in feet, of North Fork of Big Timber Creek near Big Timber, Mont., for 1911.

[N. J. Tintinger, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		0.90	1.00	3.0	1.40	1.05	1.00	0.90	0.95
2.....		.95	.90	3.1	1.30	1.10	1.05	0.90	0.95
3.....		.90	.90	2.7	1.30	1.10	1.10	0.85	0.95
4.....		.90	1.00	3.0	1.20	1.20	1.10	0.85	0.95
5.....		.90	1.00	2.7	1.30	1.20	1.10	0.85	0.95
6.....	0.85	.90	1.10	2.40	1.40	1.30	1.10	0.85	0.95
7.....	.85	.90	1.40	2.00	1.40	1.30	1.05	0.85	0.95
8.....	.70	.90	1.30	2.00	1.30	1.40	1.05	0.80	0.95
9.....	.75	.95	1.50	2.10	1.30	1.40	1.00	0.80	0.95
10.....	.75	1.00	1.40	2.00	1.40	1.45	1.00	0.80	0.95
11.....	.80	1.00	1.40	2.5	1.40	1.50	1.00	0.80	0.95
12.....	.85	.95	1.30	2.5	1.40	1.45	1.00	0.80	.....
13.....	.85	.90	1.20	3.0	1.30	1.40	1.00	0.80	.....
14.....	.80	.85	1.30	2.8	1.40	1.30	1.00	0.80	.....
15.....	.85	.85	2.70	2.5	1.40	1.30	1.00	0.80	.....
16.....	.80	.85	2.50	2.40	1.40	1.30	1.00	0.80	.....
17.....	.85	.85	2.50	2.40	1.40	1.25	.95	0.80	.....
18.....	.85	.90	2.40	2.00	1.47	1.25	.95	0.80	.....
19.....	.90	.90	2.20	2.00	1.45	1.20	1.00	0.80	.....
20.....	.90	.95	1.60	2.40	1.40	1.20	1.00	0.80	.....
21.....	.85	.95	1.40	2.40	1.40	1.20	.95	0.80	.....
22.....	.85	1.00	1.60	2.30	1.40	1.15	.95	0.80	.....
23.....	.90	1.00	1.60	2.20	1.35	1.15	.90	0.80	.....
24.....	.90	1.00	1.40	2.15	1.30	1.10	.90	0.80	.....
25.....	.90	1.00	1.60	2.00	1.25	1.05	.90	0.85	.....
26.....	.85	1.05	1.70	1.85	1.15	1.05	.90	0.85	.....
27.....	.85	1.05	1.61	1.70	1.10	1.05	.90	0.90	.....
28.....	.85	1.05	1.61	1.70	1.20	1.05	.95	0.90	.....
29.....	.91	1.00	1.70	1.65	1.30	1.05	.95	0.90	.....
30.....	.91	1.00	1.70	1.45	1.10	1.05	.95	0.95	.....
31.....	.90	.....	1.70	.....	1.00	1.00	.....	0.95	.....

NOTE.—Gage heights distorted by ice Oct. 25 to Nov. 11.

Daily discharge, in second-feet, of North Fork of Big Timber Creek near Big Timber, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		17	22	460	53	25	22	17
2.....		20	17	490	43	28	25	17
3.....		17	17	370	43	28	28	15
4.....		17	22	460	35	35	28	15
5.....		17	22	370	43	35	28	15
6.....	15	17	28	280	53	43	28	15
7.....	15	17	53	165	53	43	25	15
8.....	10	17	43	165	43	53	25	13
9.....	12	20	65	190	43	53	22	13
10.....	12	22	53	165	53	59	22	13
11.....	13	22	53	310	53	65	22	13
12.....	15	20	43	310	53	59	22	13
13.....	15	17	35	460	43	53	22	13
14.....	13	15	43	400	53	43	22	13
15.....	15	15	370	310	53	43	22	13
16.....	13	15	310	280	53	43	22	13
17.....	15	15	310	280	53	39	20	13
18.....	15	17	280	165	61	39	20	13
19.....	17	17	220	165	59	35	22	13
20.....	17	20	80	280	53	35	22	13
21.....	15	20	53	280	53	35	20	13
22.....	15	22	80	250	53	32	20	13
23.....	17	22	80	220	48	32	17	13
24.....	17	22	53	205	43	28	17	13
25.....	17	22	80	165	39	25	17	15
26.....	15	25	97	128	32	25	17	15
27.....	15	25	82	97	28	25	17	15
28.....	15	25	82	97	35	25	20	15
29.....	18	22	97	88	43	25	20	15
30.....	18	22	97	59	28	25	20	15
31.....	17		97		22	22		15

NOTE.—Daily discharge determined from a fairly well defined rating curve; discharge estimated Oct. 25 to 31.

Monthly discharge of North Fork of Big Timber Creek near Big Timber, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			a 10	615	D.
February.....			a 10	555	D.
March.....	18	10	15.0	922	C.
April.....	25	15	19.4	1,150	B.
May.....	370	17	96.3	5,920	B.
June.....	490	59	255	15,200	B.
July.....	61	22	45.8	2,820	B.
August.....	65	22	37.3	2,280	B.
September.....	28	17	21.8	1,300	B.
October.....	17	13	14.0	861	C.
November.....			a 12	714	D.
December.....			a 9	553	D.
The year.....	490		45.4	32,900	

a Estimated.

NOTE.—Discharge Mar. 1 to 5 estimated at 15 second-feet per day.

SOUTH FORK OF BIG TIMBER CREEK NEAR BIG TIMBER, MONT.

Location.—In the SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 26, T. 3 N., R. 13 E., 1 mile above Tintinger's ranch, just above the junction with the North Fork, and 15 miles northwest of Big Timber, Mont.

Records available.—May 6, 1907, to December 31, 1911.

Drainage area.—10 square miles.

Gage.—Staff; datum unchanged.

Channel.—Practically permanent.

Discharge measurements.—Made by wading near gage.

Winter flow.—Affected by ice.

Diversions.—A few ditches divert water from the creek, and practically all the water is appropriated.

Accuracy.—Open-season results fairly good.

Discharge measurements of South Fork of Big Timber Creek near Big Timber, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 29	C. S. Heidel.....	0.51	8.3
May 27	.....do.....	.99	50
July 18	R. Richards.....	.75	31
Aug. 24	C. S. Heidel.....	.64	15.4

Daily gage height, in feet, of South Fork of Big Timber Creek near Big Timber, Mont., for 1911.

[N. J. Tintinger, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		0.55	0.5	1.5	0.85	0.5	0.6	0.55	0.5
2.....		.5	.5	1.5	.8	.5	.6	.55	.5
3.....		.5	.6	1.6	.8	.55	.65	.55	.5
4.....		.5	.65	1.6	.7	.6	.65	.5	.5
5.....		.5	.65	1.7	.8	.6	.65	.5	.5
6.....	0.5	.5	.65	1.6	.85	.65	.65	.5	.5
7.....	.5	.5	.7	1.5	.85	.8	.6	.5	.5
8.....	.5	.5	.7	1.4	.8	1.0	.6	.5	.5
9.....	.5	.5	.75	1.4	.7	.9	.6	.5	.5
10.....	.55	.55	.7	1.4	.8	.85	.6	.5	.5
11.....	.5	.55	.65	1.5	.7	.8	.6	.5	.5
12.....	.5	.5	.6	1.6	.65	.8	.6	.5	.....
13.....	.55	.45	.6	1.6	.7	.75	.6	.5	.....
14.....	.5	.45	.65	1.6	.7	.75	.6	.5	.....
15.....	.5	.45	1.4	1.5	.7	.65	.6	.5	.....
16.....	.55	.45	1.0	1.5	.65	.65	.6	.5	.....
17.....	.5	.5	.9	1.4	.65	.6	.55	.5	.....
18.....	.55	.5	.8	1.0	.75	.6	.55	.5	.....
19.....	.65	.5	.7	1.0	.7	.6	.55	.5	.....
20.....	.6	.55	.7	1.3	.7	.6	.6	.5	.....
21.....	.55	.55	.6	1.3	.65	.6	.6	.5	.....
22.....	.65	.6	.75	1.2	.65	.65	.55	.5	.....
23.....	.65	.6	1.0	1.2	.65	.6	.55	.5	.....
24.....	.65	.6	1.0	1.1	.65	.65	.5	.55	.....
25.....	.6	.65	1.0	1.0	.6	.65	.5	.5	.....
26.....	.55	.65	1.1	.95	.55	.6	.5	.5	.....
27.....	.55	.6	1.1	.95	.55	.6	.55	.5	.....
28.....	.55	.6	1.05	.9	.6	.6	.55	.5	.....
29.....	.51	.65	1.15	.85	.6	.6	.55	.5	.....
30.....	.61	.6	1.1	.85	.55	.6	.55	.5	.....
31.....	.5	.....	1.05	.....	.5	.55	.....	.5	.....

Daily discharge, in second-feet, of South Fork of Big Timber Creek near Big Timber, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	7.0	9.5	7.0	162	34	7.0	12	9.5	7.0
2.....	7.0	7.0	7.0	162	29	7.0	12	9.5	7.0
3.....	7.0	7.0	12	190	29	9.5	16	9.5	7.0
4.....	7.0	7.0	16	190	20	12	16	7.0	7.0
5.....	7.0	7.0	16	220	29	12	16	7.0	7.0
6.....	7.0	7.0	16	190	34	16	16	7.0	7.0
7.....	7.0	7.0	20	162	34	29	12	7.0	7.0
8.....	7.0	7.0	20	136	29	54	12	7.0	7.0
9.....	7.0	7.0	24	136	20	40	12	7.0	7.0
10.....	9.5	9.5	20	136	29	34	12	7.0	7.0
11.....	7.0	9.5	16	162	20	29	12	7.0	7.0
12.....	7.0	7.0	12	190	16	29	12	7.0	7.0
13.....	9.5	5.2	12	190	20	24	12	7.0	7.0
14.....	7.0	5.2	16	190	20	24	12	7.0	7.0
15.....	7.0	5.2	136	162	20	16	12	7.0	7.0
16.....	9.5	5.2	54	162	16	16	12	7.0	7.0
17.....	7.0	7.0	40	136	16	12	9.5	7.0	7.0
18.....	9.5	7.0	29	54	24	12	9.5	7.0	7.0
19.....	16	7.0	20	54	20	12	9.5	7.0	7.0
20.....	12	9.5	20	113	20	12	12	7.0	7.0
21.....	9.5	9.5	12	113	16	12	12	7.0	7.0
22.....	16	12	24	91	16	16	9.5	7.0	7.0
23.....	16	12	54	91	16	12	9.5	7.0	7.0
24.....	16	12	54	72	16	16	7.0	9.5	7.0
25.....	12	16	54	54	12	16	7.0	7.0	7.0
26.....	9.5	16	72	47	9.5	12	7.0	7.0	7.0
27.....	9.5	12	72	47	9.5	12	9.5	7.0	7.0
28.....	9.5	12	63	40	12	12	9.5	7.0	7.0
29.....	7.5	16	82	34	12	12	9.5	7.0	7.0
30.....	7.5	12	72	34	9.5	12	9.5	7.0	7.0
31.....	7.0	.....	63	.....	7.0	9.5	.....	7.0	7.0

NOTE.—Daily discharge determined from a rating curve fairly well defined below 54 second-feet.

Monthly discharge of South Fork of Big Timber Creek near Big Timber, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (in acre- feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	.....	.....	α 5.00	307	D.
February.....	.....	.....	α 5.00	278	D.
March.....	16	7.0	9.16	563	B.
April.....	16	5.2	9.08	540	B.
May.....	136	7.0	36.6	2,250	B.
June.....	220	34	124	7,380	C.
July.....	34	7.0	19.8	1,220	B.
August.....	54	7.0	17.7	1,090	B.
September.....	16	7.0	11.3	672	B.
October.....	9.5	7.0	7.32	450	B.
November.....	7.0	7.0	7.00	417	C.
December.....	.....	.....	α 5.00	307	D.
The year.....	.....	.....	21.3	15,500	.....

α Estimated.

NOTE.—Discharge Mar. 1 to 5 and Nov. 12 to 30 estimated at 7 second-feet.

BOULDER RIVER NEAR CONTACT, MONT.

Location.—In the SE. $\frac{1}{4}$ sec. 14, T. 3 S., R. 12 E., at the ranch of G. W. Baker, about 8 miles above McLeod post office, 4 miles from Contact, Mont., and $2\frac{1}{2}$ miles below the Boulder Falls.

Records available.—May 1, 1910, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Staff, fastened to left abutment of private wagon bridge near the ranch buildings.

Channel.—Rocky; permanent.

Discharge measurements.—Made from the bridge or by wading just above the footbridge, which is some 400 yards above the gage.

Winter flow.—Affected by ice.

Accuracy.—Good.

Discharge measurements of Boulder River near Contact, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 31	C. S. Heidel.....	2.20	61
May 23	.....do.....	3.5	504
July 14	R. Richards.....	4.02	850
Aug. 25	C. S. Heidel.....	2.76	198

Daily gage height, in feet, of Boulder River near Contact, Mont., for 1911.

[G. W. Baker, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	2.15	2.29	2.85	5.0	5.5	3.75	2.55	2.6	2.45
2.....	2.15	2.26	2.90	5.8	5.6	3.65	2.55	2.65	2.45
3.....	2.15	2.26	2.92	5.8	5.2	3.55	2.55	2.65	2.45
4.....	2.15	2.24	2.92	5.6	5.4	3.5	2.55	2.65	2.45
5.....	2.15	2.24	3.0	6.1	5.4	3.4	2.55	2.65	2.45
6.....	2.16	2.24	3.1	5.9	5.4	3.4	2.5	2.65	2.4
7.....	2.16	2.24	3.2	6.3	5.6	3.3	2.5	2.65	2.4
8.....	2.18	2.24	3.3	6.7	5.5	3.3	2.5	2.65	2.4
9.....	2.18	2.25	3.4	7.2	4.8	3.2	2.5	2.65	2.4
10.....	2.21	2.25	3.45	6.8	4.6	3.2	2.45	2.7	2.4
11.....	2.21	2.2	3.6	7.5	4.4	3.1	2.45	2.7	2.4
12.....	2.24	2.2	3.7	8.1	4.2	3.1	2.45	2.7	.....
13.....	2.24	2.2	3.75	8.0	4.2	3.0	2.45	2.7	.....
14.....	2.24	2.2	3.85	8.3	4.2	3.0	2.45	2.7	.....
15.....	2.24	2.2	3.85	8.0	4.2	3.0	2.45	2.65	.....
16.....	2.24	2.2	3.75	6.9	4.1	3.0	2.45	2.65	.....
17.....	2.26	2.25	3.65	7.2	4.1	3.0	2.5	2.65	.....
18.....	2.26	2.25	3.65	6.8	4.1	2.9	2.5	2.65	.....
19.....	2.26	2.2	3.55	7.1	4.0	2.9	2.5	2.65	.....
20.....	2.26	2.2	3.55	7.4	4.5	2.8	2.52	2.6	.....
21.....	2.26	2.2	3.5	7.5	4.1	2.8	2.54	2.6	.....
22.....	2.26	2.3	3.6	7.6	4.0	2.7	2.55	2.55	.....
23.....	2.29	2.3	3.65	6.8	3.9	2.7	2.55	2.55	.....
24.....	2.29	2.4	3.75	6.5	3.9	2.7	2.54	2.5	.....
25.....	2.29	2.5	3.85	6.4	3.9	2.65	2.6	2.5	.....
26.....	2.29	2.6	3.95	6.2	3.85	2.65	2.6	2.5	.....
27.....	2.29	2.65	4.0	6.0	3.75	2.6	2.6	2.5	.....
28.....	2.29	2.75	4.0	5.9	3.75	2.6	2.6	2.5	.....
29.....	2.29	2.75	3.75	5.8	3.65	2.6	2.62	2.45	.....
30.....	2.29	2.75	3.75	5.6	3.65	2.6	2.62	2.45	.....
31.....	2.20	.....	3.9	.....	4.0	2.6	.....	2.45	.....

Daily discharge, in second-feet, of Boulder River near Contact, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	52	78	228	1,520	1,870	675	138	150	112
2.....	52	72	245	2,080	1,940	615	138	165	112
3.....	52	72	253	2,080	1,660	558	138	165	112
4.....	52	68	253	1,940	1,800	530	138	165	112
5.....	52	68	285	2,290	1,800	475	138	165	112
6.....	54	68	330	2,150	1,800	475	125	165	100
7.....	54	68	375	2,430	1,940	425	125	165	100
8.....	57	68	425	2,720	1,870	425	125	165	100
9.....	57	70	475	3,070	1,380	375	125	165	100
10.....	62	70	502	2,790	1,240	375	112	180	100
11.....	62	60	585	3,290	1,100	330	112	180	100
12.....	68	60	645	3,710	960	330	112	180	100
13.....	68	60	675	3,640	960	285	112	180	100
14.....	68	60	735	3,850	960	285	112	180	100
15.....	68	60	735	3,640	960	285	112	165	100
16.....	68	60	675	2,860	895	285	112	165	100
17.....	72	70	615	3,070	895	285	125	165	100
18.....	72	70	615	2,790	895	245	125	165	100
19.....	72	60	558	3,000	830	245	125	165	100
20.....	72	60	558	3,210	1,170	210	130	150	100
21.....	72	60	530	3,290	895	210	135	150	100
22.....	72	80	585	3,360	830	180	138	138	100
23.....	78	80	615	2,790	765	180	138	138	100
24.....	78	100	675	2,580	765	180	135	125	100
25.....	78	125	735	2,500	765	165	150	125	100
26.....	78	150	798	2,360	735	165	150	125	100
27.....	78	165	830	2,220	675	150	150	125	100
28.....	78	195	830	2,150	675	150	150	125	100
29.....	78	195	675	2,080	615	150	156	112	100
30.....	78	195	675	1,940	615	150	156	112	100
31.....	60	.....	765	.....	830	150	.....	112	100

NOTE.—Daily discharge determined from a rating curve well defined below 1,200 second-feet.

Monthly discharge of Boulder River near Contact, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	.....	.....	30	1,840	D.
February.....	.....	.....	35	1,940	D.
March.....	78	52	66.5	4,090	A.
April.....	195	60	88.9	5,290	A.
May.....	830	228	564	34,700	A.
June.....	3,850	1,520	2,710	161,000	C.
July.....	1,940	615	1,130	69,500	B.
August.....	675	150	308	18,900	A.
September.....	156	112	131	7,800	A.
October.....	180	112	153	9,410	A.
November.....	.....	.....	96	5,710	C.
December.....	.....	.....	65	4,000	D.
The year.....	.....	.....	448	324,000	.....

NOTE.—Means for January, February, and December estimated. Discharge Nov. 12 to 30 estimated at 90 second-feet.

WEST FORK OF BOULDER RIVER AT McLEOD, MONT.

Location.—In the SE. $\frac{1}{4}$ sec. 16, T. 2 S., R. 13 E., at Koozer's private bridge, 200 hundred yards upstream from the highway bridge at McLeod post office.

Records available.—May 4, 1907, to December 31, 1911.

Drainage area.—137 square miles.

Gage.—Staff, fastened to piling of bridge near right bank; datum unchanged.

Channel.—Composed of bowlders; rough but permanent.

Discharge measurements.—Made from bridge or by wading.

Winter flow.—Affected by ice.

Diversions.—Water to irrigate about 800 acres of land is diverted above the station.

A Carey Act project reclaiming 12,000 to 15,000 acres is now under investigation; the water is to be diverted from the West Fork about 12 miles above the station.

Accuracy.—Open-water records good.

Discharge measurements of West Fork of Boulder River at McLeod, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 31	C. S. Heidel.....	1.48	51
May 24	.....do.....	2.67	411
July 15	R. Richards.....	2.48	345
Aug. 25	C. S. Heidel.....	1.67	70

Daily gage height, in feet, of West Fork of Boulder River at McLeod, Mont., for 1911.

[Clyde Curtis, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		1.45	1.8	3.6	2.9	2.05	1.6	1.6	1.65
2.....		1.4	1.85	3.9	2.8	2.1	1.6	1.65	1.65
3.....		1.4	1.85	3.7	2.7	2.25	1.7	1.6	1.6
4.....		1.45	1.85	3.6	2.8	2.15	1.65	1.6	1.6
5.....		1.5	1.9	3.4	3.0	2.15	1.7	1.65	1.6
6.....		1.5	2.0	3.4	2.8	2.0	1.6	1.6	1.55
7.....		1.45	2.05	3.5	3.0	2.0	1.6	1.65	1.55
8.....		1.5	2.2	3.6	2.9	2.15	1.65	1.65	1.55
9.....		1.45	2.4	3.5	2.5	2.05	1.6	1.65	1.6
10.....		1.4	2.45	3.9	2.45	2.05	1.65	1.7	1.55
11.....		1.5	2.6	4.0	2.45	2.0	1.6	1.65	1.55
12.....		1.45	2.6	4.2	2.45	1.9	1.6	1.7	1.5
13.....		1.45	2.5	4.3	2.45	1.95	1.7	1.65	1.5
14.....		1.4	2.6	3.8	2.45	1.85	1.65	1.65	1.5
15.....	1.3	1.4	2.7	3.9	2.35	1.85	1.65	1.7	1.5
16.....	1.3	1.45	2.5	3.8	2.2	1.8	1.6	1.65	.....
17.....	1.3	1.45	2.4	3.7	2.2	1.7	1.6	1.7	.....
18.....	1.35	1.5	2.35	3.7	2.2	1.75	1.6	1.65	.....
19.....	1.35	1.5	2.3	3.8	2.2	1.7	1.55	1.65	.....
20.....	1.4	1.55	2.2	3.9	2.35	1.75	1.6	1.7	.....
21.....	1.4	1.55	2.2	3.8	2.25	1.7	1.6	1.65	.....
22.....	1.45	1.55	2.25	3.7	2.2	1.65	1.6	1.7	.....
23.....	1.5	1.55	2.25	3.5	2.2	1.7	1.65	1.65	.....
24.....	1.5	1.6	2.7	3.4	2.1	1.65	1.6	1.65	.....
25.....	1.5	1.65	2.8	3.4	2.1	1.7	1.6	1.7	.....
26.....	1.45	1.65	2.7	3.4	2.5	1.65	1.55	1.65	.....
27.....	1.45	1.7	2.7	3.4	2.1	1.65	1.55	1.7	.....
28.....	1.5	1.7	2.8	3.3	2.1	1.65	1.65	1.6	.....
29.....	1.45	1.75	3.0	3.2	2.0	1.6	1.6	1.6	.....
30.....	1.4	1.8	3.1	3.0	2.05	1.65	1.65	1.65	.....
31.....	1.45	.....	3.0	.....	2.0	1.6	.....	1.6	.....

Daily discharge, in second-feet, of West Fork of Boulder River at McLeod, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		50	105	1,010	545	178	69	69	77
2.....		45	118	1,280	490	195	69	77	77
3.....		45	118	1,100	440	248	85	69	69
4.....		50	118	1,010	490	213	77	69	69
5.....		56	130	860	600	213	85	77	69
6.....		56	160	860	490	160	69	69	62
7.....		50	178	935	600	160	69	77	62
8.....		56	230	1,010	545	213	77	77	62
9.....		50	305	935	345	178	69	77	69
10.....		45	325	1,280	325	178	77	85	62
11.....		56	390	1,370	325	160	69	77	62
12.....		50	390	1,570	325	130	69	85	56
13.....		50	345	1,670	325	145	85	77	56
14.....		45	390	1,180	325	118	77	77	56
15.....	36	45	440	1,280	285	118	77	85	56
16.....	36	50	345	1,180	230	105	69	77	.....
17.....	36	50	305	1,100	230	85	69	85	.....
18.....	40	56	285	1,100	230	95	69	77	.....
19.....	40	56	265	1,180	230	85	62	77	.....
20.....	45	62	230	1,280	285	95	69	85	.....
21.....	45	62	230	1,180	248	85	69	77	.....
22.....	50	62	248	1,100	230	77	69	85	.....
23.....	56	62	248	935	230	85	77	77	.....
24.....	56	69	440	860	195	77	69	77	.....
25.....	56	77	490	860	195	85	69	85	.....
26.....	50	77	440	860	345	77	62	77	.....
27.....	50	85	440	860	195	77	62	85	.....
28.....	56	85	490	790	195	77	77	69	.....
29.....	50	95	600	725	160	69	69	69	.....
30.....	45	105	660	600	178	77	77	77	.....
31.....	50	.....	600	.....	160	69	.....	69	.....

NOTE.—Daily discharge determined from a rating curve well defined below 600 second-feet.

Monthly discharge of West Fork of Boulder River at McLeod, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			a 20	1,230	
February.....			a 20	1,110	
March.....	56		37.0	2,280	C.
April.....	105	45	60.1	3,580	B.
May.....	660	105	324	19,900	B.
June.....	1,670	600	1,060	63,100	C.
July.....	600	160	322	19,800	B.
August.....	248	69	127	7,810	B.
September.....	85	62	72.0	4,280	B.
October.....	85	69	77.3	4,750	B.
November.....	77	.....	54.6	3,250	C.
December.....	.....	.....	a 35	2,150	
The year.....	1,670	.....	185	133,000	

a Estimated.

NOTE.—Discharge Mar. 1 to 14 estimated at 25 second-feet per day; Nov. 16 to 30, estimated at 45 second-feet.

SWEETGRASS CREEK ABOVE MELVILLE, MONT.

Location.—In the SW. $\frac{1}{4}$ sec. 24, T. 5 N., R. 12 E., at C. M. Rein's ranch, 17 miles northwest of Melville and 35 miles from Big Timber, at the site of a reservoir proposed under the Carey Act.

Records available.—May 5, 1907, to September 30, 1911.

Drainage area.—47 square miles (total for stream).

Gage.—A staff nailed to lower side (right bank) of a footbridge directly behind the ranch buildings. When the station was established a secondary staff gage to be used during extreme high water was installed about 300 feet below the regular gage and at a different datum. The regular gage was undermined during the high water of June and July, 1908, and readings were discontinued August 19 of that year. The present gage, which is the old secondary gage, has been read since October 1, 1908. The gage heights on the new gage are not comparable with those read on the old gage.

Channel.—Composed of rough gravel.

Discharge measurements.—Made by wading near gage at ordinary stages; at high stages made from footbridge.

Winter flow.—Stream freezes over during winter months.

Diversions.—Two small ditches divert water above the station.

Discharge measurements of Sweetgrass Creek above Melville, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 29	C. S. Heidel.....	1.45	10.7
May 23	do.....	2.32	220
July 17	R. Richards.....	2.15	127
Aug. 8	C. S. Heidel.....	1.90	59.3

Daily gage height, in feet, of Sweetgrass Creek above Melville, Mont., for 1911.

[C. M. Rein, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....			1.50	3.9		2.00	1.85	16.....	1.48	1.45	2.95	2.90	2.15	1.98	1.75
2.....		1.45	1.50	4.6	2.32	2.00	1.82	17.....	1.48	1.43	2.50	2.90	2.15	1.97	
3.....			1.50	3.9	2.32	2.00	1.82	18.....	1.48	1.42	2.38	2.90	2.15	1.97	1.74
4.....			1.52	3.7	2.38	2.00	1.80	19.....	1.48	1.42	2.29	3.25	2.15	1.97	
5.....			1.52	3.00	2.38	2.00		20.....	1.50	1.45	2.18	3.10	2.15	1.95	1.74
6.....			1.52	2.90	2.40	2.00		21.....	1.50	1.45	2.10	3.05	2.15	1.95	1.73
7.....	1.45		1.52	3.40	2.42	2.00	1.80	22.....	1.50	1.58	2.10	3.00	2.10	1.93	
8.....	1.45		1.52	3.10	2.45	2.00		23.....	1.50	1.55	2.12	2.80	2.10	1.93	1.73
9.....	1.45		1.52	3.00	2.38	2.02	1.80	24.....	1.49	1.55	2.2	2.70	2.10	1.90	1.73
10.....	1.45		1.53	3.00	2.40	2.04	1.78	25.....	1.48	1.50	2.3	2.50	2.10	1.90	1.72
11.....	1.45		1.53	3.45	2.32	2.01	1.78	26.....			2.32	2.38	2.08	1.90	
12.....			1.53	3.55	2.25	2.00	1.75	27.....			2.22	2.38	2.08	1.87	1.72
13.....			1.58	3.6	2.20	2.00		28.....			2.2	2.45	2.05	1.87	
14.....			2.85	3.30	2.20	2.00	1.75	29.....	1.45		2.2	2.42	2.05	1.85	1.72
15.....			3.55	3.10	2.20	1.98		30.....	1.45		2.2	2.38	2.05	1.85	1.70
								31.....	1.45		2.35		2.00	1.85	

Daily discharge, in second-feet, of Sweetgrass Creek above Melville, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....		10	13	950	188	83	51	16....	12	10	475	420	125	79	34
2.....		10	13	1,340	177	83	46	17....	12	10	269	420	125	76	34
3.....		10	13	980	177	83	46	18....	12	8.6	222	420	125	76	33
4.....		10	15	820	198	83	42	19....	12	8.6	189	595	125	76	33
5.....		10	15	470	198	83	42	20....	13	10	152	520	125	71	33
6.....	10		15	420	205	83	42	21....	13	10	127	495	125	71	32
7.....	10		15	670	213	83	42	22....	13	20	127	470	110	67	32
8.....	10		15	520	225	83	42	23....	13	18	133	375	110	67	32
9.....	10		15	470	198	88	42	24....	12	18	158	330	110	60	32
10....	10		16	470	205	94	39	25....	12	13	192	245	110	60	30
11....	10		16	695	177	86	39	26....	11	13	199	198	105	60	30
12....	10		16	745	155	83	34	27....	10	13	165	198	105	55	30
13....	10		20	770	140	83	34	28....	10	13	158	225	96	55	30
14....	10		425	620	140	83	34	29....	10	13	158	213	96	51	30
15....	10		775	520	140	79	34	30....	10	13	158	198	96	51	27
								31....	10	-----	210	-----	83	51	-----

NOTE.—Daily discharge determined from rating curves as follows: Mar. 16 to June 2, 1910, curve well defined; June 3 to Sept. 30, curve fairly well defined; discharge interpolated for days for which gage heights are missing.

Monthly discharge of Sweetgrass Creek above Melville, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	-----	-----	α 12	738	D.
February.....	-----	-----	α 12	666	D.
March.....	13	-----	11.8	726	C.
April.....	20	8.6	11.4	678	D.
May.....	775	13	145	8,920	A.
June.....	1,340	198	524	31,200	C.
July.....	225	83	145	8,920	B.
August.....	94	51	73.7	4,530	B.
September.....	51	27	36.0	2,140	B.
The period.....	-----	-----	-----	58,500	

α Estimated.

SWEETGRASS CREEK BELOW MELVILLE, MONT.

Location.—At McAllister's ranch, just above the head of the canal owned by the Glass-Lindsay Land Co.

Records available.—May 4, 1907 (at Adam's ranch site), to April 1, 1909; new site April 1, 1909, to August 31, 1911.

Drainage area.—Total for stream, 47 square miles.

Gage.—Staff, on left bank near observer's house; the original gage was located 2½ miles below the headgate of the Glass-Lindsay Land Co.'s canal, 9 miles below Melville and 20 miles from Big Timber. The present gage was installed April 1, 1909, when the old station was discontinued.

Channel.—Bed composed of clean gravel; nonshifting.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions and storage.—Many diversions are made from this stream. All the low-water flow is appropriated, 550 second-feet being held by adjudicated rights. The Glass-Lindsay canal will carry 575 second-feet and irrigate 30,000 acres; the canal will divert water into two storage reservoirs with capacities of 12,000 and 6,000 feet, respectively, which will be filled from the spring run-off.

Accuracy.—Records good.

Discharge measurements of Sweetgrass Creek below Melville, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 28	C. S. Heidel.....	1.12	35.8
May 25	.....do.....	2.24	342
July 17	R. Richards.....	1.35	83
Aug. 23	C. S. Heidel.....	1.19	57.8

Daily gage height, in feet, of Sweetgrass Creek below Melville, Mont., for 1911.

[Alexander Harper, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Day.	Mar.	Apr.	May.	June.	July.	Aug.
1.....	1.15	1.10	2.60	1.45	1.25	16.....	.....	1.12	3.90	2.50	1.35	1.25
2.....	1.15	1.10	3.55	1.50	1.25	17.....	.....	1.10	3.75	2.45	1.35	1.25
3.....	1.10	1.10	3.00	1.45	1.25	18.....	.....	1.10	2.00	2.50	1.35	1.28
4.....	1.10	1.00	2.72	1.50	1.25	19.....	.....	1.10	1.50	2.45	1.35	1.25
5.....	1.10	.95	2.60	1.50	1.28	20.....	.....	1.10	1.52	2.40	1.30	1.25
6.....	1.15	1.00	2.40	1.45	1.35	21.....	.....	1.15	1.50	2.38	1.25	1.25
7.....	1.10	1.10	2.35	1.45	1.25	22.....	.....	1.18	1.45	2.42	1.25	1.25
8.....	1.10	1.12	2.85	1.35	1.32	23.....	.....	1.00	1.50	2.45	1.25	1.20
9.....	1.10	1.15	2.52	1.35	1.35	24.....	.....	1.00	2.10	2.50	1.25	1.10
10.....	1.10	1.08	2.40	1.40	1.35	25.....	.....	1.00	2.25	2.45	1.30	1.10
11.....	1.10	1.15	2.58	1.35	1.35	26.....	.....	.95	2.45	2.35	1.25	1.10
12.....	1.10	1.15	2.58	1.35	1.35	27.....	.....	1.05	2.00	2.05	1.25	.....
13.....	1.10	1.15	2.55	1.35	1.35	28.....	1.12	1.10	1.62	1.70	1.25	.....
14.....	1.10	2.45	2.50	1.35	1.35	29.....	1.25	1.10	1.50	1.58	1.3	.....
15.....	1.15	2.65	2.45	1.40	1.28	30.....	1.22	1.10	1.45	1.50	1.25	.....
							31.....	1.22	.....	1.50	.....	1.25	.....

Daily discharge, in second-feet, of Sweetgrass Creek below Melville, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Day.	Mar.	Apr.	May.	June.	July.	Aug.
1.....	36	31	550	102	66	16.....	.....	33	1,560	490	82	66
2.....	36	31	1,260	112	66	17.....	.....	31	1,430	460	82	66
3.....	31	31	800	102	66	18.....	.....	31	250	490	82	70
4.....	31	23	622	112	66	19.....	.....	31	112	460	82	66
5.....	31	19	550	112	70	20.....	.....	31	117	430	73	66
6.....	36	23	430	102	82	21.....	.....	36	112	420	66	66
7.....	31	31	405	102	66	22.....	.....	38	102	442	66	66
8.....	31	33	700	82	77	23.....	.....	23	112	460	66	58
9.....	31	36	502	82	82	24.....	.....	23	290	490	66	45
10.....	31	29	430	91	82	25.....	.....	23	255	460	73	45
11.....	31	36	538	82	82	26.....	.....	19	460	405	66	45
12.....	31	36	538	82	82	27.....	.....	27	250	270	66	.....
13.....	31	36	520	82	82	28.....	33.	31	140	161	66	.....
14.....	31	440	490	82	82	29.....	46	31	112	130	73	.....
15.....	36	562	460	91	70	30.....	42	31	102	112	66	.....
							31.....	42	.....	112	.....	66	.....

NOTE.—Discharge determined from rating curves as follows: Mar. 28 to May 17 (1910), curve well defined; May 18 to Aug. 1, from rating curve fairly well defined.

Monthly discharge of Sweetgrass Creek below Melville, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			30	1,840	D.
February.....			25	1,390	D.
March.....			21.8	1,340	D.
April.....	38	19	30.8	1,830	A.
May.....	1,560	19	223	13,700	B.
June.....	1,260	112	482	28,700	B.
July.....	112	66	82.5	5,070	B.
August.....	82	45	64.7	3,980	B.
The period.....				57,800	

NOTE.—Means for January and February estimated. Discharge Mar. 1 to 27 estimated at 25 second-feet per day, and Aug. 27 to 31 at 45 second-feet.

STILLWATER RIVER NEAR NYE, MONT.

Location.—In W. $\frac{1}{2}$ SW. $\frac{1}{4}$ sec. 28, T. 5 S., R. 15 E., directly back of B. F. Wood's ranch, 1 mile below Woodbine Creek, and 7 miles from the junction of the West Fork.

Records available.—One discharge measurement during 1911.

Drainage area.—187 square miles.

Gage.—Standard chain.

Channel.—Rock, probably permanent.

Discharge measurements.—Made by wading or from cable.

Winter flow.—Affected by ice.

Diversion.—None of importance.

The following discharge measurement was made by C. S. Heidel:

August 29, 1911: Gage height, 3.98 feet; discharge, 213 second-feet.

STILLWATER RIVER NEAR ABSAROEKE, MONT.

Location.—On the public highway bridge crossing the stream at the Riverside Road house, 13 miles southwest of Columbus, Mont., and about 1 mile northeast of Absarokee, Mont.; below the mouth of Rosebud Creek.

Records available.—July 19, 1910, to October 31, 1911.

Drainage area.—Not measured.

Gage.—Staff gage nailed to right abutment pier on upstream side of bridge.

Channel.—Bed of stream is very rough, being composed of gravel and bowlders, but will not shift.

Discharge measurements.—Made from the lower side of the bridge.

Winter flow.—Affected by ice.

Diversions.—The territory bordering Stillwater River is well irrigated by water taken from the river.

Discharge measurements of Stillwater River near Absarokee, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 18	W. A. Lamb.....	1.93	1,170	Aug. 30	C. S. Heidel.....	1.18	724
July 13	R. Richards.....	3.00	2,350	Nov. 6	B. E. Jones.....	.42	318
Aug. 15	B. E. Jones.....	2.05	1,230	6	.....do.....	.42	318
16	.....do.....	2.02	1,240				

Daily gage height, in feet, of Stillwater River near Absarokee, Mont., for 1911.

[A. B. Tenney, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1....		3.68	3.6	2.5	1.2	0.75	.....	16....		5.2	3.0	2.0	1.0	0.55	.....
2....		4.2	3.6	2.6	1.2	.75	.....	17....		5.1	3.2	1.95	.85	.55	.....
3....		3.9	3.4	2.4	1.2	.75	.....	18....	1.9	5.4	3.2	2.0	.9	.6	.....
4....		4.2	3.5	2.2	1.3	.65	.....	19....	1.8	5.4	3.2	2.0	.9	.55	.....
5....		3.9	3.7	2.3	1.3	.55	.....	20....	1.6	5.1	2.9	1.9	.9	.45	.....
6....		3.9	4.0	2.6	1.35	.6	0.4	21....	1.43	5.4	3.1	1.85	.85	.55	.....
7....		4.1	4.0	2.6	1.35	.65	.5	22....	1.43	5.2	3.0	1.65	.75	.6	.....
8....		4.6	4.2	2.5	1.25	.7	.....	23....	1.5	5.1	2.9	1.65	.68	.6	.....
9....		4.6	3.6	2.4	1.25	.65	.48	24....	2.0	4.5	2.8	1.6	.8	.6	.....
10....		4.2	3.1	2.3	1.1	.55	.....	25....	2.1	4.1	2.7	1.4	.85	.6	.....
11....		4.6	3.2	2.4	1.15	.6	.48	26....	2.6	3.9	2.8	1.3	.9	.6	.....
12....		5.0	3.2	2.2	1.1	.6	.....	27....	2.3	3.6	2.9	1.2	.8	.28	.....
13....		5.9	2.9	1.95	1.0	.6	.....	28....	2.2	4.0	2.8	1.3	.9	.55	.....
14....		6.2	3.1	1.85	1.05	.6	.....	29....	2.2	3.7	2.6	1.13	.8	.....	.....
15....		5.6	2.9	1.95	0.95	.6	.....	30....	2.2	3.5	2.5	1.15	.7	.....	.....
								31....	2.1		2.28	1.13	.....	.....	.....

Daily discharge, in second-feet, of Stillwater River near Absarokee, Mont., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1....		3,170	3,070	1,760	670	445	.....	16....		5,110	2,350	1,240	570	352
2....		3,810	3,070	1,870	670	445	.....	17....		4,980	2,590	1,200	495	352
3....		3,430	2,830	1,650	670	445	.....	18....	1,150	5,370	2,590	1,240	520	375
4....		3,810	2,950	1,430	720	398	.....	19....	1,070	5,370	2,590	1,240	520	352
5....		3,430	3,190	1,540	720	352	.....	20....	920	4,980	2,230	1,150	520	310
6....		3,430	3,550	1,870	750	375	290	21....	801	5,370	2,470	1,110	495	352
7....		3,680	3,550	1,870	750	398	330	22....	801	5,110	2,350	955	445	375
8....		4,330	3,810	1,760	695	420	.....	23....	850	4,980	2,230	955	411	375
9....		4,330	3,070	1,650	695	398	322	24....	1,240	4,200	2,110	920	470	375
10....		3,810	2,470	1,540	620	352	.....	25....	1,330	3,680	1,990	780	495	375
11....		4,330	2,590	1,650	645	375	322	26....	1,870	3,430	2,110	720	520	375
12....		4,850	2,590	1,430	620	375	.....	27....	1,540	3,070	2,230	670	470	249
13....		6,020	2,230	1,200	570	375	.....	28....	1,430	3,550	2,110	720	520	352
14....		6,410	2,470	1,110	595	375	.....	29....	1,430	3,190	1,870	635	470	340
15....		5,630	2,230	1,200	545	375	.....	30....	1,430	2,950	1,760	645	420	330
								31....	1,330		1,520	635	.....	320

NOTE.—Daily discharge determined from a fairly well defined rating curve; discharge estimated for days for which gage heights are missing.

Monthly discharge of Stillwater River near Absarokee, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May 18-31.....	1,870	801	1,230	34,100	B.
June.....	6,410	2,950	4,330	258,000	C.
July.....	3,810	1,520	2,540	156,000	B.
August.....	1,870	635	1,240	76,200	B.
September.....	750	411	576	34,300	B.
October.....	445	249	370	22,800	B.
November.....			305	18,100	C.
December.....			250	15,400	D.
The period.....				615,000	

NOTE.—Mean for December estimated. Discharge Nov. 12 to 30 estimated at 300 second-feet.

WOODBINE CREEK NEAR NYE, MONT.

Location.—Gage is located 7 miles south of Nye, Mont., in the SE. $\frac{1}{4}$ sec. 32, T. 5 S., R. 15 E., approximately a quarter of a mile from the junction of this creek and the Stillwater River.

Records available.—Two measurements during 1911.

Gage.—Sloping staff.

Channel.—Large rocks; very rough.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversion.—None.

Measurements are made at this station to determine the amount of water available for power. In the first mile from its mouth the creek has a fall of 900 feet, and there is at present an application for development of its power.

Discharge measurements of Woodbine Creek near Nye, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
1911.		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 12	B. E. Jones.....	3.05	47
29	C. S. Heidel.....	2.70	31

ROSEBUD RIVER AT ABSAROOKE, MONT.

Location.—In SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 36, T. 3 S., R. 18 W., on the highway bridge just west of Absarokee, Mont., and 14 miles from Columbus, about 1 mile above the stream's junction with Stillwater River.

Records available.—July 19, 1910, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Staff, on downstream side of left abutment pier.

Channel.—Bed of stream is composed of gravel and bowlders and is not likely to shift.

Discharge measurements.—Made from the downstream side of the bridge.

Winter flow.—Affected by ice.

Diversions.—Water for irrigation is diverted above the station.

Discharge measurements of Rosebud River at Absarokee, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 18	W. A. Lamb.....	2.60	452
July 13	R. Richards.....	3.03	798
Aug. 16	B. E. Jones.....	2.85	647
30	C. S. Heidel.....	2.44	386
Nov. 7	B. E. Jones.....	1.81	147

Daily gage height, in feet, of Rosebud River at Absarokee, Mont., for 1911.

[Chris. Carstens, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.		2.0	2.2	4.0	4.0	3.5	2.5	2.9
2.		2.0	2.1	3.9	3.6	3.5	2.5	2.9
3.		2.0	2.1	3.7	3.6	3.5	2.5	2.9
4.		2.0	2.1	3.6	3.7	3.6	2.5	2.9
5.		2.0	2.2	3.4	3.2	3.6	2.6	2.9
6.		2.0	2.2	3.2	4.0	3.5	2.7	2.9
7.		2.0	2.2	3.05	4.0	3.5	2.7	2.9
8.		2.0	2.2	3.6	3.9	3.3	2.7	2.9
9.		1.8	2.3	3.8	3.8	3.2	2.7	2.9
10.		1.8	2.3	3.7	3.6	3.2	2.6	2.9
11.		1.8	2.4	4.0	3.4	3.2	2.6	2.9
12.	1.5	1.9	2.4	4.2	3.4	3.2	2.5	
13.	1.5	1.9	2.5	4.5	3.3	3.1	2.5	
14.	1.6	1.9	2.7	4.4	3.4	3.1	2.5	
15.	1.7	1.9	3.2	4.8	3.4	3.0	2.5	
16.	1.7	1.8	2.7	5.0	3.4	2.85	2.5	
17.	3.2	1.8	2.6	4.0	3.4	2.8	2.7	
18.	2.1	1.8	2.6	4.4	3.5	2.8	2.7	
19.	2.2	1.8	2.5	4.6	3.7	2.8	2.8	
20.	2.1	1.9	2.5	4.5	3.7	2.8	2.8	
21.	2.1	1.9	2.5	4.5	3.9	2.7	2.8	
22.	2.1	1.9	2.7	4.3	4.0	2.7	2.9	
23.	2.0	1.9	2.6	4.1	4.0	2.7	2.9	
24.	2.0	1.9	2.9	4.0	3.8	2.6	2.9	
25.	2.0	1.9	3.0	4.0	3.7	2.6	2.9	
26.	2.0	2.0	3.2	4.0	3.7	2.6	2.9	
27.	2.0	2.0	3.25	4.1	3.6	2.6	2.9	
28.	2.0	2.1	3.2	4.2	3.4	2.6	2.9	
29.	2.0	2.2	3.3	4.0	3.4	2.55	2.9	
30.	2.0	2.2	3.4	4.0	3.4	2.55	2.9	
31.	2.0		4.0		3.4	2.55		

NOTE.—Gage heights Sept. 17 to Oct. 11 believed to be erroneous.

Daily discharge, in second-feet, of Rosebud River at Absarokee, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.		190	260	2,350	2,350	1,470	410
2.		190	225	2,150	1,630	1,470	410
3.		190	225	1,800	1,630	1,470	410
4.		190	225	1,630	1,800	1,630	410
5.		190	260	1,320	1,050	1,630	480
6.		190	260	1,050	2,350	1,470	550
7.		190	260	875	2,350	1,470	550
8.		190	260	1,630	2,150	1,180	550
9.		135	300	1,970	1,970	1,050	550
10.		135	300	1,800	1,630	1,050	480
11.		135	350	2,350	1,320	1,050	480
12.	90	160	350	2,750	1,320	1,050	410
13.	90	160	410	3,350	1,180	930	410
14.	100	160	550	3,150	1,320	930	410
15.	115	160	1,050	4,020	1,320	820	410
16.	115	135	550	4,500	1,320	675	410
17.	300	135	480	2,350	1,320	630	
18.	225	135	480	3,150	1,470	630	
19.	260	135	410	3,580	1,800	630	
20.	225	160	410	3,350	1,800	630	
21.	225	160	410	3,350	2,150	550	
22.	225	160	550	2,950	2,350	550	
23.	190	160	480	2,550	2,350	550	
24.	190	160	720	2,350	1,970	480	
25.	190	160	820	2,350	1,800	480	
26.	190	190	1,050	2,350	1,800	480	
27.	190	190	1,120	2,550	1,630	480	
28.	190	225	1,050	2,750	1,320	480	
29.	190	260	1,180	2,350	1,320	445	
30.	190	260	1,320	2,350	1,320	445	
31.	190		2,750		1,320	445	

NOTE.—Daily discharge determined from a rating curve well defined below 1,500 second-feet.

Monthly discharge of Rosebud River at Absarokee, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
March, 12-31.....	300	90	184	7,300	B.
April.....	260	135	173	10,300	B.
May.....	2,750	225	615	37,800	B.
July.....	4,500	875	2,500	149,000	B.
June.....	2,350	1,050	1,690	104,000	B.
August.....	1,630	445	879	54,000	B.
September 1-16.....	550	410	458	14,500	B.
The period.....				377,000	

CLARK FORK AT FROMBERG, MONT.

Location.—In sec. 21, T. 5 S., R. 23 E., at the highway bridge half a mile east of the Northern Pacific Railway station at Fromberg, Mont.

Records available.—June 3, 1905, to December 31, 1911.

Drainage area.—2,500 square miles.

Gage.—A standard chain fastened to upstream side of bridge; datum unchanged.

The original gage was a staff; its datum was the same as that of the chain gage.

Channel.—Bed of stream composed of rock and gravel; free from vegetation; permanent. Channel divided by middle pier of bridge.

Discharge measurements.—Made from bridge.

Winter flow.—Affected by ice from December to the middle of March.

Diversions.—Many diversions are made from the river, but only a small portion of the total flow is used.

Accuracy.—Records excellent.

The following discharge measurement was made by B. E. Jones:

August 9, 1911: Gage height, 4.63 feet; discharge, 1,170 second-feet.

Daily gage height, in feet, of Clark Fork at Fromberg, Mont., for 1911.

[Mrs. E. V. Moran, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		3.5	3.9	6.0	7.7	5.4	3.8	3.7	3.7
2.....		3.5	3.9	6.3	7.7	5.2	3.8	3.7	3.7
3.....		3.6	4.1	6.6	7.5	5.0	3.8	3.7	3.8
4.....		3.6	4.3	7.1	7.1	4.9	3.7	3.7	3.8
5.....	3.6	3.6	4.3	7.1	6.7	5.0	3.7	3.7	3.75
6.....	3.55	3.6	4.3	6.9	6.6	5.0	3.7	3.7	3.75
7.....	3.6	3.6	4.7	6.9	6.6	4.5	3.7	3.7	3.7
8.....	3.6	3.6	4.9	7.5	6.7	4.5	3.7	3.7	3.7
9.....	3.6	3.7	5.0	8.1	6.9	4.5	3.7	3.7	3.7
10.....	3.6	3.7	5.3	8.2	5.9	4.5	3.7	3.7	.....
11.....	3.5	3.7	5.3	8.4	5.8	4.2	3.7	3.7	.....
12.....	3.5	3.7	5.5	8.6	5.7	4.25	3.7	3.7	.....
13.....	3.5	3.6	5.5	8.9	5.7	4.2	3.7	3.7	.....
14.....	3.5	3.7	5.8	8.7	5.7	4.2	3.7	3.7	.....
15.....	3.5	3.7	6.2	8.8	5.5	4.2	3.7	3.7	.....
16.....	3.5	3.7	6.2	8.9	5.5	4.2	3.7	3.7	.....
17.....	3.4	3.6	6.2	8.6	5.5	4.2	3.7	3.7	.....
18.....	3.4	3.6	6.3	8.5	5.4	4.2	3.7	3.7	.....
19.....	3.4	3.6	6.5	8.5	5.1	4.2	3.7	3.7	.....
20.....	3.4	3.6	6.3	8.5	5.0	4.2	3.7	3.7	.....
21.....	3.4	3.6	6.1	8.4	5.0	4.1	3.75	3.7	.....
22.....	3.4	3.7	6.3	8.3	5.0	4.0	3.8	3.7	.....
23.....	3.4	4.1	5.9	8.2	4.9	4.0	3.8	3.7	.....
24.....	3.5	3.6	5.5	7.9	5.0	4.0	3.7	3.7	.....
25.....	3.5	3.6	5.5	7.6	5.0	4.0	3.7	3.7	.....
26.....	3.5	3.7	6.4	7.6	5.0	3.9	3.7	3.7	.....
27.....	3.4	3.7	6.4	7.6	5.4	3.9	3.7	3.7	.....
28.....	3.5	3.7	6.0	7.8	5.3	3.9	3.7	3.7	.....
29.....	3.5	3.6	5.9	7.8	5.0	3.9	3.7	3.7	.....
30.....	3.5	3.8	5.9	7.6	5.0	3.9	3.7	3.55	.....
31.....	3.5	.....	5.9	.....	5.4	3.9	.....	3.7	.....

Daily discharge, in second-feet, of Clark Fork at Fromberg, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	300	325	555	2,860	6,230	2,040	490	430	430
2.....	325	325	555	3,360	6,230	1,800	490	430	430
3.....	350	375	700	3,880	5,740	1,560	490	430	490
4.....	350	375	860	4,840	4,840	1,440	430	430	490
5.....	375	375	860	4,840	4,060	1,560	430	430	460
6.....	350	375	860	4,440	3,880	1,560	430	430	460
7.....	375	375	1,230	4,440	3,880	1,040	430	430	430
8.....	375	375	1,440	5,740	4,060	1,040	430	430	430
9.....	375	430	1,560	7,330	4,440	1,040	430	430	430
10.....	375	430	1,920	7,620	2,710	1,040	430	430	.....
11.....	325	430	1,920	8,210	2,560	780	430	430	.....
12.....	325	430	2,160	8,810	2,420	820	430	430	.....
13.....	325	375	2,160	9,710	2,420	780	430	430	.....
14.....	325	430	2,560	9,110	2,420	780	430	430	.....
15.....	325	430	3,180	9,410	2,160	780	430	430	.....
16.....	325	430	3,180	9,710	2,160	780	430	430	.....
17.....	275	375	3,180	8,810	2,160	780	430	430	.....
18.....	275	375	3,360	8,510	2,040	780	430	430	.....
19.....	275	375	3,700	8,510	1,680	780	430	430	.....
20.....	275	375	3,360	8,510	1,560	780	430	430	.....
21.....	275	375	3,020	8,210	1,560	700	460	430	.....
22.....	275	430	3,360	7,910	1,560	625	490	430	.....
23.....	275	700	2,710	7,620	1,440	625	490	430	.....
24.....	325	375	2,160	6,760	1,560	625	430	430	.....
25.....	325	375	2,160	5,980	1,560	625	430	430	.....
26.....	325	430	3,520	5,980	1,560	555	430	430	.....
27.....	275	430	3,520	5,980	2,040	555	430	430	.....
28.....	325	430	2,860	6,490	1,920	555	430	430	.....
29.....	325	375	2,710	6,490	1,560	555	430	430	.....
30.....	325	490	2,710	5,980	1,560	555	430	350	.....
31.....	325	.....	2,710	.....	2,040	555	.....	430	.....

NOTE.—Daily discharge determined from a rating curve well defined between 200 and 8,000 second-feet. Discharge Mar. 1 to 4 estimated.

Monthly discharge of Clark Fork at Fromberg, Mont., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	.....	.....	^a 250	15,400	D.
February.....	.....	.....	^a 275	15,300	D.
March.....	375	275	322	19,800	A.
April.....	700	325	406	24,200	A.
May.....	3,700	555	2,280	140,000	A.
June.....	9,710	2,860	6,870	409,000	A.
July.....	6,230	1,440	2,770	170,000	A.
August.....	2,040	555	919	56,500	A.
September.....	490	430	441	26,200	A.
October.....	430	350	427	26,300	A.
November.....	490	.....	415	24,700	C.
December.....	.....	.....	^a 300	18,400	D.
The year.....	9,710	.....	1,310	946,000	.....

^a Estimated.

NOTE.—Discharge Nov. 10 to 30 estimated at 400 second-feet.

PRYOR CREEK NEAR PRYOR, MONT.

Location.—Three hundred feet above head gate of Pryor ditch, in sec. 21, T. 5 S., R. 25 E., about 2 miles from Pryor, Mont.

Records available.—September 12, 1911, to April 1, 1912, when station was discontinued. One measurement in 1911.

Drainage area.—Not measured.

Gage.—Vertical staff gage attached to a tree on the right bank of the stream, 300 feet above the headworks of Pryor ditch.

Channel.—Practically permanent; bottom of the stream is composed of gravel and cobblestone.

Discharge measurements.—Made by wading at the gage.

Winter flow.—Stream freezes solid at gage during the winter months.

Diversion.—No diversion above the gage.

The following discharge measurement was made by W. A. Lamb:

September 12, 1911: Gage height, 1.41 feet; discharge, 4.8 second-feet.

PRYOR CREEK NEAR COBURN, MONT.

Location.—At the ranch of John A. Hoyt, near Coburn, Mont., near south line of T. 1 S., R. 27 E.

Records available.—September 13, 1911, to December 31, 1911.

Gage.—Overhanging chain gage on left bank opposite the farm house of John A. Hoyt.

Channel.—Permanent. The bed of the stream at the gage is composed of gravel and sand, but at the control both above and below it is firm gravel and cobblestones. At low stages the water is deep and sluggish at the gage and for several hundred feet above and below.

Discharge measurement.—Made by wading above the gage.

Winter flow.—Channel is blocked with ice during winter months.

Diversion.—Water sufficient to irrigate approximately 1,000 acres near Pryor, about 30 miles above this station.

The following discharge measurement was made by W. A. Lamb:

September 13, 1911: Gage height, 4 feet; discharge, 23 second-feet.

Daily gage height, in feet, of Pryor Creek near Coburn, Mont., for 1911.

[John A. Hoyt, observer.]

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1.....		4.00	4.02	4.04	16.....	4.00	4.00	4.02	4.02
2.....		4.00	4.02	4.04	17.....	4.00	4.00	4.02	.....
3.....		4.00	4.01	4.04	18.....	4.00	4.00	4.02	.....
4.....		4.00	4.01	4.04	19.....	4.00	4.02	4.03	.....
5.....		4.00	4.01	4.04	20.....	4.01	4.02	4.03	.....
6.....		4.00	4.01	4.04	21.....	4.00	4.02	4.04	.....
7.....		4.00	4.01	4.04	22.....	4.01	4.02	4.04	.....
8.....		4.00	4.01	4.04	23.....	4.01	4.01	4.04	.....
9.....		4.00	4.01	4.04	24.....	4.02	4.01	4.04	4.03
10.....		4.00	4.02	4.02	25.....	4.02	4.01	4.04	4.03
11.....		4.00	4.02	4.02	26.....	4.01	4.01	4.04	4.03
12.....		4.00	4.02	4.02	27.....	4.01	4.01	4.04	4.03
13.....		4.00	4.02	4.02	28.....	4.00	4.01	4.04	4.03
14.....	4.01	4.00	4.02	4.02	29.....	4.00	4.03	4.04	4.03
15.....	4.00	4.00	4.02	4.02	30.....	4.00	4.03	4.04	4.03
					31.....		4.03	.....	.....

PRYOR CREEK AT HUNTLEY, MONT.

Location.—In the SW. $\frac{1}{4}$ sec. 25, T. 2 N., R. 27 E., at the steel highway bridge half a mile from the railroad station at Huntley.

Records available.—August 6, 1904, to December 31, 1911.

Drainage area.—800 square miles.

Gage.—Chain; installed June 16, 1906, at the highway bridge crossing the new channel, into which the creek was at that time turned by the United States Reclamation Service; datum unchanged since 1906.

Channel.—Bed composed of clay and gravel and may change somewhat; banks steep and uniformly graded, clean, and not subject to overflow; current moderate.

Discharge measurements.—Made from the bridge to which the gage is attached.

Winter flow.—Stream freezes over during the winter months.

Discharge measurements of Pryor Creek at Huntley, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 12	W. A. Lamb.....	1.38	45	Aug. 10	B. E. Jones.....	1.31	26
12	.....do.....	1.38	47	Sept. 11	R. Richards.....	1.20	18
July 25	B. E. Jones.....	0.90	5.5	Nov. 16	W. A. Lamb.....	1.35	23.3
25	.....do.....	0.90	6.0				

Daily gage height, in feet, of Pryor Creek at Huntley, Mont., for 1911.

[Arthur Foster, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.40	4.8	4.2	1.52	1.40	1.50	1.10	0.95	1.15	1.10	1.30	1.40
2.....	1.50	4.8	4.2	1.48	1.40	1.75	1.10	0.88	1.20	1.10	1.30	1.40
3.....	1.50	4.8	4.2	1.48	1.40	1.50	1.10	1.02	1.15	1.20	1.30	1.40
4.....	1.60	4.8	4.2	1.45	1.38	1.50	1.08	1.05	1.20	.....	1.50	1.40
5.....	1.70	4.5	4.2	1.45	1.38	1.45	1.05	0.95	1.15	.....	1.50	1.40
6.....	1.70	4.2	4.8	1.42	1.38	1.35	1.04	1.00	1.20	.....	1.60	1.40
7.....	1.90	4.2	5.2	1.42	1.35	1.35	1.00	.....	1.15	.....	1.65	1.40
8.....	2.10	4.2	7.2	1.42	1.35	1.30	1.00	.....	1.20	.....	1.65	1.40
9.....	2.75	4.10	.....	1.42	1.35	3.20	1.00	.....	1.20	.....	1.85	1.38
10.....	2.75	4.0	.....	1.40	1.35	1.75	1.00	.....	1.20	.....	1.85	1.38
11.....	2.75	4.0	.....	1.40	1.35	1.55	1.00	.....	1.20	.....	1.85	1.38
12.....	2.75	4.2	2.60	1.40	1.32	1.50	1.00	.....	1.20	.....	1.85	1.35
13.....	2.75	4.0	2.15	1.40	1.32	1.40	0.90	.....	1.20	.....	1.85	1.35
14.....	2.75	4.2	2.00	1.40	1.30	1.40	0.88	.....	1.20	.....	1.85	1.35
15.....	2.75	4.3	2.00	1.40	1.30	1.40	0.88	1.15	1.20	.....	1.85	1.35
16.....	2.75	4.3	1.80	1.38	1.30	1.40	0.88	1.20	1.20	1.31	.....	1.35
17.....	2.75	4.6	1.70	1.35	1.35	1.35	0.88	1.10	1.18	1.30	1.35	1.40
18.....	2.75	4.6	1.50	1.35	1.30	2.10	0.88	1.10	1.18	1.30	1.40	1.42
19.....	2.75	4.6	1.50	1.35	1.32	1.45	0.90	1.10	1.20	1.30	1.40	1.50
20.....	2.75	4.6	1.60	1.40	1.32	1.25	0.85	1.05	1.18	1.28	1.45	1.50
21.....	2.75	4.3	1.50	1.40	1.30	1.25	0.92	1.10	1.18	1.28	1.50	1.53
22.....	2.75	4.3	1.50	1.40	1.30	1.20	0.90	1.05	1.18	1.28	1.50	1.53
23.....	2.75	4.3	1.50	1.40	1.28	1.20	0.95	1.10	1.25	1.28	1.45	1.60
24.....	2.75	4.1	1.50	1.45	1.28	1.18	0.98	1.05	1.23	1.28	1.45	1.70
25.....	2.75	4.1	1.50	1.50	1.32	1.15	0.88	1.15	1.20	1.30	1.40	1.70
26.....	2.75	4.1	1.50	1.50	1.50	1.18	1.05	1.20	1.20	1.30	1.40	1.70
27.....	2.75	4.1	1.50	1.50	1.80	1.15	1.00	1.15	1.18	1.31	1.35	1.70
28.....	2.75	4.1	1.80	1.45	2.00	1.15	1.04	1.22	1.15	1.28	1.30	1.70
29.....	2.75	.....	1.75	1.40	1.60	1.15	1.00	1.20	1.15	1.30	1.35	1.65
30.....	3.8	.....	1.70	1.40	1.15	1.05	0.95	1.15	1.15	1.30	1.40	1.65
31.....	6.7	.....	1.70	.....	1.55	.....	0.95	1.20	.....	1.30	.....	1.65

NOTE.—Gage height distorted by ice Jan. 1 to Mar. 12 and Nov. 4 to Dec. 31.

Daily discharge, in second-feet, of Pryor Creek at Huntley, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	22	59	47	57	20	6	13	8	20
2.....	22	55	47	85	20	2	17	8	20
3.....	22	55	47	57	20	9	13	15	20
4.....	22	52	45	57	18	6	17	15	.....
5.....	22	52	45	52	16	3	13	15	.....
6.....	30	49	45	42	15	5	17	16	.....
7.....	50	42	42	42	12	10	13	16	.....
8.....	100	49	42	38	12	15	17	17	.....
9.....	125	49	42	272	12	20	17	17	.....
10.....	150	47	42	85	12	26	17	18	.....
11.....	175	47	42	62	12	23	17	18	.....
12.....	194	47	40	57	12	21	16	19	.....
13.....	136	47	40	47	6.0	19	16	19	.....
14.....	116	47	38	47	5.2	16	16	20	.....
15.....	116	47	38	47	5.2	13	16	21	.....
16.....	91	45	38	47	5.2	17	16	22	.....
17.....	79	42	42	42	5.2	9	15	21	.....
18.....	57	42	38	129	5.2	9	15	21	.....
19.....	57	42	40	52	6.0	9	16	21	.....
20.....	68	47	40	34	4.0	6	15	20	.....
21.....	57	47	38	34	7.2	9	15	20	.....
22.....	57	47	38	29	6.0	6	15	20	.....
23.....	57	47	36	29	9.0	9	19	20	.....
24.....	57	52	36	27	11	6	17	20	.....
25.....	57	57	40	24	5.2	13	15	21	.....
26.....	57	57	57	27	15	17	15	20	.....
27.....	57	57	91	24	11	13	14	21	.....
28.....	91	52	116	24	14	19	11	18	.....
29.....	85	47	68	24	11	17	11	20	.....
30.....	79	47	24	16	6	13	11	20	.....
31.....	79	.....	62	.....	6	17	.....	20	.....

NOTE.—Daily discharge determined as follows: Mar. 12 to July 25, from curve parallel to 1910 curve but poorly defined; July 25 to Aug. 9 and Sept. 12 to Nov. 3, by indirect method for shifting channels; Aug. 10 to Sept. 11, from curve poorly defined. Discharge interpolated for days for which gage heights are missing.

Monthly discharge of Pryor Creek at Huntley, Mont., for 1911.

[Drainage area, 800 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accu- racy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....	α 20	0.025	0.03	1,230	C. C. C. C. C. C. C. C. C.
February.....	.....	.....	α 22	.028	.03	1,220
March.....	194	22	77	.096	.11	4,730	
April.....	59	42	49.3	.062	.07	2,930	
May.....	116	24	46.6	.058	.07	2,870	
June.....	272	16	53.6	.067	.07	3,190	
July.....	20	4	10.5	.013	.02	646	
August.....	26	2	12.4	.016	.02	762	
September.....	19	11	15.2	.019	.02	904	
October.....	22	8	18.3	.023	.03	1,130	
November.....	.....	.....	α 20	.025	.03	1,190
December.....	.....	.....	α 20	.025	.03	1,230
The year.....	272	2	30.4	.038	.53	22,000	

α Estimated.

WIND RIVER AT DUBOIS, WYO.

Location.—At Dubois, in sec. 7, T. 41 N., R. 106 W., just below the mouth of Horse Creek, the nearest tributary.

Records available.—August 4, 1910, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Data too meager to determine.

Discharge measurements.—Made by wading.

Winter flow.—Springs keep the river open during the winter months.

Diversions.—A number of irrigation ditches divert water above the station.

Accuracy.—Sufficient discharge measurements have not been made to afford a basis for estimates of flow.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of Wind River at Dubois, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 7	O. M. Wimmer	6.15	318
9	.....do.....	6.55	444
Nov. 5	H. B. Waha.....	5.90	174

Daily gage height, in feet, of Wind River at Dubois, Wyo., for 1910.

[Earl French, observer.]

Day.	Aug.	Sept.	Oct.	Nov.	Day.	Aug.	Sept.	Oct.	Nov.
1.		5.85	5.8	5.8	16.	5.9	5.8	5.8	5.7
2.		5.85	5.8	5.8	17.	5.95	5.8	5.8	5.9
3.		5.85	5.8	5.8	18.	5.9	5.8	5.8	5.95
4.	6.0	5.85	5.8	5.8	19.	5.9	5.8	5.8	5.9
5.	6.0	5.85	5.8	5.6	20.	5.9	5.8	5.8	5.95
6.	5.95	5.85	5.8	5.7	21.	5.85	5.8	5.8	5.95
7.	5.95	5.8	5.8	5.85	22.	5.9	5.85	5.8	5.85
8.	5.95	5.8	5.8	5.8	23.	5.85	5.85	5.8	5.75
9.	5.95	5.85	5.8	5.8	24.	5.85	5.8	5.8	5.8
10.	5.95	5.85	5.8	5.8	25.	5.8	5.8	5.8	5.8
11.	5.9	5.85	5.8	5.75	26.	5.85	5.85	5.8	5.75
12.	6.0	5.9	5.8	5.75	27.	5.85	5.85	5.8	5.75
13.	6.0	5.9	5.9	5.75	28.	5.85	5.8	5.7	5.7
14.	5.95	5.85	5.8	5.7	29.	5.85	5.75	5.7	5.75
15.	5.95	5.85	5.8	5.65	30.	5.85	5.75	5.65	5.85
					31.	5.85	.....	5.7	

Daily gage height, in feet, of Wind River at Dubois, Wyo., for 1911.

[Earl French, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	5.70	5.55	5.55	5.65	5.70	7.90	8.05	6.50	5.95	5.98	5.68	5.80
2.....	5.80	5.55	5.55	5.70	5.80	8.25	7.95	6.45	5.95	6.10	5.70	5.75
3.....	5.70	5.60	5.55	5.75	5.75	8.15	7.75	6.40	5.95	6.05	5.82	5.75
4.....	5.70	5.60	5.55	5.70	5.80	8.35	7.85	6.38	5.95	6.02	5.88	5.80
5.....	5.50	5.60	5.55	5.60	6.00	8.60	7.80	6.35	5.98	6.00	5.92	5.85
6.....	5.50	5.60	5.55	5.60	6.20	8.65	7.80	6.30	6.08	6.00	5.80	5.85
7.....	5.50	5.60	5.60	5.60	6.15	8.85	7.70	6.30	6.05	6.00	5.70	5.90
8.....	5.50	5.55	5.55	5.60	6.20	9.20	7.75	6.32	6.05	5.98	5.92	5.90
9.....	5.55	5.60	5.55	5.60	6.50	9.05	7.45	6.28	6.02	5.95	5.88	5.85
10.....	5.50	5.55	5.55	5.60	6.32	8.40	7.25	6.25	6.00	5.95	5.90	5.85
11.....	5.50	5.55	5.55	5.60	6.18	8.85	7.30	6.25	6.00	5.95	5.88	5.85
12.....	5.55	5.55	5.60	5.60	6.20	9.30	7.25	6.25	6.02	5.95	5.88	5.80
13.....	5.55	5.57	5.60	5.65	6.42	9.85	7.20	6.22	6.15	5.95	5.82	5.80
14.....	5.55	5.60	5.65	5.65	6.50	9.55	7.15	6.22	6.05	5.95	5.88	5.80
15.....	5.55	5.55	5.65	5.65	6.95	9.70	7.18	6.18	6.02	5.95	5.90	5.80
16.....	5.60	5.55	5.65	5.65	6.95	10.20	7.20	6.18	6.00	5.92	5.90	5.80
17.....	5.50	5.50	5.55	5.65	6.82	10.05	7.17	6.15	5.98	5.88	5.88	5.88
18.....	5.55	5.50	5.65	5.65	6.68	10.60	7.10	6.15	5.95	5.82	5.90	5.80
19.....	5.55	5.55	5.65	5.70	6.55	9.95	7.10	6.12	5.95	5.72	5.85	5.80
20.....	5.55	5.50	5.65	5.65	6.40	9.90	6.98	6.10	5.98	5.70	5.88	5.80
21.....	5.50	5.50	5.65	5.70	6.35	9.85	6.92	6.12	5.98	5.75	5.85	5.80
22.....	5.50	5.50	5.60	5.65	6.50	9.50	6.92	6.08	5.95	5.80	5.88	5.80
23.....	5.55	5.50	5.65	5.65	6.58	9.00	6.88	6.05	5.95	5.82	5.85	5.80
24.....	5.60	5.50	5.65	5.65	6.85	8.85	6.75	6.02	5.95	5.82	5.85	5.80
25.....	5.60	5.50	5.65	5.65	7.05	8.45	6.78	6.00	5.95	5.85	5.82	5.80
26.....	5.60	5.50	5.60	5.80	7.20	8.35	6.80	6.02	5.95	5.82	5.80	5.80
27.....	5.60	5.50	5.65	5.90	6.95	8.20	6.75	6.02	5.95	5.75	5.75	5.80
28.....	5.60	5.50	5.70	5.80	6.70	8.10	6.65	6.00	5.95	5.70	5.75	5.80
29.....	5.60	.....	5.65	5.90	6.82	8.05	6.60	5.98	5.95	5.70	5.80	5.80
30.....	5.60	.....	5.65	5.80	6.80	8.15	6.58	5.95	5.95	5.68	5.80	5.80
31.....	5.60	.....	5.65	.....	7.12	.....	6.60	5.95	.....	5.68	.....	5.80

WIND RIVER AT RIVERTON, WYO.

Location.—At highway bridge in sec. 2, T. 1 S., R. 4 E., three-fourths of a mile east of Riverton and three-fourths of a mile above its junction with Little Wind River.

Records available.—May 15 to November 11, 1911. From May 14, 1906, to November 1, 1908, a station was maintained at Walker's ferry, about 1 mile above the present station. As no streams enter between, the records at the two points are comparable.

Drainage area.—2,090 square miles (measured from Land Office map).

Gage.—Chain gage.

Channel.—Shifting after high water.

Discharge measurements.—Made from bridge.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions of 34 second-feet from Wind River above the station, and of 91 second-feet from tributaries entering above.

Accuracy.—Conditions are favorable for accurate results and the estimates should be reliable.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of Wind River at Riverton, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 15	Fletcher and Kingdon	6.00	1,460	July 1	R. H. Fletcher	8.41	5,960
June 7	E. O. Christiansen	7.90	4,930	19	do	7.80	4,450
10	do	8.50	5,920	Oct. 16	G. H. Russell	4.73	508
17	do	10.50	11,100				

Daily gage height, in feet, of Wind River at Riverton, Wyo., for 1911.

[Frances Feris, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1		6.70	8.50	6.55	5.40	4.82	4.52	16	6.40	9.80	7.60	6.05	4.95	4.73	
2		7.30	8.40	6.55	5.40	4.95	4.54	17	6.25	10.10	7.70	6.05	4.92	4.70	
3		7.50	8.10	6.45	5.45	5.05	4.66	18	6.05	10.10	7.80	6.00	4.88	4.70	
4		7.60	8.00	6.35	5.65	4.98	4.58	19	5.98	10.30	7.80	6.10	4.78	4.68	
5		7.90	8.10	6.20	5.60	4.92	4.50	20	5.70	10.20	7.70	6.10	4.78	4.68	
6		8.10	8.20	6.30	5.55	4.96	4.50	21	5.50	10.00	7.60	6.10	4.72	4.55	
7		8.20	8.30	6.15	5.55	4.92	4.51	22	5.40	10.00	7.60	6.10	4.62	4.40	
8		8.50	8.40	6.00	5.55	4.92	4.48	23	5.50	9.90	7.50	6.05	4.65	4.55	
9		8.60	8.20	5.90	5.40	4.82	4.48	24	5.80	9.70	7.30	5.90	4.69	4.61	
10		8.40	8.10	5.90	5.30	4.92	4.54	25	6.15	9.40	7.30	5.80	4.68	4.60	
11		8.00	7.70	5.95	5.10	4.88	4.48	26	6.40	8.80	7.20	5.70	4.70	4.60	
12		8.30	7.60	5.95	4.90	4.80		27	6.50	8.60	7.20	5.60	4.68	4.62	
13		9.00	7.50	6.00	4.92	4.77		28	6.30	8.60	7.00	5.50	4.68	4.61	
14		9.50	7.50	6.00	4.91	4.72		29	6.10	8.40	6.85	5.40	4.66	4.58	
15	6.10	9.50	7.50	5.95	4.98	4.72		30	6.00	8.40	6.65	5.40	4.72	4.52	
								31	6.10		6.70	5.30		4.51	

Daily discharge, in second-feet, of Wind River at Riverton, Wyo., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1		2,470	6,080	2,240	895	559	437
2		3,540	5,850	2,240	895	620	444
3		3,940	5,200	2,080	932	672	489
4		4,150	4,990	1,940	1,100	635	458
5		4,780	5,200	1,730	1,050	605	430
6		5,200	5,410	1,870	1,030	625	430
7		5,410	5,630	1,660	1,030	605	434
8		6,080	5,850	1,470	1,030	605	424
9		6,310	5,410	1,350	895	559	424
10		5,850	5,200	1,350	825	605	444
11		4,990	4,360	1,410	700	586	424
12		5,630	4,150	1,410	595	550	
13		7,270	3,940	1,470	605	536	
14		8,520	3,940	1,470	600	514	
15	1,600	8,520	3,940	1,410	635	514	
16	2,010	9,280	4,150	1,540	620	518	
17	1,800	10,100	4,360	1,540	605	505	
18	1,540	10,100	4,570	1,470	586	505	
19	1,350	10,600	4,570	1,600	441	497	
20	1,140	10,300	4,360	1,600	441	497	
21	970	9,800	4,150	1,600	514	448	
22	895	9,800	4,150	1,600	473	400	
23	970	9,540	3,940	1,540	485	448	
24	1,240	9,020	3,540	1,350	501	469	
25	1,660	8,270	3,540	1,240	497	465	
26	2,010	6,790	3,350	1,140	505	465	
27	2,160	6,310	3,350	1,050	497	473	
28	1,870	6,310	2,980	970	497	469	
29	1,600	5,850	2,720	895	489	458	
30	1,470	5,850	2,390	895	514	437	
31	1,600		2,470	825		434	

NOTE.—Daily discharge determined from a well-defined rating curve.

Monthly discharge of Wind River at Riverton, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off.	Accu- racy.
	Maximum.	Minimum.	Mean.	Total in acre-feet.	
May 15-31.....	2,160	895	1,520	51,300	A.
June.....	10,600	2,470	7,020	418,000	A.
July.....	6,080	2,390	4,310	265,000	A.
August.....	2,240	825	1,480	91,000	A.
September.....	1,100	441	683	40,600	A.
October.....	672	400	525	32,300	A.
November 1-11.....	489	424	439	9,890	A.
December.....					
The period.....				908,000	

BIGHORN RIVER AT THERMOPOLIS, WYO.

Location.—In sec. 19, T. 43 N., R. 95 W., on the public highway bridge between Thermopolis and the Thermopolis Hot Springs.

Records available.—May 28, 1900, to December 31, 1905; June 30, 1910, to December 31, 1911.

Drainage area.—8,180 square miles.

Gage.—Staff, fastened securely to the downstream side of the middle pier; datum unchanged.

Channel.—The bed of the stream is composed of rock and gravel, and is practically permanent.

Discharge measurements.—Made from the highway bridge.

Winter flow.—Little affected by ice.

Diversions.—Irrigation is carried on extensively on the tributaries of Bighorn River, but not from the river itself.

Discharge measurements of Bighorn River at Thermopolis, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 24	W. A. Lamb.....	2.05	1,690
June 23	R. Richards.....	10.05	15,400
Aug. 2	B. E. Jones.....	2.38	2,350
.....3	.....do.....	2.39	2,340
Oct. 28	.....do.....	1.10	748

Daily gage height, in feet, of Bighorn River at Thermopolis, Wyo., for 1911.

[Samuel Nelson, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1		1.0	1.4	1.0	1.4	2.6	5.1	2.2	1.2	0.75	0.95
2		1.0	1.4	1.0	1.3	2.8	5.4	2.4	1.3	0.75	0.95
3		1.0	1.4	0.9	1.3	4.9	5.0	2.2	1.3	0.8	0.95
4		1.0	1.4	0.9	1.2	4.3	4.8	2.2	1.4	1.0	1.0
5		1.0	1.0	1.0	1.2	4.3	4.7	2.3	1.5	1.0	1.0
6		1.0	1.0	1.0	1.2	5.3	4.7	2.4	1.4	1.1	1.0
7		1.0	1.0	1.2	1.6	5.8	4.7	2.3	1.45	1.2	0.8
8		1.0	1.0	1.0	2.0	6.0	4.8	2.2	1.5	1.2	0.9
9		1.0	1.0	0.9	2.0	6.5	5.0	2.0	1.5	1.2	0.9
10	0.7	1.0	1.0	1.0	2.3	7.0	4.7	1.95	1.5	1.25	1.1
11	1.0	1.0	1.0	1.0	2.5	5.6	4.3	1.95	1.4	1.3	1.2
12	1.0	1.0	1.0	1.0	2.3	5.7	3.7	2.0	1.2	1.3	1.3
13	1.0	1.0	1.1	1.0	2.0	6.0	3.5	1.95	1.0	1.2	1.5
14	1.0	1.0	1.1	1.0	2.0	7.5	3.5	2.0	1.1	1.2	1.2
15	1.0	1.0	1.2	1.0	1.8	8.4	3.5	2.0	0.9	1.3	1.1
16	1.0	1.0	1.2	0.9	1.4	9.0	3.5	1.95	1.0	1.3	1.1
17	1.0	1.0	1.0	0.9	2.2	9.9	3.6	2.2	1.0	1.3	1.1
18	1.0	1.0	1.0	0.9	2.8	10.8	3.8	2.25	1.0	1.2	1.1
19	1.0	1.0	1.0	0.7	2.7	11.5	3.8	2.3	0.9	1.1	
20	1.0	1.0	1.0	0.8	2.6	11.0	3.9	2.0	0.9	1.1	
21	1.0	1.0	1.2	0.8	2.4	10.5	3.8	1.95	0.9	0.9	
22	0.9	1.8	1.2	1.0	2.0	10.2	3.7	1.9	0.95	0.8	
23	0.9	1.8	1.3	0.9	2.3	10.1	3.5	1.9	0.8	1.0	
24	0.9	1.0	1.3	1.1	2.0	9.8	3.4	1.8	0.8	1.0	
25	0.9	1.0	1.3	1.0	2.3	9.0	3.3	1.7	0.8	1.0	
26	0.9	1.0	1.2	1.0	2.6	6.6	3.2	1.6	0.75	1.0	
27	0.9	1.0	1.2	0.9	2.7	5.9	3.1	1.6	0.75	1.0	
28	0.9	1.0	1.0	1.0	2.8	5.8	3.0	1.55	0.7	1.1	
29	0.9		1.1	1.1	2.8	5.6	2.9	1.5	0.7	1.05	
30	0.9		1.1	1.1	2.8	5.3	2.6	1.3	0.7	0.95	
31	1.0		1.1		2.7		2.4	1.2		0.95	

NOTE.—Gage heights Jan., Feb., Mar. and Apr. 7 distorted by ice.

Daily discharge, in second-feet, of Bighorn River at Thermopolis, Wyo., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	660	970	2,590	6,770	1,960	810	485	625
2	660	890	2,910	7,280	2,270	890	485	625
3	590	890	6,430	6,600	1,960	890	520	625
4	590	810	5,410	6,260	1,960	970	660	660
5	660	810	5,410	6,090	2,110	1,060	660	660
6		810	7,110	6,090	2,270	970	730	660
7	660	1,160	7,960	6,090	2,110	1,020	810	520
8	660	1,660	8,300	6,260	1,960	1,060	810	590
9	590	1,660	9,150	6,600	1,660	1,060	810	590
10	660	2,110	10,000	6,090	1,590	1,060	850	730
11	660	2,430	9,320	5,410	1,590	970	890	810
12	660	2,110	7,790	4,390	1,660	810	890	890
13	660	1,660	8,300	4,050	1,590	660	810	1,060
14	660	1,660	10,800	4,050	1,660	730	810	810
15	660	1,390	12,400	4,050	1,660	590	890	730
16	590	970	13,500	4,050	1,590	660	890	730
17	590	1,960	15,100	4,220	1,960	660	890	730
18	590	2,910	16,700	4,560	2,040	660	810	730
19	450	2,750	18,000	4,560	2,110	590	730	720
20	520	2,590	17,100	4,730	1,660	590	730	710
21	520	2,270	16,200	4,560	1,590	590	590	700
22	660	1,660	15,700	4,390	1,520	625	520	690
23	590	2,110	15,500	4,050	1,520	520	660	680
24	730	1,660	14,900	3,880	1,390	520	660	660
25	660	2,110	13,500	3,710	1,270	520	660	640
26	660	2,590	9,320	3,550	1,160	485	660	620
27	590	2,750	8,130	3,390	1,160	485	660	580
28	660	2,910	7,960	3,230	1,110	450	730	570
29	730	2,910	7,620	3,070	1,060	450	695	560
30	730	2,910	7,110	2,590	890	450	625	550
31		2,750		2,270	810		625	

NOTE.—Daily discharge determined from a rating curve fairly well defined between 650 and 17,000 second-feet. Discharge estimated Apr. 7 and Nov. 19 to 30.

Monthly discharge of Bighorn River at Thermopolis, Wyo., for 1911.

[Drainage area, 8,180 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....			α 500	0.061	0.07	30,700	D.
February.....			α 500	.061	.06	27,800	D.
March.....			α 600	.073	.08	36,900	D.
April.....	810	450	637	.078	.09	37,900	B.
May.....	2,910	810	1,900	.232	.27	117,000	B.
June.....	18,000	2,590	10,300	1.26	1.41	613,000	C.
July.....	7,280	2,270	4,740	.579	.67	291,000	B.
August.....	2,270	810	1,640	.200	.23	101,000	B.
September.....	1,060	450	727	.089	.10	43,300	B.
October.....	890	485	718	.088	.10	44,100	B.
November.....	1,060	520	678	.083	.09	40,300	B.
December.....			α 550	.067	.08	33,800	D.
The year.....	18,000		1,970	.240	3.25	1,420,000	

α Estimated.

BIGHORN RIVER NEAR HARDIN, MONT.

Location.—In the SW. $\frac{1}{4}$, sec. 13, T. 1 S., R. 33 E., at the bridge of the Burlington & Missouri River Railroad, about half a mile above the junction of Bighorn and Little Bighorn rivers, 2 miles from Hardin, Mont.

Records available.—June 16, 1904, to December 31, 1911.

Drainage area.—20,700 square miles.

Gage.—A chain attached to west span of railroad bridge; datum unchanged since August 10, 1905.

Channel.—Composed of gravel; free from vegetation.

Discharge measurements.—Made from railroad bridge.

Winter flow.—Affected by ice.

Diversions.—Water is diverted a few miles above the station by a private irrigation company to irrigate land on the west side of the river.

Discharge measurements of Bighorn River near Hardin, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Fect.</i>	<i>Sec.-ft.</i>
May 16	W. A. Lamb.....	3.73	3,630
July 26	B. F. Jones.....	4.77	7,870
Sept. 4	W. A. Lamb.....	3.70	3,970

Daily gage height, in feet, of Bighorn River near Hardin, Mont., for 1911.

[H. R. Kean, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		2.9	3.0	4.3	5.8	4.3	3.65	2.95	2.6
2.		2.85	3.15	4.6	5.8	4.3	3.6	2.95	2.6
3.		3.0	3.1	4.6	5.7	4.3	3.6	2.95	2.7
4.		3.0	3.0	4.7	5.6	4.3	3.6	3.0	2.8
5.		3.0	3.0	4.8	5.5	4.2	3.55	3.0	2.8
6.		2.9	2.95	5.2	5.2	4.3	3.55	3.0	2.8
7.		2.85	3.0	5.5	5.1	4.4	3.5	3.0	2.7
8.		2.9	3.0	5.3	5.1	4.4	3.5	3.0	2.6
9.		2.9	3.2	5.6	5.1	4.3	3.5	3.0	2.5
10.		3.0	3.3	5.6	5.2	4.2	3.45	3.0	2.55
11.		3.0	3.65	5.7	5.2	4.1	3.6	3.0	2.0
12.		2.95	3.7	5.7	5.3	4.1	3.5	3.0	2.0
13.		3.0	3.7	5.8	5.2	4.0	3.5	3.0	2.3
14.		3.0	3.7	5.8	4.9	4.1	3.4	3.0	2.3
15.		3.0	3.65	6.7	4.8	4.0	3.4	2.8	2.5
16.		2.8	3.85	6.7	4.6	4.0	3.3	2.7	2.7
17.	3.9	2.7	4.3	7.3	4.6	3.9	3.3	2.7	2.9
18.	3.9	2.7	4.2	7.3	4.6	3.9	3.2	2.7	3.1
19.	3.15	2.6	4.2	7.3	4.8	3.95	3.2	2.7	3.1
20.	3.0	2.6	4.1	7.5	4.7	3.85	3.15	2.7	3.0
21.	2.9	2.8	4.1	7.7	4.8	3.9	3.2	2.7	3.4
22.	3.1	2.9	4.0	7.6	4.9	3.85	3.1	2.6	3.1
23.	3.05	2.9	3.8	7.6	4.9	3.85	3.0	2.6	3.0
24.	3.1	2.9	3.8	7.2	4.8	3.85	3.0	2.6	3.0
25.	3.1	3.0	3.8	6.9	4.6	3.75	3.0	2.6	2.95
26.	3.1	3.0	3.8	6.8	4.6	3.8	2.9	2.6	2.9
27.	3.05	3.0	3.1	6.7	4.6	3.8	2.9	2.6	2.9
28.	2.95	3.0	4.5	6.6	4.4	3.8	2.9	2.6	2.85
29.	2.95	3.0	4.3	6.2	4.4	3.7	2.9	2.6	2.85
30.	2.95	2.8	4.2	5.9	4.4	3.7	2.8	2.6	2.8
31.	2.95		4.2		4.6	3.65		2.6	

Daily discharge, in second-feet, of Bighorn River near Hardin, Mont., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		1,820	1,990	5,380	12,200	5,860	3,870	2,150	1,560
2.		1,740	2,270	6,400	12,200	5,860	3,730	2,150	1,560
3.		1,990	2,170	6,400	11,700	5,860	3,730	2,150	1,710
4.		1,990	1,990	6,760	11,300	5,860	3,730	2,250	1,880
5.		1,990	1,990	7,130	10,800	5,520	3,590	2,250	1,880
6.		1,820	1,900	8,710	9,460	5,860	3,590	2,250	1,880
7.		1,740	1,990	10,000	9,020	6,220	3,450	2,250	1,710
8.		1,820	1,990	9,130	9,020	6,220	3,450	2,250	1,560
9.		1,820	2,370	10,400	9,020	5,860	3,450	2,250	1,420
10.		1,990	2,590	10,400	9,460	5,520	3,320	2,250	1,490
11.		1,990	3,480	10,900	9,460	5,200	3,730	2,250	870
12.		1,990	3,610	10,900	9,900	5,200	3,450	2,250	870
13.		1,990	3,610	11,300	9,460	4,900	3,450	2,250	
14.		1,990	3,610	11,300	8,180	5,200	3,180	2,250	
15.		1,990	3,480	16,000	7,780	4,900	3,180	1,880	
16.		1,660	4,020	18,000	6,980	4,900	2,920	1,710	
17.		1,510	5,380	19,400	6,980	4,600	2,920	1,710	
18.		1,510	5,060	19,400	6,980	4,600	2,680	1,710	
19.		1,370	5,060	19,400	7,780	4,750	2,680	1,710	
20.		1,370	4,750	20,600	7,380	4,450	2,570	1,710	
21.	1,820	1,660	4,750	21,800	7,780	4,600	2,680	1,710	
22.	2,170	1,820	4,450	22,400	8,180	4,450	2,460	1,560	
23.	2,080	1,820	3,880	22,400	8,180	4,450	2,250	1,560	
24.	2,170	1,820	3,880	19,900	7,780	4,450	2,250	1,560	
25.	2,170	1,990	3,880	18,100	6,980	4,160	2,250	1,560	
26.	2,170	1,990	3,880	17,500	6,980	4,300	2,060	1,560	
27.	2,080	1,990	2,170	17,000	6,980	4,300	2,060	1,560	
28.	1,900	1,990	6,050	16,400	6,220	4,300	2,060	1,560	
29.	1,900	1,990	5,380	14,200	6,220	4,010	2,060	1,560	
30.	1,900	1,660	5,060	12,700	6,220	4,010	1,880	1,560	
31.	1,900		5,060		6,980	3,870		1,560	

NOTE.—Daily discharge determined from two well-defined rating curves, applicable Mar. 21 to June 21 and June 22 to Nov. 12, respectively.

Monthly discharge of Bighorn River near Hardin, Mont., for 1911.

[Drainage area, 20,700 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accu- racy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....			1,000	0.048	0.06	61,500	D.
February.....			1,200	.058	.06	66,600	D.
March.....	2,170		1,690	.082	.09	104,000	C.
April.....	1,990	1,370	1,820	.088	.10	108,000	B.
May.....	6,050	1,900	3,600	.174	.20	221,000	B.
June.....	22,400	5,380	13,900	.672	.75	827,000	B.
July.....	12,200	6,220	8,500	.411	.47	523,000	B.
August.....	6,220	3,870	4,980	.241	.28	306,000	B.
September.....	3,870	1,880	2,960	.143	.16	176,000	B.
October.....	2,250	1,560	1,900	.092	.11	117,000	B.
November.....	1,880	870	1,210	.058	.06	72,000	C.
December.....			1,000	.048	.06	61,500	D.
The year.....	22,400		3,660	.177	2.40	2,640,000	

NOTE.—Means for January, February, and December, estimated; mean for period Mar. 1 to 20 estimated at 1,500 second-feet; mean for period Nov. 13 to 30 estimated at 1,000 second-feet.

WARM SPRINGS CREEK NEAR DUBOIS, WYO.

Location.—In sec. 32, T. 42 N., R. 107 W., 150 feet above Wind River, about 6 miles above Dubois. The nearest tributary is a small stream entering from the south half a mile above.

Records available.—Fragmentary gage heights May 9 to December 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Data too meager to determine.

Discharge measurements.—Made from footbridge at the station.

Winter flow.—Springs keep the creek open during the winter months.

Diversions.—There were adjudicated decrees for diversion of 0.6 second-foot from Warm Springs Creek prior to July 1, 1912.

Accuracy.—Owing to insufficient data it is not possible to make estimates of discharge.

Cooperation.—Station is maintained in cooperation with the United States Forest Service.

Discharge measurements of Warm Springs Creek near Dubois, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.
May 9	O. M. Wimmer.....	<i>Fect.</i> 0.40	<i>Sec.-ft.</i> 72.5
Nov. 5	H. B. Waha.....	.20	48.5

Daily gage height, in feet, of Warm Springs Creek near Dubois, Wyo., for 1911.

[K. S. Clark, observer.]

Day.	May.	June.	Sept.	Oct.	Nov.	Dec.	Day.	May.	June.	Sept.	Oct.	Nov.	Dec.
1			0.20				16		3.10			0.20	0.20
2					0.15	0.20	17						
3							18						
4		2.70					19						
5					.20		20						.19
6							21						
7			.15				22	0.60					
8						.20	23	.90					
9	0.40				.20		24						
10	.30						25						
11							26				0.22		.19
12							27						
13							28	.80		0.25			
14					.21		29					.20	
15							30						
							31						

HORSE CREEK AT DUBOIS, WYO.

Location.—At Dubois, in sec. 7, T. 41 N., R. 106 W., 100 yards above the mouth and $1\frac{1}{2}$ miles below the entrance of Piney Creek.

Records available.—August 4, 1910, to November 13, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Data too meager to determine.

Discharge measurements.—Made from bridge at the station during high water and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months and records are discontinued.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions of 14 second-feet from Horse Creek above the station.

Accuracy.—Owing to lack of high water measurements no estimates of discharge have been made.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of Horse Creek at Dubois, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
May 7	O. M. Wimmer	<i>Feet.</i>	<i>Sec.-ft.</i>
9	do.	9.40	59.8
Nov. 5	H. B. Waha	9.70	102
		9.10	33.0

Daily gage height, in feet, of Horse Creek at Dubois, Wyo., for 1910.

[Earl French, observer.]

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1	-----	9.0	8.75	8.95	9.45	16	9.0	8.8	9.0	8.85	9.55
2	-----	9.0	8.8	8.95	9.5	17	9.05	8.8	9.0	8.85	9.9
3	-----	9.0	8.8	8.95	9.55	18	9.0	8.85	9.0	8.85	9.8
4	9.2	9.0	8.8	8.9	9.5	19	9.0	8.85	8.95	8.85	9.85
5	9.2	9.0	8.8	9.05	9.45	20	9.0	8.8	8.95	9.0	10.25
6	-----	9.15	9.0	8.8	9.0	21	9.0	8.85	8.95	9.2	9.6
7	9.15	8.85	8.75	9.0	9.7	22	9.0	9.0	8.95	9.1	9.4
8	9.15	8.85	8.9	9.0	9.9	23	9.0	8.9	8.95	9.0	10.1
9	9.1	9.0	8.9	9.0	9.8	24	9.0	8.85	8.95	9.0	10.45
10	9.1	9.0	8.9	8.95	9.7	25	8.9	8.8	8.95	8.95	10.3
11	-----	9.1	9.0	8.9	8.95	26	8.95	8.8	8.95	9.0	10.5
12	9.1	9.0	8.9	8.95	9.5	27	9.0	8.8	8.95	9.2	10.6
13	9.15	8.85	9.0	8.85	9.55	28	9.0	8.8	8.9	9.5	11.0
14	9.1	8.8	9.0	8.85	9.5	29	9.0	8.75	8.9	9.6	-----
15	9.05	8.8	9.0	8.8	9.55	30	9.0	8.75	8.8	9.6	-----
						31	9.0	-----	8.8	9.45	-----

NOTE.—Gage height distorted by ice after Nov. 25, 1910.

Daily gage height, in feet, of Horse Creek at Dubois, Wyo., for 1911.

[Earl French, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	-----	10.30	10.75	9.62	9.05	9.08	8.98
2	-----	10.25	10.80	9.58	9.05	9.15	8.98
3	-----	10.15	10.60	9.48	9.05	9.10	9.05
4	-----	10.35	10.55	9.50	9.05	9.10	9.10
5	-----	10.45	10.75	9.45	9.10	9.10	9.10
6	-----	10.50	10.75	9.38	9.20	9.10	9.00
7	9.40	10.55	10.75	9.38	9.15	9.10	9.15
8	-----	10.80	10.70	9.38	9.15	9.08	9.28
9	9.60	10.85	10.35	9.40	9.15	9.05	9.22
10	9.50	10.50	10.25	9.38	9.15	9.05	9.20
11	9.35	10.50	10.20	9.38	9.15	9.05	9.12
12	9.45	10.30	10.25	9.35	9.18	9.05	9.18
13	9.62	11.10	10.18	9.35	9.18	9.05	9.18
14	9.65	10.45	10.18	9.38	9.12	9.05	-----
15	10.15	10.65	10.15	9.32	9.10	9.05	-----
16	9.85	11.85	10.15	9.32	9.10	9.02	-----
17	9.68	11.75	10.12	9.28	9.10	9.00	-----
18	9.65	12.30	10.20	9.28	9.10	9.00	-----
19	9.55	11.95	10.18	9.28	9.08	8.98	-----
20	9.50	11.85	10.00	9.25	9.05	8.95	-----
21	9.40	11.70	9.95	9.22	9.05	8.98	-----
22	9.52	11.60	9.90	9.20	9.05	8.95	-----
23	9.58	11.40	9.88	9.18	9.05	8.90	-----
24	9.72	11.35	9.82	9.15	9.05	8.92	-----
25	9.75	10.95	9.80	9.18	9.05	8.90	-----
26	9.82	10.90	9.85	9.12	9.05	8.92	-----
27	9.75	10.80	9.82	9.15	9.05	8.92	-----
28	9.65	10.75	9.72	9.10	9.05	8.88	-----
29	9.72	10.75	9.68	9.08	9.05	8.90	-----
30	9.75	10.75	9.68	9.05	9.05	8.92	-----
31	9.82	-----	9.68	9.05	-----	8.95	-----

LITTLE WIND RIVER ABOVE ARAPAHOE, WYO.

Location.—At railroad bridge in sec. 23, T. 1 S., R. 3 E., opposite the Indian sub-agency, one-fourth mile above Arapahoe, and one-fourth mile above the mouth of Popo Agie River.

Records available.—May 14 to November 11, 1911. From May 11, 1906, to December 17, 1909, a station was maintained a short distance above the present site. The flow at the two points is comparable.

Drainage area.—Not measured.

Gage.—Chain gage reading approximately 1.6 feet higher than the gage at the former site.

Channel.—Somewhat shifting after high water.

Discharge measurements.—Made from railroad bridge.

Winter flow.—Ice causes backwater during the winter months and records are discontinued.

Diversions.—There were adjudicated decrees for 4.3 second-feet from Little Wind River above the station prior to July 1, 1912.

Accuracy.—Conditions are favorable for accurate results and the estimates should be excellent.

Cooperation.—Station is maintained in cooperation with the State engineer.

Discharge measurements of Little Wind River above Arapahoe, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.ft.</i>
May 14	Fletcher and Kingdon.	3.00	251	June 16	E. O. Christiansen.....	5.75	2,740
June 6	E. O. Christiansen.....	4.45	1,260	30	R. H. Fletcher.....	4.50	1,300
9	do.....	4.80	1,680	July 19	do.....	3.85	798
13	do.....	5.00	1,920	Oct. 15	G. H. Russell.....	2.30	74.3

Daily gage height, in feet, of Little Wind River above Arapahoe, Wyo., for 1911.

[J. E. Plummer, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1....	3.40	4.70	3.05	1.98	2.35	2.15	16....	3.32	5.80	3.80	2.45	1.92	2.30	.....
2....	3.65	4.65	2.98	1.95	2.32	2.12	17....	3.00	6.50	3.80	2.40	1.92	2.30	.....
3....	3.70	4.50	2.92	1.90	2.50	2.08	18....	2.95	6.10	3.80	2.40	1.90	2.32	.....
4....	3.90	4.35	2.88	1.95	2.52	2.20	19....	2.90	5.80	3.90	2.38	1.90	2.30	.....
5....	4.20	4.40	2.80	2.00	2.50	2.20	20....	2.80	5.70	3.90	2.35	1.90	2.25	.....
6....	4.40	4.45	2.85	2.00	2.55	2.20	21....	2.68	5.70	3.80	2.30	1.90	2.22	.....
7....	4.45	4.45	2.78	2.02	2.52	2.15	22....	2.65	5.80	3.60	2.30	1.85	2.20	.....
8....	4.70	4.40	2.75	2.08	2.55	2.20	23....	2.82	5.70	3.60	2.35	1.80	2.30	.....
9....	4.80	4.40	2.65	2.05	2.42	2.05	24....	3.05	5.40	3.60	2.32	1.80	2.30	.....
10....	4.50	4.15	2.60	2.02	2.40	2.30	25....	3.15	5.20	3.50	2.32	1.75	2.30	.....
11....	4.20	3.90	2.55	2.00	2.35	2.15	26....	3.20	4.90	3.48	2.30	1.75	2.25	.....
12....	4.60	3.80	2.60	1.95	2.40	.....	27....	3.30	4.60	3.40	2.28	1.78	2.20	.....
13....	4.90	3.70	2.55	1.90	2.32	.....	28....	3.20	4.60	3.38	2.25	1.90	2.15	.....
14....	3.00	5.20	3.70	2.48	1.90	2.32	.....	29....	3.12	4.60	3.30	2.20	2.12	2.12	.....
15....	3.05	5.30	3.70	2.40	1.90	2.25	.....	30....	3.08	4.50	3.20	2.15	2.28	2.15	.....
								31....	3.15	.....	3.12	2.02	.....	2.25	.....

Daily discharge, in second-feet, of Little Wind River above Arapahoe, Wyo., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		470	1,540	285	33	85	56
2.....		628	1,480	258	31	80	52
3.....		660	1,330	237	27	116	48
4.....		805	1,200	224	31	121	62
5.....		1,050	1,240	198	35	116	62
6.....		1,240	1,280	214	35	128	62
7.....		1,280	1,280	192	37	121	56
8.....		1,540	1,240	183	43	128	62
9.....		1,640	1,240	154	40	103	40
10.....		1,330	1,010	141	37	94	76
11.....		1,050	805	128	35	85	56
12.....		1,430	730	141	31	94	.....
13.....		1,750	660	128	27	80	.....
14.....	265	2,090	660	112	27	80	.....
15.....	285	2,210	660	94	27	69	.....
16.....	422	2,830	730	105	29	76	.....
17.....	265	3,730	730	94	29	76	.....
18.....	248	3,210	730	94	27	80	.....
19.....	230	2,830	805	90	27	76	.....
20.....	198	2,700	805	85	27	69	.....
21.....	163	2,700	730	76	27	65	.....
22.....	155	2,830	595	76	24	62	.....
23.....	204	2,700	595	85	20	76	.....
24.....	285	2,330	595	80	20	76	.....
25.....	330	2,090	530	80	18	76	.....
26.....	355	1,750	518	76	18	69	.....
27.....	410	1,430	470	73	19	62	.....
28.....	355	1,430	458	69	27	56	.....
29.....	315	1,430	410	62	52	52	.....
30.....	298	1,330	355	56	73	56	.....
31.....	330	.....	315	37	.....	69	.....

NOTE.—Daily discharge determined from a well-defined rating curve.

Monthly discharge of Little Wind River above Arapahoe, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May 14-31.....	422	155	284	11,300	A.
June.....	3,730	470	1,820	108,000	A.
July.....	1,540	315	830	51,063	A.
August.....	285	37	127	7,810	A.
September.....	73	18	31.1	1,850	A.
October.....	128	52	83.7	5,150	A.
November 1-11.....	76	40	57.5	1,250	A.
The period.....	.....	.....	.....	186,000	.....

LITTLE WIND RIVER BELOW ARAPAHOE, WYO.

Location.—At highway bridge in sec. 23, T. 1 S., R. 3 E., one-half mile below Arapahoe. Popo Agie River enters 200 yards above. Little Wind River enters Wind River 6 miles below, and between the station and mouth Beaver Creek enters.

Records available.—May 11, 1906, to November 27, 1909; May 14 to November 11, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff; datum unchanged since it was originally placed in 1906. From June 19 to July 19, 1911, a temporary gage was used whose datum was 2.95 feet higher. This was replaced on the latter date by a gage reading to the original datum. All readings are referred to the original datum.

Channel.—Slightly shifting.

Discharge measurements.—Made from highway bridge.

Winter flow.—The river is frozen over during the winter months and the records are discontinued.

Divisions.—Prior to July 1, 1912, there were adjudicated diversions of 4.3 second-feet from Little Wind River and diversions of 563 second-feet from the Popo Agie and tributaries.

Accuracy.—Although there is a slight shift, frequent measurements have defined this, and the estimates should be reliable.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of Little Wind River below Arapahoe, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 14	Fletcher and Kingdon	2.90	1,050	June 14	E. O. Christiansen	6.62	4,940
June 6	E. O. Christiansen	5.25	3,090	16	do.	7.57	6,980
8	do.	5.87	3,840	Oct. 15	G. H. Russell	1.48	231

Daily gage height, in feet, of Little Wind River below Arapahoe, Wyo., for 1911.

[J. E. Plummer, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1....	3.6	4.7	2.00	0.78	1.38	1.25	16....	3.2	7.6	3.2	1.38	0.85	1.42	.....
2....	4.1	4.5	1.92	.75	1.48	1.25	17....	2.95	.....	3.3	1.32	.85	1.48	.....
3....	4.2	4.4	1.88	.75	1.72	1.12	18....	2.9	.....	3.2	1.28	.80	1.52	.....
4....	4.5	4.3	1.78	.80	1.70	1.28	19....	2.7	6.5	3.6	1.25	.80	1.40	.....
5....	5.1	4.2	1.70	.85	1.65	1.28	20....	2.5	6.5	3.4	1.18	.80	1.38	.....
6....	5.2	4.4	1.78	.92	1.70	1.28	21....	2.3	6.8	3.2	1.12	.78	1.38	.....
7....	5.4	4.2	1.78	1.05	1.68	1.22	22....	2.2	7.0	3.1	1.15	.75	1.35	.....
8....	5.7	4.2	1.70	1.10	1.70	1.28	23....	2.4	6.5	3.0	1.15	.75	1.42	.....
9....	5.8	4.1	1.62	1.08	1.60	1.35	24....	2.9	6.0	2.9	1.10	.72	1.42	.....
10....	5.4	3.8	1.50	1.00	1.50	1.35	25....	2.9	5.5	2.8	1.10	.70	1.40	.....
11....	4.8	3.4	1.50	1.00	1.52	1.20	26....	3.2	5.0	2.7	1.10	.70	1.40	.....
12....	5.5	3.2	1.55	.90	1.52	.....	27....	3.2	4.6	2.6	1.10	.72	1.38	.....
13....	6.1	3.2	1.50	.88	1.50	.....	28....	2.95	4.6	2.5	1.10	.90	1.32	.....
14....	2.9	6.3	3.0	1.40	.85	1.50	.....	29....	2.8	4.5	2.4	1.02	1.15	1.25	.....
15....	3.0	6.6	3.1	1.38	.88	1.42	.....	30....	2.8	4.4	2.2	.95	1.32	1.25	.....
								31....	2.95	.....	2.1	.88	.....	1.32	.....

Daily discharge, in second-feet, of Little Wind River below Arapahoe, Wyo., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		1,560	2,530	485	62	223	180
2.		1,990	2,350	445	58	258	180
3.		2,080	2,260	426	58	354	141
4.		2,350	2,170	381	65	345	189
5.		2,920	2,080	345	75	325	189
6.		3,030	2,260	381	90	345	189
7.		3,250	2,080	381	122	337	171
8.		3,610	2,080	345	135	345	189
9.		3,740	1,990	313	130	305	212
10.		3,250	1,720	265	110	265	212
11.		2,620	1,400	265	110	273	165
12.		3,370	1,250	285	85	273	.....
13.		4,140	1,250	265	81	265	.....
14.	1,040	4,430	1,110	230	75	265	.....
15.	1,110	4,920	1,180	223	81	237	.....
16.	1,250	7,060	1,250	223	75	237	.....
17.	1,080	9,660	1,320	202	75	258	.....
18.	1,040	7,840	1,250	189	65	273	.....
19.	900	4,750	1,560	180	65	230	.....
20.	770	4,750	1,400	159	65	223	.....
21.	650	5,270	1,250	141	62	223	.....
22.	595	5,660	1,180	150	58	212	.....
23.	710	4,750	1,110	150	58	237	.....
24.	1,040	4,000	1,040	135	53	237	.....
25.	1,040	3,370	970	135	50	230	.....
26.	1,250	2,820	900	135	50	230	.....
27.	1,250	2,440	835	135	53	223	.....
28.	1,080	2,440	770	135	85	202	.....
29.	970	2,350	710	115	150	180	.....
30.	970	2,260	595	98	202	180	.....
31.	1,080	.....	540	81	.....	202	.....

NOTE.—Daily discharge determined from a fairly well-defined rating curve; discharge estimated June 17 and 18.

Monthly discharge of Little Wind River below Arapahoe, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May 14-31.....	1,250	595	990	35,300	B.
June.....	9,660	1,560	3,890	231,000	B.
July.....	2,530	540	1,430	87,900	B.
August.....	485	81	239	14,700	B.
September.....	202	50	83.4	4,960	B.
October.....	354	180	258	15,900	B.
November 1-11.....	212	141	183	4,000	B.
The period.....	.....	.....	.....	394,000	.....

POPO AGIE RIVER NEAR LANDER, WYO.

Location.—On the Middle Fork, in the Yellowstone National Forest, at the ranger station in sec. 24, T. 32 N., R. 101 W. The nearest tributary enters several miles below.

Records available.—April 1 to November 9, 1911.

Drainage area.—Not measured.

Gage.—Staff gage used until June 17, 1911, when it was washed out by high water.

A new staff gage was installed reading 7.86 feet higher than the original gage.

All readings have been referred to the latter gage.

Channel.—Apparently permanent.

Discharge measurements.—Made by wading.

Winter flow.—Ice causes backwater during the winter months and the records are discontinued.

Diversions.—Appropriations amounting to 164 second-feet have been adjudicated on this stream prior to July 1, 1912. Very nearly all of this water is diverted below the station.

Accuracy.—Owing to a lack of high-water measurements, no estimates of discharge have been made.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of Popo Agie River near Lander, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 2	O. M. Wimmer	8.96	53.2
3	do.	9.06	59.4
12	do.	9.66	190
Nov. 2	H. B. Waha	8.70	22.5

Daily gage height, in feet, of Popo Agie River near Lander, Wyo., for 1911.

[Chas. J. Bayer, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	8.55	8.95	10.35	-----	-----	8.80	9.20	8.65
2	8.58	8.95	10.40	-----	-----	8.82	9.15	8.75
3	8.59	8.92	10.45	-----	9.30	8.82	9.30	8.60
4	8.55	9.80	10.70	-----	9.30	8.85	9.00	8.60
5	-----	9.65	10.85	10.20	9.25	8.85	9.25	8.55
6	8.50	9.40	10.80	10.15	9.40	9.05	9.20	8.55
7	8.50	9.45	11.05	10.20	9.35	8.95	9.05	8.55
8	8.48	9.90	-----	-----	9.28	8.90	9.05	8.55
9	-----	9.85	-----	-----	9.28	8.90	9.05	8.50
10	8.50	10.00	10.35	-----	9.25	8.80	9.00	-----
11	8.52	10.00	10.75	9.80	-----	8.80	-----	-----
12	8.50	9.85	11.15	9.85	9.25	8.80	-----	-----
13	8.48	9.80	11.15	9.90	9.20	8.80	8.90	-----
14	8.46	9.75	11.15	9.80	9.18	8.80	8.95	-----
15	8.45	9.80	11.30	9.80	9.18	8.78	8.80	-----
16	-----	10.50	11.45	9.90	9.20	8.80	8.82	-----
17	8.48	9.85	11.25	9.85	-----	-----	8.82	-----
18	8.48	9.75	10.70	9.90	9.12	8.65	8.80	-----
19	8.50	9.45	11.00	-----	9.10	8.65	8.80	-----
20	8.52	-----	11.00	-----	9.10	-----	8.80	-----
21	8.52	9.50	11.40	9.70	9.10	8.70	8.78	-----
22	8.50	-----	-----	9.75	9.10	8.65	8.70	-----
23	-----	9.75	11.05	9.65	9.08	8.65	-----	-----
24	8.68	9.80	10.75	9.65	9.05	8.65	-----	-----
25	8.75	10.05	10.40	9.62	-----	-----	8.70	-----
26	8.92	10.05	10.30	9.60	-----	8.68	8.68	-----
27	9.10	9.90	10.25	9.62	-----	8.85	8.70	-----
28	9.15	9.85	10.40	9.60	-----	9.05	8.72	-----
29	9.15	9.80	10.30	-----	-----	9.00	8.72	-----
30	-----	9.85	-----	9.55	8.80	8.95	8.72	-----
31	-----	10.10	-----	9.50	8.80	-----	8.65	-----

LITTLE POPO AGIE RIVER AT HUDSON, WYO.

Location.—A short distance below the highway bridge three-eighths of a mile south-west of Hudson. No tributary between the station and the mouth of the river.

Records available.—August 26, 1907, to December 31, 1909; June 19 to November 11, 1911.

Drainage area.—Approximately 360 square miles.

Gage.—Chain gage. The original gage was located at the highway bridge. On June 13, 1908, a chain gage was installed at the present site, at a somewhat different datum, but was set to read the same as the original gage for the stage at which it was installed.

Channel.—Practically permanent.

Discharge measurements.—Made from the highway bridge during high water and by wading during low stages.

Winter flow.—Ice causes backwater during the winter months and the records are discontinued.

Diversions.—Prior to July 1, 1912, adjudicated diversions from Little Popo Agie River above the station amounted to 49 second-feet and from the tributaries 20 second-feet.

Accuracy.—As the station has not been completely rated no estimates of discharge have been made.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of Little Popo Agie River at Hudson, Wyo., in 1911.

Date.	Hydrographer.	Gage height	Dis-charge.
June 19	E. O. Christiansen.....	<i>Feet.</i> 4.87	<i>Sec.-ft.</i> 500
30	R. H. Fletcher.....	3.50	263
July 19	.....do.....	3.50	276
Oct. 17	G. H. Russell.....	2.19	36.5

Daily gage height, in feet, of Little Popo Agie River at Hudson, Wyo., for 1911.

[L. D. Ladd, observer.]

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	3.60	2.05	1.80	2.0	2.27	16.....	2.50	1.90	1.80	2.10	.....	.....	.....
2.....	3.30	2.02	1.78	2.08	2.32	17.....	2.50	1.90	1.80	2.17	.....	.....	.....
3.....	3.15	2.00	1.75	2.10	2.32	18.....	2.50	1.90	1.75	2.19	.....	.....	.....
4.....	3.10	2.00	1.75	2.10	2.32	19.....	4.87	3.05	1.90	1.78	2.19	.....	.....
5.....	3.10	1.98	1.85	2.05	2.32	20.....	4.90	2.80	1.85	1.80	2.17	.....	.....
6.....	3.10	2.02	1.92	2.15	2.29	21.....	5.40	2.60	1.85	1.80	2.17	.....	.....
7.....	3.00	2.05	1.95	2.15	2.25	22.....	5.70	2.60	1.85	1.80	2.17	.....	.....
8.....	3.00	2.10	2.00	2.10	2.27	23.....	4.80	2.50	1.85	1.80	2.32	.....	.....
9.....	2.90	2.05	2.00	2.15	2.29	24.....	4.40	2.50	1.85	1.80	2.29	.....	.....
10.....	2.80	2.00	1.98	2.15	2.45	25.....	4.10	2.42	1.85	1.80	2.29	.....	.....
11.....	2.65	2.02	1.85	2.15	2.47	26.....	3.70	2.32	1.85	1.82	2.29	.....	.....
12.....	2.60	2.02	1.85	2.12	.....	27.....	3.60	2.30	1.85	1.90	2.32	.....	.....
13.....	2.50	2.00	1.80	2.18	.....	28.....	3.60	2.28	1.85	1.95	2.27	.....	.....
14.....	2.50	2.00	1.80	2.15	.....	29.....	3.50	2.22	1.85	2.05	2.27	.....	.....
15.....	2.50	2.00	1.80	2.15	.....	30.....	3.50	2.15	1.85	2.00	2.32	.....	.....
						31.....	2.08	1.85	.....	2.29	.....	.....	.....

OWL CREEK NEAR THERMOPOLIS, WYO.

Location.—At a highway bridge about 5 miles northwest of Thermopolis, Wyo., near the ranch buildings of the observer, C. H. McCumber.

Records available.—July 30, 1910, to December 31, 1911.

Drainage area.—Not measured.

Gage.—A staff fastened to upstream side of bridge.

Channel.—Probably shifting.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—Water is diverted from Owl Creek for irrigation and practically all the low-water flow is appropriated.

Discharge measurements of Owl Creek near Thermopolis, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 23 ^a	W. A. Lamb.....	1.38	1.05
June 23	R. Richards.....	2.83	160
Aug. 1	B. E. Jones.....	1.66	5.5
Oct. 28	do.....	21.67	0.5

^a Float measurement.^b Ice conditions.*Daily discharge, in second-feet, of Owl Creek near Thermopolis, Wyo., for 1910.*

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		10	1.5	4.0	6.5	6.5	16.....		1.5	2.5	2.5	6.5	.....
2.....		2.5	1.5	6.5	6.5	6.5	17.....		1.5	2.5	2.5	6.5	.....
3.....		2.5	1.5	6.5	6.5	6.5	18.....		.5	2.5	2.5	6.5	.....
4.....		1.5	1.5	6.5	6.5	6.5	19.....		.5	2.5	2.5	6.5	.....
5.....		1.5	1.5	6.5	6.5	6.5	20.....		.5	2.5	2.5	6.5	.....
6.....		1.5	2.5	6.5	6.5	.....	21.....		.5	2.5	2.5	6.5	.....
7.....		1.5	2.5	6.5	6.5	.....	22.....		.5	142	2.5	6.5	.....
8.....		1.5	6.5	6.5	6.5	.....	23.....		.5	76	2.5	6.5	.....
9.....		1.5	6.5	4.0	6.5	.....	24.....		.5	197	2.5	6.5	.....
10.....		1.5	6.5	3.2	6.5	.....	25.....		.5	131	2.5	6.5	.....
11.....		1.5	6.5	2.5	6.5	.....	26.....		.5	10	2.5	6.5	.....
12.....		1.5	6.5	2.5	6.5	.....	27.....		.5	6.5	6.5	6.5	.....
13.....		1.5	6.5	2.5	6.5	.....	28.....		.5	6.5	6.5	6.5	.....
14.....		1.5	6.5	2.5	6.5	.....	29.....		.5	4.0	6.5	6.5	.....
15.....		1.5	6.5	2.5	6.5	.....	30.....	6.5	.5	4.0	6.5	6.5	.....
							31.....	34	.5	.....	6.5	.....	.....

NOTE.—Gage heights after Oct. 26, 1910, distorted by ice.

Daily gage height, in feet, of Owl Creek near Thermopolis, Wyo., for 1911.

[C. H. McCumber, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		1.7	1.5	1.5	2.0	1.6	1.4	1.5
2.....		1.7	1.5	1.75	2.0	1.6	1.4	1.5
3.....		1.7	1.5	2.2	2.0	1.6	1.4	1.6
4.....		1.5	1.5	2.45	1.9	1.7	1.4	1.6
5.....		1.5	1.5	2.6	1.9	1.7	1.4	1.6
6.....		1.5	1.5	2.55	1.8	1.7	1.4	1.6
7.....		1.5	1.5	2.6	1.9	2.0	1.5	1.6
8.....		1.5	1.5	2.55	1.7	1.8	1.5	1.6
9.....		1.5	1.7	2.55	1.7	1.7	1.4	1.5
10.....		1.5	1.7	2.55	1.8	1.6	1.4	1.5
11.....		1.5	1.7	2.7	1.7	1.6	1.4	1.5
12.....	2.0	1.5	1.5	2.8	1.6	1.6	1.4	1.5
13.....	2.0	1.5	1.5	2.85	1.6	1.6	1.4	1.5
14.....	2.1	1.5	1.6	2.9	1.6	1.5	1.4	1.5
15.....	2.1	1.5	1.6	3.0	1.6	1.5	1.4	1.5
16.....	2.1	1.7	1.6	.....	1.7	1.5	1.4	1.5
17.....	2.1	1.7	1.5	.....	1.7	1.4	1.4	1.5
18.....	2.2	1.7	1.5	.....	1.9	1.4	1.4	1.5
19.....	2.1	1.7	1.5	.....	2.0	1.4	1.4	1.5
20.....	2.1	1.7	1.5	.....	1.9	1.4	1.4	1.5
21.....	2.0	1.7	1.5	.....	1.8	1.4	1.4	1.6
22.....	2.0	1.7	1.4	2.83	1.7	1.4	1.4	1.6
23.....	2.0	1.5	1.4	2.9	1.7	1.4	1.4	1.6
24.....	1.9	1.5	1.4	2.85	1.7	1.4	1.4	1.6
25.....	1.8	1.5	1.4	2.7	1.7	1.4	1.4	1.6
26.....	1.8	1.5	1.4	2.55	1.6	1.4	1.5	1.6
27.....	1.8	1.5	1.6	2.4	1.6	1.4	1.5	1.6
28.....	1.8	1.5	1.5	2.4	1.5	1.4	1.5	1.65
29.....	1.7	1.5	1.4	2.3	1.5	1.4	1.5	1.65
30.....	1.7	1.5	1.4	2.1	1.5	1.4	1.5	1.6
31.....	1.7	.....	1.5	.....	1.5	1.4	.....	1.6

NOTE.—Gage heights, Oct. 21-31, 1911, distorted by ice.

Daily discharge, in second-feet, of Owl Creek near Thermopolis, Wyo., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		6.5	2.5	2.5	24	4.0	1.5	2.5
2.....		6.5	2.5	8.2	24	4.0	1.5	2.5
3.....		6.5	2.5	46	24	4.0	1.5	4.0
4.....		2.5	2.5	84	16	6.5	1.5	4.0
5.....		2.5	2.5	111	16	6.5	1.5	4.0
6.....		2.5	2.5	102	10	6.5	1.5	4.0
7.....		2.5	2.5	111	16	24	2.5	4.0
8.....		2.5	2.5	102	6.5	10	2.5	4.0
9.....		2.5	6.5	102	6.5	6.5	1.5	2.5
10.....		2.5	6.5	102	10	4.0	1.5	2.5
11.....		2.5	6.5	131	6.5	4.0	1.5	2.5
12.....	24	2.5	2.5	153	4.0	4.0	1.5	2.5
13.....	24	2.5	2.5	164	4.0	4.0	1.5	2.5
14.....	34	2.5	4.0	175	4.0	2.5	1.5	2.5
15.....	34	2.5	4.0	197	4.0	2.5	1.5	2.5
16.....	34	6.5	4.0	190	6.5	2.5	1.5	2.5
17.....	34	6.5	2.5	190	6.5	1.5	1.5	2.5
18.....	46	6.5	2.5	190	16	1.5	1.5	2.5
19.....	34	6.5	2.5	190	24	1.5	1.5	2.5
20.....	34	6.5	2.5	180	16	1.5	1.5	2.5
21.....	24	6.5	2.5	170	10	1.5	1.5	.....
22.....	24	6.5	1.5	160	6.5	1.5	1.5	.....
23.....	24	2.5	1.5	175	6.5	1.5	1.5	.....
24.....	16	2.5	1.5	164	6.5	1.5	1.5	.....
25.....	10	2.5	1.5	131	6.5	1.5	1.5	.....
26.....	10	2.5	1.5	102	4.0	1.5	2.5	.....
27.....	10	2.5	4.0	76	4.0	1.5	2.5	.....
28.....	10	2.5	2.5	76	2.5	1.5	2.5	.....
29.....	6.5	2.5	1.5	60	2.5	1.5	2.5	.....
30.....	6.5	2.5	1.5	34	2.5	1.5	2.5	.....
31.....	6.5	.....	2.5	.....	2.5	1.5	.....	.....

NOTE.—Determination of daily discharge for 1910 has been revised by measurements made during 1911. Daily discharge determined from a rating curve fairly well defined between 0 and 10 second-feet. Discharge interpolated June 16 to 21.

Monthly discharge of Owl Creek near Thermopolis, Wyo., for 1910-11.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
1910.					
August.....	10	0.5	1.39	855	C.
September.....	197	1.5	21.9	1,300	C.
October.....	6.5	2.5	4.10	256	C.
1911.					
March.....	46	6.5	18.6	1,140	C.
April.....	6.5	2.5	3.83	228	C.
May.....	6.5	1.5	2.85	175	C.
June.....	197	2.5	123	7,320	D.
July.....	24	2.5	9.63	592	C.
August.....	24	1.5	3.81	234	C.
September.....	2.5	1.5	1.73	103	C.
October.....	4.0	.....	2.44	150	C.
The period.....	.....	.....	14.7	9,940	.....

NOTE.—Discharge Oct. 27-31, 1910, estimated at 2.5 second-feet, Mar. 1 to 11, 1911, at 12 second-feet, and Oct. 21-31 at 1.5 second-feet.

NO WOOD RIVER AT BONANZA, WYO.

Location.—In the SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 13, T. 49 N., R. 91 W., near the ranch of J. W.

Graves, one-fourth mile north of Bonanza post office.

Records available.—July 29, 1910, to November 30, 1911.

Drainage area.—Not measured.

Gage.—Chain gage on left bank near public highway.

Channel.—Sand and gravel.

Discharge measurements.—Made by wading 50 feet below the gage; in flood, from the public highway bridge one-half mile below.

Winter flow.—Affected by ice.

Diversions.—Irrigation is carried on to some extent and water is diverted both above and below the station.

Discharge measurements of No Wood River at Bonanza, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 20	W. A. Lamb.....	3.18	473
June 25	R. Richards.....	3.26	542
Aug. 4	B. E. Jones.....	2.14	109
Oct. 30	.....do.....	2.35	175

Daily gage height, in feet, of No Wood River at Bonanza, Wyo., for 1911.

[Grace E. Taylor, observer.]

Day.	Mar.	Apr.	May.	June.	Aug.	Sept.	Oct.	Nov.
1.....		2.20	2.45	4.80		1.80	2.28	2.42
2.....		2.22		5.20		1.80	2.30	2.35
3.....		2.32		4.60		1.85	2.32	2.35
4.....		2.32	2.28	4.40	2.15	1.90	2.32	2.35
5.....		2.40	2.25	4.40	2.35	1.95	2.33	2.38
6.....		2.41	2.26	4.20	2.28	2.00	2.34	2.41
7.....		2.31	2.90	4.20	2.40	2.00	2.32	2.38
8.....			3.20	4.40	2.65	2.00	2.31	2.35
9.....		2.22	3.70	4.50	2.30	2.00	2.30	2.32
10.....		2.24	3.60	3.80	2.20	2.00	2.30	2.55
11.....		2.24	3.30	3.80	2.10	2.00	2.30	2.55
12.....		2.20	3.20		2.10	2.00	2.30	2.52
13.....		2.28	3.00	4.40	2.00	2.00	2.28	2.68
14.....		2.20	3.15		2.00	2.00	2.28	2.80
15.....			4.00	5.20	2.00	2.00	2.35	2.95
16.....		1.70	4.90	5.70	1.90	2.00	2.38	2.98
17.....		2.13	4.20	5.20	1.90	2.05	2.38	3.00
18.....		2.14			1.90	2.05	2.64	3.00
19.....	2.36	2.14	3.50		1.85	2.05	2.40	2.98
20.....	2.36	2.12	3.20		1.80	2.05	2.36	2.95
21.....	2.35	2.14	3.05		1.80	2.10	2.30	
22.....	2.44	2.24			1.75	2.10	2.35	
23.....	2.40				1.80	2.10	2.40	
24.....	2.32				1.80	2.10	2.35	
25.....	2.30		3.80	3.26	1.85	2.15	2.38	
26.....	2.35				1.85	2.20	2.40	
27.....	2.30		4.00		1.80	2.20	2.35	
28.....	2.23		3.50		1.80	2.25	2.36	
29.....	2.20		3.30		1.85	2.20	2.36	
30.....	2.20	2.55	3.60		1.80	2.25	2.34	
31.....					1.75		2.35	

NOTE.—Gage heights after Nov. 9 distorted by ice.

Daily discharge, in second-feet, of No Wood River at Bonanza, Wyo., for 1911.

Day.	Mar.	Apr.	May.	June.	Aug.	Sept.	Oct.	Nov.
1.....		125	198	1,280	100	50	145	187
2.....		130	180	1,480	100	50	150	165
3.....		156	162	1,180	100	58	156	165
4.....		156	145	1,080	112	65	156	165
5.....		180	138	1,080	165	73	159	174
6.....		184	140	980	145	80	162	184
7.....		153	365	980	180	80	156	174
8.....		142	495	1,080	268	80	153	165
9.....		130	730	1,130	150	80	150	156
10.....		135	680	780	125	80	150	.....
11.....		135	540	780	100	80	150	.....
12.....		125	495	930	100	80	150	.....
13.....		145	405	1,080	80	80	145	.....
14.....		125	472	1,280	80	80	145	.....
15.....		82	880	1,480	80	80	165	.....
16.....		40	1,330	1,730	65	80	174	.....
17.....		108	980	1,480	65	90	174	.....
18.....		110	805	1,360	65	90	264	.....
19.....	168	110	630	1,240	58	90	180	.....
20.....	168	105	495	1,120	50	90	168	.....
21.....	165	110	428	1,000	50	100	150	.....
22.....	194	135	516	880	45	100	165	.....
23.....	180	147	604	760	50	100	180	.....
24.....	156	159	692	640	50	100	165	.....
25.....	150	171	780	522	58	112	174	.....
26.....	165	183	830	.....	58	125	180	.....
27.....	150	195	880	.....	50	125	165	.....
28.....	132	207	630	.....	50	138	168	.....
29.....	125	219	540	.....	58	125	168	.....
30.....	125	232	680	.....	50	138	162	.....
31.....	125	.....	980	.....	45	.....	165	.....

NOTE.—Daily discharge determined from a rating curve well defined below 600 second-feet; discharge interpolated for days for which gage heights are missing.

Monthly discharge of No Wood River at Bonanza, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
March 19-31.....	194	125	154	3,970	B.
April.....	232	40	144	8,570	B.
May.....	1,330	138	575	35,400	C.
June.....	1,730	.....	994	59,100	C.
August.....	268	45	88.8	5,460	B.
September.....	138	50	90.0	5,360	B.
October.....	264	145	164	10,100	B.
November 1 to 9.....	.....	.....	171	3,050	B.

NOTE.—Discharge June 26 to 30, estimated at 500 second-feet.

TENSLEEP CREEK NEAR TENSLEEP, WYO.

Location.—In NW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 12, T. 47 N., R. 88 W., 5 miles from Tensleep post office and 800 feet east of the county bridge, on Burke's ranch, located by a cliff 80 feet high on north side of creek; just below mouth of Canyon Fork, the principal tributary.

Records available.—September 21, 1910, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Inclined and upright staff.

Channel.—Rocky ledge.

Discharge measurements.—At low and ordinary stages made by wading; at flood stages made from the bridges over Canyon Fork and Tensleep Creek.

Winter flow.—Ice will not form at this station except in extremely cold weather.

Diversions.—A small amount of water is diverted from this stream for irrigation.

Discharge measurements of Tensleep Creek near Tensleep, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 21	W. A. Lamb.....	0.99	193
June 24 ^a	R. Richards.....	1.20	263
Aug. 4	B. E. Jones.....	0.38	89
Oct. 31	.....do.....	0.00	45

^a Measurement made from wagon bridges over Ten Sleep and Canyon Fork Creeks

Daily gage height, in feet, of Tensleep Creek near Tensleep, Wyo., for 1911.

[Bessie Burke, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		0.1	0.35	3.05	1.0	0.25	0.0	0.15	0.0	0.05
2.....		.2	.3	2.75	.9	.25	.0	.15	.0	.05
3.....		.2	.3	2.2	.85	.25	.0	.15	.0	.05
4.....		.1	.3	2.3	.75	.35	.0	.2	.0	.0
5.....		.1	.5	2.7	.65	.4	.05	.2	.0	.05
6.....		.0	1.05	2.5	.65	.35	.1	.15	.05	.05
7.....		.0	.95	2.15	.6	.35	.05	.15	.05	.05
8.....		.0	1.05	2.1	.55	.35	.05	.1	.05	.0
9.....		.05	1.0	2.0	.55	.35	.0	.15	.0	.05
10.....		.05	1.0	1.7	.5	.3	.0	.15	.0	.05
11.....	0.05	.0	.95	2.2	.5	.35	.0	.1	.0	.0
12.....	.0	.0	.9	2.3	.45	.35	.0	.1	.0	.0
13.....	.0	.0	1.1	2.4	.4	.3	.1	.1	.05	.0
14.....	.0	.0	1.25	2.8	.3	.35	.1	.15	.05	.0
15.....	.0	.0	2.25	2.85	.3	.2	.05	.15	.15	.0
16.....	.0	.0	2.25	2.8	.4	.2	.05	.15	.15	.0
17.....	.0	.0	1.95	2.45	.45	.1	.1	.15	.1	.0
18.....	.0	.0	1.65	2.4	.6	.1	.05	.15	.1	.0
19.....	.0	.0	1.15	2.2	.55	.1	.1	.1	.05	.0
20.....	.0	.05	1.0	2.15	.4	.05	.05	.05	.1	.0
21.....	.0	.05	1.0	1.9	.5	.05	.05	.1	.1	.0
22.....	.0	.1	1.1	1.65	.4	.05	.05	.1	.1	.05
23.....	.0	.05	1.15	1.4	.3	.05	.05	.1	.05	.0
24.....	.0	.05	1.6	1.25	.3	.05	.05	.1	.05	.0
25.....	.0	.1	1.9	1.15	.25	.05	.05	.1	.05	.0
26.....	.0	.15	2.3	1.0	.25	.0	.05	.05	.05	.0
27.....	.0	.4	1.6	.9	.25	.05	.05	.05	.05	.0
28.....	.0	.4	1.3	.8	.25	.05	.1	.05	.05	.0
29.....	.0	.45	1.15	.75	.3	.0	.05	.05	.0	.0
30.....	.05	.35	1.75	.65	.3	.05	.05	.0	.05	.0
31.....	.10		2.1		.25	.0		.0		.05

Daily discharge, in second-feet, of Tensleep Creek near Tensleep, Wyo., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		55	82	940	195	70	45	60	45	50
2.		65	76	820	170	70	45	60	45	50
3.		65	76	600	160	70	45	60	45	50
4.		55	76	640	140	82	45	65	45	45
5.		55	101	800	123	88	50	65	45	50
6.		45	210	720	123	82	55	60	50	50
7.		45	182	580	115	82	50	60	50	50
8.		45	210	560	108	82	50	55	50	45
9.		50	195	525	108	82	45	60	45	50
10.		50	195	420	101	76	45	60	45	50
11.	50	45	182	600	101	82	45	55	45	45
12.	45	45	170	640	94	82	45	55	45	45
13.	45	45	225	680	88	76	55	55	50	45
14.	45	45	270	840	76	82	55	60	50	45
15.	45	45	620	860	76	65	50	60	60	45
16.	45	45	620	840	88	65	50	60	60	45
17.	45	45	508	700	94	55	55	60	55	45
18.	45	45	402	680	115	55	50	60	55	45
19.	45	45	240	600	108	55	55	55	50	45
20.	45	50	195	580	88	50	50	50	55	45
21.	45	50	195	490	101	50	50	55	55	45
22.	45	55	225	402	88	50	50	55	55	50
23.	45	50	240	315	76	50	50	55	50	45
24.	45	50	385	270	76	50	50	55	50	45
25.	45	55	490	240	70	50	50	55	50	45
26.	45	60	640	195	70	45	50	50	50	45
27.	45	88	385	170	70	50	50	50	50	45
28.	45	88	285	149	70	50	55	50	50	45
29.	45	94	240	140	76	45	50	50	45	45
30.	50	82	438	123	76	50	50	45	50	45
31.	55		560		70	45		45		50

NOTE.—Daily discharge determined from a fairly well-defined rating curve. Discharge estimated Mar. 1 to 10, 50 second-feet.

Monthly discharge of Tensleep Creek near Tensleep, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			50	3,070	D.
February.....			50	2,780	D.
March.....	55	45	47.3	2,910	C.
April.....	94	45	55.2	3,280	B.
May.....	640	76	288	17,700	B.
June.....	940	123	537	32,000	B.
July.....	195	70	105	6,460	B.
August.....	88	45	64.1	3,940	B.
September.....	55	45	51.3	3,050	B.
October.....	65	45	56.1	3,450	B.
November.....	60	45	49.8	2,960	B.
December.....	50	45	46.6	2,870	B.
The year.....	940		116	84,500	

NOTE.—Means for January and February estimated.

PAINT ROCK CREEK NEAR HYATTVILLE, WYO.

Location.—In the Bighorn National Forest in the NW. $\frac{1}{4}$ sec. 18, T. 50 N., R. 88 W., $1\frac{1}{2}$ miles southeast of the Longview ranger station and about 12 miles east of Hyattville; 400 yards below the mouth of the North Fork, the nearest tributary.

Records available.—October 28 to December 31, 1911.

Drainage area.—81 square miles (measured from topographic sheet).

Gage.—Vertical staff.

Channel.—Probably permanent.

Discharge measurements.—Made by wading.

Winter flow.—No data.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions from Paint Rock Creek amounting to 54 second-feet. Practically all the water is diverted below the station.

Accuracy.—Sufficient data to determine accuracy have not been obtained.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

The following discharge measurement was made by H. B. Waha on October 28, 1911: Gage height, 0.80 foot; discharge, 26 second-feet.

The following additional gage heights were observed at this station: November 3, 1.10 feet; December 23, 0.15 foot.

PAINT ROCK CREEK NEAR BONANZA, WYO.

Location.—In the SE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 19, T. 49 N., R. 90 W., near the farmhouse of William Paumer, $1\frac{1}{2}$ miles from Bonanza post office and 12 miles from Manderson, Wyo.; about $1\frac{1}{2}$ miles above junction with No Wood River.

Records available.—July 28, 1910, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Chain gage on the right bank of the stream, directly in front of the house of the observer.

Channel.—Bed of stream rocky and clean, probably nonshifting.

Discharge measurements.—Made by wading at the gage at low and ordinary stages, and from the highway bridge, one-fourth mile below, in flood.

Winter flow.—Ice common at gaging station.

Diversions.—Water for irrigation is diverted above the station.

Discharge measurements of Paint Rock Creek near Bonanza, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 20	W. A. Lamb.....	3.47	173
June 25	R. Richards.....	3.77	289
Aug. 4	B. E. Jones.....	2.91	64
Oct. 30	.....do.....	2.85	61

Daily gage height, in feet, of Paint Rock Creek near Bonanza, Wyo., for 1911.

[V. Paumer, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1		2.57	2.48	5.45	3.30	2.62	2.24	2.81	2.80
2		2.57	2.48	5.60	3.40	2.63	2.20	2.84	2.80
3		2.61	2.41	4.90	3.20	2.72	2.22	2.90	2.74
4		2.61	2.38	5.00	3.10	2.94	2.22	2.92	2.91
5		2.67	2.29	5.35	3.10	3.00	2.24	2.91	2.91
6		2.67	3.25	4.80	3.10	3.00	2.31	2.94	2.84
7		2.59	3.30	4.75	3.05	3.25	2.32	3.00	2.80
8		2.60	3.90	5.00	3.00	3.10	2.34	2.92	2.80
9		2.39	4.40	4.70	2.91	3.00	2.34	2.92	2.81
10		2.39	4.35	4.40	2.90	2.81	2.34	2.84	
11		2.41	3.90	4.30	2.73	2.71	2.41	2.92	
12		2.49	3.40	4.90	2.63	2.64	2.42	2.81	
13	2.67	2.49	3.40	5.10	2.53	2.52	2.42	2.81	
14	2.67	2.47	3.70	5.10	2.51	2.54	2.52	2.73	
15	2.61	2.41	4.30	5.10	2.50	2.51	2.52	2.91	
16	2.60	2.37	5.10	5.60	2.44	2.44	2.52	2.82	
17	2.68	2.37	4.60	5.10	2.52	2.42	2.54	2.82	
18	2.59	2.38	4.30	4.50	2.62	2.40	2.61	2.90	
19	2.59	2.31	4.05	4.6	2.73	2.41	2.61	2.82	
20	2.59	2.31	3.60	4.85	2.80	2.34	2.52	2.84	
21	2.60	2.39	3.40	4.50	2.92	2.31	2.52	2.80	
22	2.60	2.39	3.45	4.30	2.80	2.31	2.54	2.82	
23	2.59	2.31	3.80	4.10	2.74	2.34	2.54	2.80	
24	2.59	2.31	3.80	4.00	2.72	2.40	2.60	2.94	
25	2.59	2.29	4.30	3.80	2.64	2.32	2.61	2.92	
26	2.59	2.27	5.00	3.55	2.62	2.30	2.70	2.92	
27	2.58	2.19	4.40	3.45	2.52	2.31	2.71	2.80	
28	2.51	2.27	3.90	3.30	2.51	2.34	2.71	2.90	
29	2.57	2.28	3.70	3.30	2.42	2.40	2.74	2.82	
30	2.51	2.48	4.10	3.20	2.44	2.31	2.81	2.81	
31	2.51		4.65		2.51	2.30		2.81	

Daily discharge, in second-feet, of Paint Rock Creek near Bonanza, Wyo., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1		31	24	890	140	35	11	54	53
2		31	24	950	165	36	10	58	53
3		34	19	670	120	44	11	66	46
4		34	17	710	100	72	11	69	68
5		39	13	850	100	82	11	67	68
6		39	130	630	100	82	14	72	58
7		32	140	612	91	130	14	82	53
8		33	280	710	82	100	15	69	53
9		17	490	595	68	82	15	69	54
10		17	472	490	66	54	15	58	
11		19	315	455	45	43	19	69	
12		24	165	670	36	37	19	54	
13	39	24	165	750	14	27	19	54	
14	39	23	250	750	26	28	27	45	
15	34	19	455	750	25	26	27	67	
16	33	16	750	950	21	21	27	56	
17	40	16	560	750	27	19	28	56	
18	32	17	455	525	35	18	34	66	
19	32	13	368	560	45	19	34	56	
20	32	13	220	650	53	15	27	58	
21	33	17	165	525	69	14	27	53	
22	33	17	178	455	53	14	28	56	
23	32	13	280	385	46	15	28	53	
24	32	13	280	350	44	18	33	72	
25	32	13	455	208	37	14	34	69	
26	32	12	710	205	35	13	42	69	
27	31	10	490	178	27	14	43	53	
28	26	12	315	140	26	15	43	66	
29	31	12	250	140	19	18	46	56	
30	26	24	385	120	21	14	54	54	
31	26		578		26	13		54	

NOTE.—Daily discharge determined from a rating curve fairly well defined. Daily discharge Mar. 1 to 12 estimated at 40 second-feet; Nov. 10 to 30, discharge estimated at 50 second-feet.

Monthly discharge of Paint Rock Creek near Bonanza, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	.....	.....	40	2,460	D.
February.....	.....	.....	40	2,220	D.
March.....	.....	.....	35.3	2,170	C.
April.....	39	10	21.1	1,260	B.
May.....	750	13	303	18,600	B.
June.....	950	120	556	33,100	B.
July.....	165	14	56.8	3,490	B.
August.....	130	13	36.5	2,240	B.
September.....	54	10	25.5	1,520	B.
October.....	82	45	61.3	3,770	B.
November.....	68	.....	51.9	3,090	C.
December.....	.....	.....	35	2,150	D.
The year.....	950	.....	105	76,100	

NOTE.—Means January, February, and December estimated.

GREYBULL RIVER NEAR MEETEETSE, WYO.

Location.—In the NW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 15, T. 48 N., R. 101 W., 300 feet from Wilson's house, about 5 miles from Meeteetse, Wyo., on the road to Sunshine & Wilson's mine.

Records available.—September 14, 1910, to December 31, 1910.

Drainage area.—Not measured.

Gage.—Staff gage fastened to south span of the middle pier on the upstream side of the bridge; datum unchanged.

Channel.—Bed of stream rocky.

Discharge measurements.—At flood stage made from the upstream side of the bridge; low-water measurements are made by wading either above or below the bridge.

Diversions.—Irrigation is carried on extensively by water diverted from this stream and its tributaries.

Discharge measurements of Greybull River near Meeteetse, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 26	W. A. Lamb.....	1.80	382
June 27	R. Richards.....	2.55	1,070
Aug. 6	B. E. Jones.....	1.33	366
7	.....do.....	1.33	361
Nov. 3	.....do.....	0.83	146

Daily gage height, in feet, and discharge, in second-feet, of Greybull River near Meeteetse, Wyo., for 1910.

[Katherine Wilson, observer.]

Day.	September.		October.		November.		December.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....			0.98	185	0.98	185	0.85	156
2.....			1.01	193	.96	180	.85	156
3.....			1.02	195	.94	176	.83	151
4.....			.98	185	.86	158	.82	149
5.....			.97	183	.78	141	.79	143
6.....			1.06	206	.96	180	.75	135
7.....			1.03	198	.91	168	.76	138
8.....			.99	188	.86	158	.82	149
9.....			.97	183	.79	143	.85	156
10.....			.97	183	.89	164	.88	162
11.....			.97	183	.87	160	.85	156
12.....			.97	183	.84	153	.86	158
13.....			.96	180	.82	149	.88	162
14.....	0.68	124	.97	183	.74	134	.90	166
15.....	.68	124	.97	183	.72	131	.94	176
16.....	.81	147	.96	180	.70	127	.96	180
17.....	1.30	280	1.01	193	.78	141	1.04	.....
18.....	.86	158	.99	188	.85	156	1.65	.....
19.....	.98	185	.97	183	.88	162	1.78	.....
20.....	.85	156	.78	141	.69	126	.98	.....
21.....	.88	162	.89	164	.75	136	.98	.....
22.....	2.34	839	.86	158	.70	127	3.00	.....
23.....	1.27	270	.90	166	.88	162	3.00	.....
24.....	1.06	206	.88	162	.85	156	2.68	.....
25.....	.98	185	.89	164	.80	145	3.00	.....
26.....	1.07	209	.99	188	.85	156	.....	.....
27.....	1.07	209	.92	171	.65	120	.....	.....
28.....	1.04	201	.98	185	.68	124	.....	.....
29.....	.98	185	1.02	195	.85	156	.....	.....
30.....	.98	185	1.00	190	.88	162	.....	.....
31.....			.96	180	.....	.....	.....	.....

NOTE.—Gage heights Mar. 12 to 14 and after Dec. 16, distorted by ice.

Daily gage height, in feet, of Greybull River near Meeteetse, Wyo., for 1911.

[Katherine Wilson, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		0.74	0.89	1.55	2.30	1.50	0.94	0.94	0.83	0.84
2.....		.74	.98	1.65	2.15	1.50	.96	.92	.84	.84
3.....		.74	.98	1.45	2.20	1.45	.96	.92	.83	.84
4.....		.76	.96	1.90	2.25	1.45	.95	.90	.86	.84
5.....		.76	.98	2.85	2.30	1.35	.97	.88	.88	.....
6.....		.75	1.65	2.90	2.30	1.38	.98	.88	.86	.....
7.....		.74	1.60	3.05	2.50	1.30	1.00	.88	.83	.....
8.....		.74	1.60	3.20	2.55	1.35	.98	.86	.82	.....
9.....		.76	1.95	3.00	2.00	1.35	.97	.86	.82	.....
10.....		.78	1.55	2.90	1.90	1.30	.96	.87	.82	.....
11.....		.76	1.55	2.95	1.90	1.30	.95	.86	.82	.....
12.....	1.25	.72	1.50	3.40	1.85	1.25	.97	.86	.82	.....
13.....	1.40	.65	1.50	4.85	1.85	1.20	.96	.86	.83	.....
14.....	1.60	.57	1.60	3.80	1.85	1.20	.96	.86	.86	.....
15.....	.98	.54	2.65	4.15	1.90	1.20	.96	.87	.86	.....
16.....	.85	.60	1.95	3.85	1.90	1.20	.95	.87	.86	.....
17.....	.88	.62	1.70	3.75	2.05	1.15	.97	.87	.86	.....
18.....	.88	.65	1.45	4.05	2.00	1.10	.96	.87	.88	.....
19.....	.94	.68	1.30	3.55	1.95	1.00	.96	.84	.90	.....
20.....	1.00	.71	1.25	3.50	2.80	.98	.95	.84	.94	.....
21.....	.98	.76	1.20	3.40	2.00	.98	.95	.86	.94	.....
22.....	.84	.73	1.65	3.20	2.05	.95	.96	.90	.96	.....
23.....	.85	.78	1.45	2.95	1.95	.95	.96	.88	.96	.....
24.....	.88	.75	1.90	2.90	1.80	.95	.97	.86	.96	.....
25.....	.76	.78	1.95	2.75	1.75	.92	.97	.84	.94	.....
26.....	.75	.81	2.05	2.55	1.70	.90	.96	.83	.94	.....
27.....	.68	1.00	1.85	2.50	1.70	.92	.95	.83	.88	.....
28.....	.65	.92	1.65	2.55	1.70	.94	.95	.84	.86	.....
29.....	.72	.96	1.85	2.50	1.65	.94	.94	.84	.86	.....
30.....	.72	.96	1.95	2.65	1.55	.92	.94	.83	.84	.....
31.....	.74	.....	2.05	.....	1.50	.90	.....	.83	.....	.....

Daily discharge, in second-feet, of Greybull River near Meeteetse, Wyo., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		134	164	378	855	355	176	176	151	153
2.....		134	185	425	732	355	180	171	153	153
3.....		134	185	336	770	336	180	171	151	153
4.....		138	180	565	812	336	178	166	158	153
5.....		138	185	1,340	855	298	183	162	162	.....
6.....		136	425	1,390	855	309	185	162	158	.....
7.....		134	400	1,520	1,030	280	190	162	151	.....
8.....		134	400	1,660	1,080	298	185	158	149	.....
9.....		138	595	1,480	625	298	183	158	149	.....
10.....		141	378	1,390	565	280	180	160	149	.....
11.....		138	378	1,440	565	280	178	158	149	.....
12.....		131	355	1,840	535	264	183	158	149	.....
13.....		120	355	3,140	535	247	180	158	151	.....
14.....		108	400	2,200	535	247	180	158	158	.....
15.....	185	105	1,160	2,520	565	247	180	160	158	.....
16.....	156	112	595	2,240	565	247	178	160	158	.....
17.....	162	115	450	2,160	660	232	183	160	158	.....
18.....	162	120	336	2,420	625	217	180	160	162	.....
19.....	176	124	280	1,980	595	190	180	153	166	.....
20.....	190	129	264	1,930	1,300	185	178	153	176	.....
21.....	185	138	247	1,840	625	185	178	158	176	.....
22.....	153	132	425	1,660	660	178	180	166	180	.....
23.....	156	141	336	1,440	595	178	180	162	180	.....
24.....	162	136	565	1,390	505	178	183	158	180	.....
25.....	138	141	595	1,260	472	171	183	153	176	.....
26.....	136	147	660	1,080	450	166	180	151	176	.....
27.....	124	190	535	1,030	450	171	178	151	162	.....
28.....	120	171	425	1,080	450	176	178	153	158	.....
29.....	131	180	535	1,030	425	176	176	153	158	.....
30.....	131	180	595	1,160	378	171	176	151	153	.....
31.....	134	.....	660	.....	355	166	.....	151	.....	.....

NOTE.—Daily discharge for 1910 and 1911 determined from a poorly defined rating curve.

Monthly discharge of Greybull River near Meeteetse, Wyo., for 1910-11.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
1910.					
September 14-30.....	889	124	228	7,690	C.
October.....	206	141	181	11,100	C.
November.....	185	120	151	8,990	C.
December.....	180	135	158	9,720	D.
1911.					
January.....			150	9,220	D. C. C. C. C. C. C. C.
February.....			140	7,780	
March.....	190	120	152	9,350	
April.....	190	105	137	8,150	
May.....	1,160	164	427	26,300	
June.....	3,140	336	1,510	89,800	
July.....	1,300	355	646	39,700	
August.....	355	166	239	14,700	
September.....	190	176	180	10,700	
October.....	176	151	159	9,780	
November.....	180	149	160	9,520	
December.....			140	8,600	
The year.....				244,000	

NOTE.—Discharge Dec. 17 to 31, 1910, estimated at 160 second-feet. Means for January, February, and December, 1911, estimated. Discharge Mar. 1 to 14, 1911, estimated at 150 second-feet.

WOOD RIVER NEAR MEETEETSE, WYO.

Location.—In the SE. $\frac{1}{4}$ sec. 22, T. 48 N., R. 101 W., on the highway bridge 800 feet above the junction of Wood and Meeteetse rivers, 9 miles from Meeteetse post office, on the road running west to the Pitchfork ranch.

Records available.—September 15, 1910, to December 31, 1911.

Gage.—Staff fastened to the wind brace on the north side of the bridge.

Channel.—Bed of stream, gravel.

Discharge measurements.—Made from the downstream side of bridge.

Winter flow.—Ice present during winter months.

Diversions.—A few ditches, all above the station, divert water from this stream.

Discharge measurements of Wood River near Meeteetse, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 26	W. A. Lamb.....	1.05	127
June 27	R. Richards.....	1.74	323
Aug. 6	B. E. Jones.....	1.24	148
Nov. 3	.....do.....	1.03	86
3	.....do.....	1.03	85

Daily gage height, in feet, and discharge, in second-feet, of Wood River near Meeteetse, Wyo., for 1910.

[Guinevere Irwin, observer.]

Day.	September.		October.		November.		December.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1.....			0.80	68	0.75	58	0.72	53
2.....			.85	79	.75	58	.70	49
3.....			.82	72	.75	58	.70	49
4.....			.81	70	.74	57	.70	49
5.....			.80	68	.74	57	.70	49
6.....			.81	70	.73	55	.70	49
7.....			.81	70	.73	55	.70	49
8.....			.78	64	.73	55	.70	49
9.....			.75	58	.72	53	.70	49
10.....			.75	58	.72	53	.70	49
11.....			.75	58	.73	55		
12.....			.74	57	.72	53		
13.....			.74	57	.72	53		
14.....			.73	55	.71	51		
15.....	0.78	64	.73	55	.71	51		
16.....	.82	72	.72	53	.71	51		
17.....	.85	79	.71	51	.71	51		
18.....	.84	77	.73	55	.71	51		
19.....	.84	77	.72	53	.72	53		
20.....	.85	79	.70	49	.73	55		
21.....	.84	77	.70	49	.71	51		
22.....	.95	102	.70	49	.72	53		
23.....	.90	90	.68	46	.72	53		
24.....	.85	79	.67	44	.70	49		
25.....	.85	79	.69	47	.70	49		
26.....	.84	77	.72	53	.71	51		
27.....	.80	68	.77	62	.71	51		
28.....	.78	64	.80	68	.75	58		
29.....	.80	68	.77	62	.75	58		
30.....	.78	64	.75	58	.75	58		
31.....			.77	62				

Daily gage height, in feet, of Wood River near Meeteetse, Wyo., for 1911.

[Guinevere Irwin, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		0.65	0.65	1.09	1.48	1.26	1.00	0.72	1.03
2.....		.65	.70	1.11	1.48	1.26	1.00	.89	1.04
3.....		.65	.68	1.09	1.46	1.21	1.00	.84	1.04
4.....		.60	.70	1.14	1.43	1.22	1.00	.86	1.03
5.....		.62	.76	1.19	1.48	1.21	1.02	.89	1.03
6.....		.61	.80	1.24	1.43	1.21	.99	.90	1.01
7.....		.64	.85	1.23	1.48	1.16	1.00	.89	1.01
8.....		.66	.85	1.24	1.48	1.16	1.00	.88	1.04
9.....		.60	.92	1.49	1.38	1.16	.95	.89	.99
10.....		.61	.86	1.09	1.28	1.16	.99	.88	.99
11.....		.61	.82	1.29	1.23	1.16	.98	.86	1.01
12.....		.60	.80	1.34	1.20	1.16	.97	.88	1.39
13.....		.59	.80	1.49	1.18	1.14	.99	.86	1.39
14.....		.65	.85	1.44	1.23	1.06	.95	.86	1.41
15.....		.66	1.10	2.39	1.28	1.06	.95	.85	1.41
16.....		.65	.90	2.14	1.36	1.06	.97	.84	1.59
17.....		.60	.90	2.39	1.46	1.04	.95	.85	1.58
18.....		.60	.82	2.49	1.38	1.01	.95	.86	1.39
19.....		.60	.80	2.29	1.48	1.01	.90	.85	1.14
20.....		.58	.80	2.19	1.53	1.01	.95	.86	.89
21.....		.58	.76	2.09	1.48	.98	.95	.93	.89
22.....		.58	.78	1.99	1.40	1.01	.87	.88	.94
23.....		.58	.76	1.89	1.43	1.00	.85	.84	.99
24.....		.59	.84	1.79	1.41	1.06	.90	.84	1.04
25.....		.58	.85	1.69	1.38	1.06	.90	.84	1.04
26.....	0.65	.65	1.05	1.59	1.36	1.06	.90	.81	.....
27.....	.72	.72	.95	1.59	1.38	1.06	.87	.84	.....
28.....	.75	.70	.90	1.79	1.28	1.06	.85	.86	.....
29.....	.65	.70	.90	1.59	1.26	1.06	.85	.89	.....
30.....	.65	.65	.90	1.59	1.26	1.06	.85	.92	.....
31.....	.65	.....	.95	.....	1.33	1.06	.....	.96	.....

NOTE.—Gage heights distorted by ice Nov. 12 to 25.

Daily discharge, in second-feet, of Wood River near Meeteetse, Wyo., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		41	41	138	228	153	80	28	88
2.....		41	49	142	228	153	80	58	90
3.....		41	46	138	221	138	80	48	90
4.....		33	49	150	210	141	80	52	88
5.....		36	60	162	228	138	85	58	88
6.....		35	68	177	210	138	78	60	82
7.....		39	79	174	228	123	80	58	82
8.....		43	79	177	228	123	80	56	90
9.....		33	95	256	193	123	70	58	78
10.....		35	81	138	159	123	78	56	78
11.....		35	72	192	124	123	76	52	82
12.....		33	68	202	135	123	74	56	.....
13.....		32	68	256	129	117	78	52	.....
14.....		41	79	239	144	95	70	52	.....
15.....		43	140	615	159	95	70	50	.....
16.....		41	90	506	186	95	74	48	.....
17.....		33	90	615	221	90	70	50	.....
18.....		33	72	665	193	82	70	52	.....
19.....		33	68	570	228	82	60	50	.....
20.....		30	68	520	246	82	70	52	.....
21.....		30	60	470	228	76	70	66	.....
22.....		30	64	426	200	82	54	56	.....
23.....		30	60	386	210	80	50	48	.....
24.....		32	77	346	204	95	60	48	.....
25.....		30	79	306	193	95	60	48	.....
26.....	41	41	128	266	186	95	60	42	.....
27.....	53	53	102	266	193	95	54	48	.....
28.....	58	49	90	346	159	95	50	52	.....
29.....	41	49	90	266	153	95	50	58	.....
30.....	41	41	90	266	153	95	50	64	.....
31.....	41	.....	102	.....	176	95	.....	72	.....

NOTE.—Daily discharge determined from fairly well defined rating curves applicable Sept. 15, 1910, to June 13, 1911, and June 19 to Nov. 11, 1911.

Monthly discharge of Wood River near Meeteetse, Wyo., for 1910-11.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
1910.					
September 15-30.....	102	64	76	2,410	B.
October.....	79	44	58.7	3,610	B.
November.....	58	49	53.8	3,200	B.
December.....	53		46.4	2,850	C.
1911.					
January.....			a 40	2,460	D.
February.....			a 35	1,940	D.
March.....			41.1	2,530	D.
April.....	53	30	37.2	2,210	B.
May.....	140	41	77.5	4,770	B.
June.....	665	138	313	18,600	B.
July.....	246	129	197	12,100	B.
August.....	153	76	108	6,640	B.
September.....	85	50	68.7	4,090	B.
October.....	72	28	53.2	3,270	B.
November.....	90	78	72.3	4,300	C.
December.....			a 50	3,070	D.
The year.....			91.1	66,000	.

a Estimated.

NOTE.—Discharge Dec. 11 to 31, 1910, estimated at 45 second-feet per day; Mar. 1 to 25, 1911, estimated at 40 second-feet; Nov. 12 to 30, 1911; estimated at 65 second-feet.

LITTLE BIGHORN RIVER NEAR WYOLA, MONT.

Location.—One-fourth mile below proposed headworks of Little Bighorn canal No. 3, in the N. $\frac{1}{2}$ SW. $\frac{1}{4}$ sec. 28, T. 8 S., R. 35 E., about 16 miles above the mouth of Lodge Grass Creek.

Records available.—September 7 to October 31, 1911.

Gage.—Overhanging chain gage on right bank.

Channel.—Practically permanent; bed of stream is composed of gravel and cobblestones.

Discharge measurements.—Made by wading at ford below the gage.

Winter flow.—Channel filled with ice during the winter months; winter gage heights are not reliable.

Diversion.—None.

The following discharge measurement was made by W. A. Lamb:

September 7, 1911: Gage height, 4.08 feet; discharge, 91 second-feet.

Daily gage height, in feet, of Little Bighorn River near Wyola, Mont., for 1911.

[Charles C. Dillon, observer.]

Day.	Sept.	Oct.	Day.	Sept.	Oct.	Day.	Sept.	Oct.
1.....		3.95	11.....	3.96	3.95	21.....	3.95	3.95
2.....		3.95	12.....	3.97	3.95	22.....	3.95	3.95
3.....		3.95	13.....	3.95	3.95	23.....	3.95	4.01
4.....		4.00	14.....	3.96	3.95	24.....	4.00	4.00
5.....		4.00	15.....	3.95	4.00	25.....	4.00	4.00
6.....		3.98	16.....	3.95	4.00	26.....	3.96	3.98
7.....	4.08	3.95	17.....	3.95	3.96	27.....	3.95	3.98
8.....	4.01	3.95	18.....	3.95	3.95	28.....	3.95	3.95
9.....	4.01	3.95	19.....	3.95	3.95	29.....	3.95	3.95
10.....	3.96	3.95	20.....	3.95	3.95	30.....	3.95	3.95
						31.....		3.95

LITTLE BIGHORN RIVER NEAR CROW AGENCY, MONT.

Location.—At the Chicago, Burlington & Quincy Railroad bridge 2 miles south of Crow Agency, Mont., in W. $\frac{1}{2}$ sec. 18, T. 3 S., R. 35 E., about 14 miles above the junction with Bighorn River.

Records available.—March 24, 1905, to June 30, 1906; September 7, 1911, to December 31, 1911.

Gage.—Vertical staff attached to downstream end of a pile bridge pier. The records from March 24, 1905, to June 30, 1906, were obtained from a standard chain gage attached to the upstream side of the railroad bridge at Crow Agency, about 2 miles farther downstream. No tributaries enter between these two points.

Channel.—Permanent, broken by the piers of the bridge. Bed of the stream is coarse gravel and cobblestones. Current is sluggish at the gage.

Discharge measurements.—Made from downstream side of the bridge; low-water measurements are made by wading at the ford about 75 feet above the bridge.

Winter flow.—Affected by ice, which forms at the control below the bridge.

Diversion.—None.

Discharge measurements of Little Bighorn River near Crow Agency, Mont., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
Sept. 5	W. A. Lamb.....	<i>Feet.</i> 4.0	<i>Sec.-ft.</i> 61
Nov. 17	do.....	(a)	100

^a Ice.

SHOSHONE RIVER AT CORBETT DAM, WYO.

Location.—In the NE. $\frac{1}{4}$ sec. 7, T. 53 N., R. 100 W., at the Corbett diversion dam, 8 miles below Cody, Wyo.

Records available.—April 20, 1908, to October 25, 1911.

Drainage area.—Not measured at this station; the drainage area above Cody is 1,400 square miles. Sage Creek, the only important tributary that enters between this station and Cody, drains only about 25 square miles.

Gage.—Forty feet above the crest of the dam; readings represent height of water above crest.

Determinations of discharge.—The discharge is computed by considering the dam as a weir and the sluice tunnel gates as submerged orifices. The dam is of reinforced concrete, of the buttressed type, having on the upstream side a deck $2\frac{1}{2}$ feet thick sloping 1 to 1 and supported by buttresses 2 feet thick spaced 14 feet on centers; it raises the low-water elevation of the river 10.2 feet; the length between abutments is 400 feet.

Cooperation.—Gage heights and gate openings furnished by the United States Reclamation Service.

The following discharge measurement was made by B. E. Jones at the highway bridge at Cody:

August 7, 1911: Gage height, 1.83 feet; discharge, 3,720 second-feet.

Daily gage height, in feet, of Shoshone River at Corbett dam, Wyo., for 1911.

[J. A. Fleming, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....	0.35	0.47	0.34	0.56	0.75	1.14	1.90	1.56	1.65	0.98
2.....	.36	.44	.35	.65	.70	1.17	1.90	1.84	1.64	.99
3.....	.46	.48	.35	.65	.69	1.21	1.88	1.84	1.61	.99
4.....	.41	.37	.37	.51	.68	1.20	1.88	1.84	1.60	.99
5.....	.45	.37	.39	.57	.72	1.32	1.90	1.85	1.58	.96
6.....	.51	.39	.39	.53	.80	1.37	1.88	1.85	1.56	.94
7.....	.46	.38	.40	.56	.82	1.20	1.88	1.85	1.55	.93
8.....	.37	.34	.43	.54	.85	1.29	1.88	1.83	1.56	.90
9.....	.35	.31	.44	.57	.89	1.36	1.88	1.84	1.55	.88
10.....	.46	.33	.35	.56	.92	1.38	1.88	1.84	1.53	.87
11.....	.38	.36	.42	.55	.90	1.40	1.87	1.83	1.50	.83
12.....	.46	.38	.35	.51	.88	1.40	1.88	1.81	1.46	.79
13.....	.54	.41	.37	.57	.84	1.43	1.88	1.82	1.44	.70
14.....	.78	.35	.41	.46	.89	1.46	1.88	1.80	1.43	.54
15.....	.60	.35	.44	.50	.90	1.53	1.87	1.80	1.43	.54
16.....	.43	.35	.46	.46	.90	1.59	1.87	1.79	1.43	.53
17.....	.41	.38	.48	.50	.90	1.63	1.88	1.79	1.41	.48
18.....	.43	.32	.56	.55	.90	1.67	1.88	1.77	1.33	.49
19.....	.39	.36	.45	.58	.90	1.70	1.87	1.75	1.30	.47
20.....	.39	.36	.51	.57	.93	1.73	1.90	1.74	1.28	.40
21.....	.40	.35	.57	.58	.92	1.75	1.87	1.74	1.27	.37
22.....	.32	.32	.62	.68	.93	1.78	1.87	1.74	1.20	.32
23.....	.32	.30	.63	.69	.93	1.80	1.80	1.72	1.09	.35
24.....	.45	.32	.65	.55	.92	1.80	1.77	1.71	1.05	.35
25.....	.41	.35	.63	.55	.90	1.80	1.73	1.71	1.04	.35
26.....	.41	.49	.55	.61	.94	1.84	1.67	1.71	1.04	.....
27.....	.41	.44	.50	.68	1.08	1.85	1.66	1.69	1.03	.....
28.....	.40	.36	.47	.72	1.11	1.83	1.65	1.69	1.02	.....
29.....	.40	.....	.56	.76	1.05	1.86	1.67	1.67	1.01	.....
30.....	.42	.....	.65	.77	1.05	1.87	1.60	1.66	1.00	.....
31.....	.46	.....	.52	.....	1.06	.....	1.60	1.66	.....	.....

Daily discharge, in second-feet, of Shoshone River and sluices at Corbett dam, Wyo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....	265	428	254	566	890	1,740	3,850	3,610	3,080	1,360
2.....	276	386	265	715	800	1,810	3,850	3,660	3,060	1,380
3.....	414	442	265	715	783	1,900	3,790	3,660	2,970	1,380
4.....	344	287	287	486	766	1,880	3,790	3,660	2,940	1,380
5.....	400	287	319	582	836	2,180	3,850	3,690	2,880	1,310
6.....	486	319	319	518	980	2,310	3,790	3,690	2,830	1,270
7.....	414	308	330	566	1,020	1,880	3,790	3,690	2,800	1,250
8.....	287	254	372	534	1,080	2,100	3,790	3,630	2,830	1,180
9.....	265	221	386	582	1,160	2,290	3,790	3,660	2,800	1,140
10.....	414	243	265	566	1,220	2,340	3,790	3,660	2,740	1,120
11.....	308	276	358	550	1,180	2,390	3,750	3,630	2,660	1,040
12.....	414	308	265	486	1,140	2,390	3,790	3,560	2,550	962
13.....	534	344	287	582	1,060	2,470	3,790	3,590	2,500	800
14.....	944	265	344	414	1,160	2,550	3,790	3,530	2,470	534
15.....	630	265	386	470	1,180	2,740	3,750	3,530	2,470	534
16.....	372	265	414	414	1,180	2,910	3,750	3,500	2,470	518
17.....	344	308	442	470	1,180	3,030	3,790	3,500	2,420	442
18.....	372	232	566	550	1,180	3,140	3,790	3,440	2,210	456
19.....	319	276	400	598	1,180	3,230	3,750	3,380	2,130	428
20.....	319	276	486	582	1,250	3,320	3,850	3,350	2,080	330
21.....	330	265	582	598	1,220	3,380	3,750	3,350	2,060	287
22.....	232	232	664	766	1,250	3,470	3,960	3,350	1,880	232
23.....	232	210	681	783	1,250	3,530	4,030	3,290	1,620	265
24.....	400	232	715	550	1,220	3,530	3,940	3,260	1,520	265
25.....	344	265	681	550	1,180	3,530	3,960	3,260	1,500	265
26.....	344	456	550	647	1,270	3,660	3,870	3,260	1,500	.....
27.....	344	386	470	766	1,590	3,690	3,840	3,200	1,470	.....
28.....	330	276	428	836	1,660	3,630	3,810	3,200	1,450	.....
29.....	330	.....	566	908	1,520	3,720	4,020	3,140	1,420	.....
30.....	358	.....	715	926	1,520	3,750	4,110	3,110	1,400	.....
31.....	414	.....	502	.....	1,540	.....	4,110	3,110	.....	.....

Monthly discharge of Shoshone River and sluices at Corbett dam, Wyoming, for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	944	232	380	23,400
February.....	456	210	297	16,500
March.....	715	254	438	26,900
April.....	926	414	609	36,200
May.....	1,660	766	1,180	72,600
June.....	3,750	1,740	2,820	168,000
July.....	4,110	3,750	3,850	237,000
August.....	3,690	3,110	3,460	213,000
September.....	3,080	1,400	2,290	136,000
October 1-25.....	1,380	232	805	39,900
The period.....				970,000

Daily discharge, in second-feet, of Corbett tunnel at Corbett dam, Wyoming, for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....			62	132	132	194		114
2.....			62	112	120	162		88
3.....			62	160	166	128		84
4.....			70	226	182	96		90
5.....			94	0	200	96	170	100
6.....			134	90	224	96	158	104
7.....	15		112	386	224	96	138	116
8.....	51		118	304	260	80	58	130
9.....	51		136	276	296	64	64	140
10.....	18		170	256	320	64	64	144
11.....			186	256	296	64	94	132
12.....			172	256	272	66	102	108
13.....			164	260	308	84	120	98
14.....			176	288	328	112	122	110
15.....			186	326	338	128	116	116
16.....			172	332	284	128	120	132
17.....			158	282	276	150	122	146
18.....	15		154	252	296	180	118	158
19.....	51	8	162	252	250	200	122	168
20.....	51	0	158	252	192	160	120	196
21.....	40	44	176	218	158	140	116	236
22.....		84	186	162	128	174	116	
23.....		68	186	142	128	220	110	
24.....		44	200	170	150	236	98	
25.....		44	206	142	194	214	88	
26.....		52	78	0	238	184	78	
27.....		84	34	58	252		66	
28.....		60	74	278	216		62	
29.....		44	108	236	174		94	
30.....		54	148	190	148		114	
31.....			154		180			

Monthly discharge of Corbett tunnel at Corbett dam, Wyoming, for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
March 7-10, 18-21.....	51	15	36.5	579
April 19-30.....	84	0	48.8	1,160
May.....	206	34	137	8,420
June.....	386	0	210	12,500
July.....	338	120	224	13,800
August 1-26.....	236	64	135	6,960
September 5-30.....	170	58	106	5,470
October 1-21.....	236	84	129	5,370

NOTE.—No records available for Aug. 27 to Sept. 4 and after Oct. 21. Daily discharges were computed considering the gate openings as submerged orifices. Considering the uncertainties involved in the method of computation, the accuracy of the above monthly means is not better than "C."

SOAP CREEK NEAR ST. XAVIER, MONT.

Location.—One-fourth mile above the headworks of Soap Creek ditch, in the W. $\frac{1}{4}$

NW. $\frac{1}{4}$ sec. 2, T. 6 S., R. 32 E., about 11 miles southeast of St. Xavier, Mont.

Records available.—September 11 to November 11, 1911.

Drainage area.—Not measured.

Gage.—An overhanging chain gage on the left bank about 100 feet above the ford.

Channel.—Permanent; bed of stream is gravel and sand at gage and firm gravel and cobblestones at the control 50 feet below the gage.

Discharge measurements.—Made by wading at the ford 100 feet below the gage.

Winter flow.—Stream frozen during the winter months; winter gage heights of no value.

Diversion.—None above gage.

The following discharge measurement was made by W. A. Lamb:

September 11, 1911: Gage height, 3.05 feet; discharge, 13 second-feet.

Daily gage height, in feet, of Soap Creek near St. Xavier, Mont., for 1911.

[W. G. Wanett, observer.]

Day.	Sept.	Oct.	Nov.	Day.	Sept.	Oct.	Nov.	Day.	Sept.	Oct.	Nov.
1.....	3.11	.....	11.....	3.05	.....	2.95	21.....	.....	3.15	.....
2.....	12.....	.....	.....	.....	22.....	3.08	.....	.....
3.....	13.....	.....	.....	.....	23.....	.....	.....	.....
4.....	3.14	14.....	3.08	3.15	.....	24.....	3.12	.....	.....
5.....	15.....	.....	.....	.....	25.....	.....	.....	.....
6.....	16.....	3.10	.....	.....	26.....	3.10	.....	.....
7.....	17.....	.....	.....	.....	27.....	.....	.....	.....
8.....	18.....	3.10	.....	.....	28.....	3.12	2.98	.....
9.....	19.....	.....	.....	.....	29.....	.....	.....	.....
10.....	20.....	3.10	.....	.....	30.....	.....	.....	.....

ROTTENGRASS CREEK NEAR ST. XAVIER, MONT.

Location.—One-fourth mile above the crossing of the Bighorn canal, in the SW $\frac{1}{4}$

SW. $\frac{1}{4}$ sec. 31, T. 4 S., R. 33 E.; about 4 miles southeast of St. Xavier, Mont.

Records available.—September 9 to November 11, 1911.

Gage.—Overhanging chain gage on left bank.

Channel.—Liable to change; bed of stream is composed of sand and silt. The channel is deep and the current sluggish for several hundred feet above and below the gage.

Discharge measurements.—Made by wading above the gage.

Winter flow.—Channel freezes during the winter months; winter gage heights of no value.

Diversions.—None.

The following discharge measurement was made by W. A. Lamb:

September 9, 1911: Gage height, 2.29 feet; discharge, 0.3 second-foot

Daily gage height, in feet, of Rottengrass Creek at St. Xavier, Mont., for 1911.

[W. H. Broadbent, observer.]

Day.	Sept.	Oct.	Nov.	Day.	Sept.	Oct.	Nov.	Day.	Sept.	Oct.	Nov.
1				11			3.15	21		2.97	
2				12	2.61	2.98		22			
3		2.70		13		2.97		23			
4				14	2.53	2.96		24	2.32	3.02	
5				15				25			
6		2.97		16	2.47	3.37		26			
7				17		3.18		27	2.30	3.10	
8				18		3.10		28			
9		2.96		19		3.23		29			
10		2.96		20		2.98		30		3.18	
								31			

LOGDEGRASS CREEK NEAR LOGDEGRASS, MONT.

Location.—Above road crossing one-fourth mile above headworks of Lodgegrass ditch, in the SW. $\frac{1}{4}$ sec. 29, T. 6 N., R. 35 E., about 6 miles southwest of Lodgegrass, Mont.

Records available.—September 9 to December 31, 1911.

Drainage area.—Not measured.

Gage.—Overhanging chain gage on left bank, 50 feet above the road crossing.

Channel.—Permanent at control below the gage. Bed of stream is composed of mud and silt at the gage, but of firm gravel and cobblestones at the ford below the gage. Current sluggish at gage at low stages.

Discharge measurements.—Made by wading at the ford below the gage.

Winter flow.—Stream freezes over during winter months; winter gage heights of no value.

Diversion.—None.

The following discharge measurement was made by W. A. Lamb:
September 8, 1911; Gage height, 3.22 feet; discharge, 16 second-feet.

TONGUE RIVER BASIN.

TONGUE RIVER NEAR DAYTON, WYO.

Location.—At the edge of the Bighorn National Forest, in the NE. $\frac{1}{4}$ sec. 11, T. 56 N., R. 87 W., 3 miles southwest of Dayton; $3\frac{1}{4}$ miles below the mouth of Sheep Creek.

Records available.—October 24 to December 16, 1911. From May 3 to October 31, 1903, a station was maintained at Dayton.

Drainage area.—214 square miles (measured from topographic sheets).

Gage.—Vertical staff.

Channel.—Apparently permanent.

Discharge measurements.—Made from highway bridge 2 miles below station during high water, and by wading at the gage at ordinary stages.

Winter flow.—Ice causes some backwater during the winter months.

Diversions.—The only diversion above the station is a log flume which heads 15 miles above. One hundred feet below the station is the intake for the Highline Community ditch. Prior to July 1, 1912, there were adjudicated diversions from Tongue River amounting to 213 second-feet in Wyoming.

Accuracy.—Owing to a lack of discharge measurements no estimates of flow have been made.

Cooperation.—Station is maintained in cooperation with the United States Forest Service.

The following discharge measurement was made by H. B. Waha:
October 24, 1911: Gage height, 1.50 feet; discharge, 63 second-feet.

Daily gage height, in feet, of Tongue River near Dayton, Wyo., for 1911.

[H. E. Anderson, observer.]

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....			1.5	11.....				21.....		1.5	
2.....			1.4	12.....				22.....		1.4	
3.....				13.....			1.4	23.....			
4.....			1.4	14.....			1.4	24.....	1.5	1.4	
5.....			1.4	15.....			1.4	25.....	1.6		
6.....			1.4	16.....			1.4	26.....			
7.....			1.4	17.....				27.....			
8.....			1.4	18.....				28.....		a 2.0	
9.....			1.4	19.....				29.....		a 2.0	
10.....				20.....		1.5		30.....		1.5	
								31.....			

a Ice caused backwater.

TONGUE RIVER AT CARNEYVILLE, WYO.

Location.—At the highway bridge at Carneyville, Wyo., about 2 miles above the mouth of Big Goose Creek.

Records available.—May 25, 1911, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Standard chain gage on highway bridge.

Channel.—Believed to be permanent; bed of stream is composed of gravel and cobblestones.

Discharge measurements.—Made from bridge at high stages and by wading at low and medium stages.

Winter flow.—Gage heights affected by ice during the winter months.

Diversion.—See Tongue River near Dayton, Wyo.

Discharge measurements of Tongue River at Carneyville, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 5	W. A. Lamb.....	3.44	285
June 17	R. Richards.....	3.82	436
July 31	B. E. Jones.....	2.77	82
Sept. 7	R. Richards.....	2.70	73
Nov. 18a	W. A. Lamb.....	3.15	84

a Ice conditions.

Daily gage height, in feet, of Tongue River at Carneyville, Wyo., for 1911.

[John Bone, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1....		4.2	3.2	2.85	2.7	2.75	2.85	16....	4.15	3.95	2.75	2.7	2.7	2.95	3.15
2....		4.2	3.05	2.8	2.7	2.85	2.85	17....	3.65	3.7	2.8	2.7	2.7	2.85	3.35
3....		4.0	3.15	2.8	2.7	2.85	2.9	18....	3.7	3.65	2.85	2.7	2.75	2.95	3.05
4....		4.0	3.0	2.8	2.65	2.85	2.9	19....	3.6	3.65	2.8	2.6	2.9	2.9	3.15
5....		4.1	3.0	3.1	2.75	2.85	2.85	20....	3.5	3.5	2.85	2.5	2.95	2.8	3.1
6....		3.9	2.9	2.9	2.65	2.85	2.85	21....	3.45	3.4	2.85	2.5	2.9	2.8	3.05
7....		3.8	2.85	2.85	2.7	2.85	2.85	22....	3.6	3.4	2.85	2.7	2.9	2.9	3.0
8....		3.85	2.85	2.9	2.95	2.8	2.85	23....	3.55	3.65	2.8	2.65	2.9	2.9	3.0
9....		3.75	2.85	2.9	2.8	2.8	2.75	24....	3.6	3.45	2.8	2.8	2.95	2.85	3.0
10....		3.7	2.85	2.85	2.7	2.85	2.95	25....	3.65	3.3	2.8	2.8	2.9	2.95	2.95
11....		3.6	2.8	2.85	2.65	2.8	3.05	26....	3.85	3.35	2.75	2.65		2.9	3.0
12....		3.6	2.85	2.9	2.6	2.75	3.2	27....	3.75	3.35	2.6	2.7		2.65	2.9
13....		3.5	2.85	2.9	2.5	3.05	3.25	28....	3.65	3.2	2.6	2.7		2.7	3.05
14....		3.6	2.8	2.9	2.55	2.85	3.25	29....	3.65	3.05	2.65	2.7		2.8	3.1
15....	3.7	3.85	2.85	2.7	2.6	3.0	3.25	30....	3.7	3.0	2.65	2.65		2.75	3.25
								31....	3.7		2.7	2.7		2.85	

NOTE.—Gage heights distorted by ice Nov. 10 to 30.

Daily discharge, in second-feet, of Tongue River at Carneyville, Wyo., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1....	200	603	200	101	72	81	101	16....	580	490	81	72	72	125	.....
2....	220	603	153	90	72	101	101	17....	365	384	90	72	72	101	.....
3....	240	513	184	90	72	101.	112	18....	384	365	101	72	81	125	.....
4....	260	513	138	90	65	101	112	19....	345	365	90	58	112	112	.....
5....	285	558	138	168	81	101	101	20....	307	307	101	49	125	90	.....
6....	295	468	112	112	65	101	101	21....	288	270	101	49	112	90	.....
7....	305	425	101	101	72	101	101	22....	345	270	101	72	112	112	.....
8....	315	446	101	112	125	90	101	23....	326	365	90	65	112	112	.....
9....	325	404	101	112	90	90	81	24....	345	288	90	90	125	101	.....
10....	335	384	101	101	72	101	.....	25....	365	234	90	90	112	125	.....
11....	345	345	90	101	65	90	.....	26....	446	252	81	65	107	112	.....
12....	355	345	101	112	58	81	.....	27....	404	252	58	72	102	65	.....
13....	365	307	101	112	49	153	.....	28....	365	200	58	72	97	72	.....
14....	375	345	90	112	54	101	.....	29....	365	153	65	72	92	90	.....
15....	384	446	101	72	58	138	.....	30....	384	138	65	65	87	81	.....
								31....	384	.....	72	72	.....	101	.....

NOTE.—Daily discharge determined from a rating curve fairly well defined between 60 and 500 second-feet; discharge estimated May 1 to 4, May 6 to 14, and Sept. 26 to 30.

Monthly discharge of Tongue River at Carneyville, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	580	200	342	21,000	C.
June.....	603	138	368	21,900	C.
July.....	200	58	101	6,210	C.
August.....	168	49	86.9	5,340	C.
September.....	125	49	86.3	5,140	C.
October.....	153	65	101	6,210	C.
November.....	112	75	82.9	4,930	C.
December.....			α 50	3,070	C.
The period.....				73,800	

α Estimated.

NOTE.—Estimated discharge Nov. 10 to 30, 75 second-feet.

GOOSE CREEK AT SHERIDAN, WYO.

Location.—At footbridge in city park at Sheridan, Wyo.

Records available.—From April 10, 1896, to August 1, 1897, and from May 14 to December 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff attached to under pier of the footbridge. The gage readings from April 10, 1896, to August, 1897, were made from a gage at the Fifth Avenue Bridge, below the mouth of Little Goose Creek.

Channel.—Practically permanent; bed of stream is composed of gravel and cobblestones.

Discharge measurements.—Made from the footbridge at high stages and by wading at low stages.

Winter flow.—Gage heights during winter months are affected by ice at the gage.

Diversion.—During the irrigation season the greater part of the flow is diverted for irrigation above the gage. About 7,500 acre-feet of water are stored in the mountains on the headwaters of the stream and diverted in the Little Goose Creek drainage area. There are also a number of smaller diversions into the Little Goose Creek drainage area after the stream leaves the mountains. The records at the station show the amount of water that is not used in the Big Goose drainage basin.

Discharge measurements of Goose Creek at Sheridan, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 14	W. A. Lamb.....	4.06	131
June 16	R. Richards.....	5.02	493
July 31	B. E. Jones.....	2.95	5.5
Sept. 10	R. Richards.....	3.20	3.20
Nov. 18 ^a	W. A. Lamb.....	3.55	38

^a Ice conditions.*Daily gage height, in feet, of Goose Creek at Sheridan, Wyo., for 1911.*

[H. A. Loucks, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1....		4.50	3.19	3.06	3.00	3.26	3.35	16....	4.60	5.10	2.88	3.07	3.12	3.32	3.60
2....		4.80	3.20	3.04	2.99	3.26	3.50	17....	4.80	4.80	2.86	3.05	3.19	3.38	3.54
3....		5.00	3.32	3.28	2.98	3.30	3.49	18....	4.60	4.32	2.85	3.05	3.17	3.37	3.51
4....		4.70	3.44	3.24	3.02	3.26	3.43	19....	4.46	4.45	2.87	3.08	3.20	3.32	3.46
5....		4.80	3.12	3.48	3.06	3.30	3.38	20....	4.42	4.37	2.88	3.10	3.24	3.42	3.46
6....		4.70	3.18	3.62	3.15	3.28	3.42	21....	4.38	4.50	2.88	2.96	3.26	3.31	3.41
7....		4.35	3.28	3.43	3.20	3.29	3.40	22....	4.42	4.38	2.84	2.90	3.24	3.26	3.40
8....		4.50	3.28	3.40	3.36	3.22	3.40	23....	4.14	4.18	2.88	2.88	3.25	3.27	3.46
9....		4.60	3.15	3.40	3.24	3.20	3.38	24....	4.02	4.11	3.20	2.94	3.26	3.44	3.40
10....		4.60	3.18	3.42	3.20	3.19	3.42	25....	4.00	4.04	3.30	3.02	3.22	3.48	.....
11....		4.20	3.14	3.40	3.19	3.20	3.60	26....	4.26	3.90	3.30	3.00	3.25	3.50	.....
12....		4.17	3.10	3.34	3.14	3.20	3.60	27....	4.34	3.64	3.32	3.01	3.16	3.30	.....
13....		4.42	3.05	3.38	3.09	3.28	3.65	28....	4.09	3.55	3.32	3.02	3.20	3.27	.....
14....	4.05	4.65	2.91	3.18	3.16	3.36	3.66	29....	3.94	3.39	3.26	3.00	3.23	3.34	.....
15....	4.45	5.05	2.92	3.10	3.14	3.27	3.68	30....	4.02	3.24	3.15	3.00	3.30	3.42	.....
								31....	4.23	.....	2.98	3.00	.....	3.44	.....

NOTE.—Gage heights distorted by ice after Nov. 11.

Daily discharge, in second-feet, of Goose Creek at Sheridan, Wyo., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1....		255	17	16	8.0	22	29	16....	295	530	3.6	11	13	27	.....
2....		380	18	9.6	7.6	22	43	17....	380	380	3.2	10	17	31	.....
3....		480	27	24	7.2	25	42	18....	295	196	3.0	10	16	31	.....
4....		335	37	21	8.8	22	36	19....	241	238	3.4	11	18	27	.....
5....		380	13	41	10	25	31	20....	227	211	3.6	12	21	35	.....
6....		335	17	58	15	24	35	21....	214	255	3.6	6.4	22	26	.....
7....		205	24	36	18	24	33	22....	227	214	2.8	4.0	21	22	.....
8....		255	24	33	30	19	33	23....	150	160	3.6	3.6	22	23	.....
9....		295	15	33	21	18	31	24....	123	142	18	5.6	22	37	.....
10....		295	17	35	18	17	35	25....	119	127	25	8.8	19	41	.....
11....		165	14	33	17	18	.....	26....	180	101	25	8.0	22	43	.....
12....		158	17	28	14	18	.....	27....	202	61	27	8.4	16	25	.....
13....		227	10	31	12	24	.....	28....	138	49	27	8.8	18	23	.....
14....	130	315	4.4	17	16	30	.....	29....	109	32	22	8.0	19	28	.....
15....	238	505	4.8	12	14	23	.....	30....	123	21	15	8.0	25	35	.....
								31....	172	.....	7.2	8.0	.....	37	.....

NOTE.—Daily discharge determined from a fairly well defined rating curve.

Monthly discharge of Goose Creek at Sheridan, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May 14-31.....	380	119	198	7,080	B.
June.....	530	21	243	14,500	B.
July.....	37	2.8	14.6	898	B.
August.....	58	3.6	17.8	1,080	B.
September.....	30	7.2	16.9	1,010	B.
October.....	43	17	26.5	1,630	B.
November.....	43	29	31.6	1,880	C.
December.....			<i>a</i> 25	1,540	D.
The period.....				29,600	

a Estimated.

NOTE.—Discharge Nov. 11 to 30 estimated at 30 second-feet.

LITTLE GOOSE CREEK AT SHERIDAN, WYO.

Location.—At the footbridge about 200 yards above the point where the stream parallels the Chicago, Burlington & Quincy Railroad and about one-fourth mile above the junction with Goose Creek at Sheridan, Wyo.

Records available.—May 1, 1896, to August 1, 1897; May 14 to December 31, 1911.

Gage.—A staff attached to the downstream end of the right abutment of the footbridge. The gage read from May 1, 1896, to August 1, 1897, was at the Broadway Bridge, 600 feet below the site of the present gage.

Channel.—Liable to shift; bed of stream is composed of sand and gravel.

Discharge measurements.—Made from the downstream side of the footbridge; low-water measurements are made by wading.

Winter flow.—Stream freezes solid at the control below gage.

Diversions.—During the irrigation season, from May to September, the greater part of the stream is diverted for irrigation above the station. The records at this point show the amount of water that is not being used for irrigation.

Accuracy.—Results for 1911 are believed to be good. The shifting character of the channel may affect future results.

Discharge measurements of Little Goose Creek at Sheridan, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 14	W. A. Lamb.....	2.75	3.2
June 16	R. Richards.....	3.42	86
July 31	E. E. Jones.....	2.65	1.10
Sept. 10	R. Richards.....	2.72	2.9
Nov. 18 ^a	W. A. Lamb.....	3.55	36

a Ice conditions.

Daily gage height, in feet, of Little Goose Creek at Sheridan, Wyo., for 1911.

[W. E. Hammontree, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1....		2.85	2.72	2.70	2.80	2.98	3.00	16....	3.40	3.45	2.62	2.82	2.75	3.00	3.50
2....		2.95	2.72	2.65	2.80	3.00	3.02	17....	3.25	3.10	2.62	2.85	2.80	3.00	3.50
3....		2.85	2.65	2.70	2.80	3.00	3.02	18....	3.15	2.95	2.70	2.82	2.85	3.00	3.50
4....		2.80	2.62	2.65	2.80	3.00	3.02	19....	3.08	2.90	2.75	2.75	2.90	3.00	3.45
5....		2.70	2.62	2.65	2.80	3.00	3.02	20....	2.98	2.80	2.72	2.70	2.90	3.02	3.40
6....		2.80	2.60	2.80	2.88	3.00	3.02	21....	2.90	2.85	2.70	2.70	2.90	3.00	3.40
7....		2.65	2.70	2.80	2.80	3.00	3.02	22....	2.80	2.90	2.70	2.70	2.90	3.00	3.40
8....		2.70	2.65	2.80	2.80	3.00	3.05	23....	2.75	2.85	2.70	2.80	2.90	3.00	3.40
9....		2.65	2.75	2.70	2.78	3.00	3.05	24....	2.70	2.70	2.70	2.75	2.90	3.00	.....
10....		2.65	2.62	2.70	2.78	3.00	3.05	25....	2.85	2.60	2.70	2.80	2.90	3.00	.....
11....		2.60	2.65	2.90	2.78	3.00	3.05	26....	3.00	2.65	2.70	2.80	2.92	3.00	.....
12....		2.60	2.65	2.90	2.80	3.00	3.05	27....	3.10	2.62	2.70	2.75	3.00	3.00	.....
13....		2.60	2.65	2.88	2.80	3.00	3.05	28....	3.05	2.66	2.70	2.80	2.95	3.00	.....
14....	2.75	2.60	2.65	2.88	2.75	3.00	3.05	29....	2.85	2.65	2.62	2.80	2.98	3.00	.....
15....	3.06	3.00	2.62	2.90	2.72	3.00	3.42	30....	2.70	2.65	2.62	2.80	2.98	3.00	.....
								31....	2.70	.....	2.60	2.80	.....	3.00	.....

NOTE.—Gage heights distorted by ice after Nov. 14.

Daily discharge, in second-feet, of Little Goose Creek at Sheridan, Wyo., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1....		9.0	2.7	1.9	6.0	20	22	16....	82	92	0.4	7.2	4.0	22	.....
2....		17	2.7	1.0	6.0	22	24	17....	56	34	.4	9.0	6.0	22	.....
3....		9.0	1.0	1.9	6.0	22	24	18....	41	17	1.9	7.2	9.0	22	.....
4....		6.0	.4	1.0	6.0	22	24	19....	32	12	4.0	4.0	12	22	.....
5....		1.9	.4	1.0	6.0	22	24	20....	20	6.0	2.7	1.9	12	24	.....
6....		6.0	.0	6.0	11	22	24	21....	12	9.0	1.9	1.9	12	22	.....
7....		1.0	1.9	6.0	6.0	22	24	22....	6.0	12	1.9	1.9	12	22	.....
8....		1.9	1.0	6.0	6.0	22	28	23....	4.0	9.0	1.9	6.0	12	22	.....
9....		1.0	4.0	1.9	5.2	22	28	24....	1.9	1.9	1.9	4.0	12	22	.....
10....		1.0	.4	1.9	5.2	22	28	25....	9.0	.0	1.9	6.0	12	22	.....
11....		.0	1.0	12	5.2	22	28	26....	22	1.0	1.9	6.0	14	22	.....
12....		.0	1.0	12	6.0	22	28	27....	34	.4	1.9	4.0	22	22	.....
13....		.0	1.0	11	6.0	22	28	28....	28	1.1	1.9	6.0	17	22	.....
14....	4.0	.0	1.0	11	4.0	22	28	29....	9.0	1.0	.4	6.0	20	22	.....
15....	29	22	.4	12	2.7	22	.....	30....	1.9	1.0	.4	6.0	20	22	.....
								31....	1.9	.....	.0	6.0	.....	22	.....

NOTE.—Daily discharge determined from a fairly well defined rating curve.

Monthly discharge of Little Goose Creek at Sheridan, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May 14-31.....	82	1.9	21.9	782	C.
June.....	92	.0	9.11	542	C.
July.....	4.0	.0	1.43	87.9	C.
August.....	12	1.0	5.47	336	C.
September.....	22	2.7	6.65	397	C.
October.....	24	20	22.0	1,350	C.
November.....	28	22	25.4	1,510	D.
December.....			a 15	922	
The period.....				5,390	

a Estimated.

NOTE.—Discharges Nov. 15 to 30 estimated at 25 second-feet.

POWDER RIVER BASIN.

SOUTH FORK OF POWDER RIVER NEAR KAYCEE, WYO.

Location.—At Z. W. French's ranch, about 7 miles southeast of Kaycee, Wyo.

Records available.—May 11 to December 31, 1911.

Gage.—An overhanging chain gage on left bank of the stream opposite the ranch buildings.

Channel.—Liable to change; bed composed of gravel and sand.

Discharge measurements.—Made by wading near the gage.

Winter records.—Gage heights are affected by ice during the winter months. The stream freezes solid at times.

Diversion.—Small diversions for irrigation are made above the stations.

Accuracy.—On account of the shifting channel results are only fair.

Discharge measurements of South Fork of Powder River near Kaycee, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Fect.</i>	<i>Sec.-ft.</i>
May 11	W. A. Lamb	5.88	110
June 20	R. Richards	5.39	30
Sept. 8	do.	4.60	1.5

Daily gage height, in feet, of South Fork of Powder River near Kaycee, Wyo., for 1911.

[Z. W. French, observer.]

Day.	May.	June.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	Aug.	Sept.	Oct.	Nov.
1		5.0	6.3		8.5	4.9	16	5.3			4.8	5.05	5.2
2		5.0	6.1		5.95	4.9	17	5.3			4.8	5.0	5.5
3		5.0	6.4		5.3	5.2	18	5.2			4.8	5.1	5.3
4		5.0	5.4		5.1	5.0	19	5.3			4.8	5.1	
5		5.9	7.1		5.0	5.0	20	5.2	5.4		4.8	4.9	
6		5.9			5.0	5.0	21	5.2	5.4		4.8	4.9	
7		5.7			5.0	5.0	22	5.2	5.0		4.8	4.9	
8		5.6		4.6	5.0	5.0	23	5.2	5.0		4.8	4.9	
9		5.5		4.6	5.0	5.3	24	5.2	0.0		4.9	4.9	
10		5.3		4.6	4.9	5.1	25	5.1	0.0		4.9	4.95	
11	5.8	5.2		4.6	4.9	5.0	26	5.0	0.0		4.9	4.95	
12	5.6			4.6	4.9	5.0	27	5.0	0.0		4.9	4.9	
13	5.4			4.7	4.9	5.0	28	5.0	0.0		4.9	4.9	
14	5.2			4.7	5.0	5.2	29	5.0	0.0		4.9	4.9	
15	5.5			4.7	5.5	5.1	30	5.0	0.0		4.9	4.9	
							31	5.0				4.9	

MIDDLE FORK OF POWDER RIVER AT KAYCEE, WYO.

Location.—At highway bridge at Kaycee, Wyo.

Records available.—May 11 to December 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff attached to the middle pier of the highway bridge.

Channel.—Permanent at control but shifting at gage. The bed of the stream is composed of gravel and cobblestones. Current sluggish at low water.

Discharge measurements.—Made from bridge at high stages and by wading at low stages.

Winter flow.—Gage heights during the winter months are affected by ice.

Diversion.—The greater part of the flow is diverted above the gage during the irrigation season.

Discharge measurements of Middle Fork of Powder River at Kaycee, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 10	W. A. Lamb.....	4.10	365
11	do.....	3.55	162
June 20	R. Richards.....	3.13	64
July 29	B. E. Jones.....	2.77	7.6
Sept. 8	R. Richards.....	3.06	45

Daily gage height, in feet, of Middle Fork of Powder River at Kaycee, Wyo., for 1911.

[P. A. Gatchell, jr., observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1....	.....	3.4	3.0	2.95	3.0	3.4	3.25	16....	3.65	3.7	2.8	3.0	3.0	3.1	.....
2....	.....	3.4	3.0	2.9	3.0	3.2	3.25	17....	3.5	3.35	2.8	3.0	3.0	3.2	.....
3....	.....	3.4	2.95	2.9	3.0	3.2	3.3	18....	3.45	3.3	2.8	3.0	3.05	3.2	.....
4....	.....	3.4	2.95	2.85	3.0	3.15	3.3	19....	3.45	3.2	2.8	3.0	3.05	3.2	.....
5....	.....	3.4	2.9	2.8	3.0	3.1	3.2	20....	3.45	3.1	2.8	3.0	3.05	3.15	.....
6....	.....	3.35	2.9	4.0	3.2	3.1	3.2	21....	3.5	3.1	2.8	3.0	3.1	3.1	.....
7....	.....	3.3	2.9	3.9	3.1	3.1	3.2	22....	3.5	3.2	2.8	3.0	3.1	3.1	.....
8....	.....	3.3	2.9	3.1	3.05	3.2	3.2	23....	3.5	3.1	2.8	3.0	3.1	3.15	.....
9....	.....	3.2	2.9	3.1	3.0	3.1	3.2	24....	3.5	3.1	2.8	3.05	3.1	3.15	.....
10....	.....	3.2	2.85	3.1	3.0	3.1	3.15	25....	3.5	3.15	2.8	3.05	3.1	3.15	.....
11....	.....	3.2	2.85	3.1	3.0	3.1	3.15	26....	3.5	3.1	2.8	3.05	3.1	3.15	.....
12....	3.5	3.15	2.85	3.0	3.0	3.1	.....	27....	3.5	3.1	2.8	3.05	3.1	3.2	.....
13....	3.5	3.1	2.8	3.0	3.0	3.1	.....	28....	3.5	3.1	2.8	3.0	3.1	3.2	.....
14....	3.48	3.0	2.8	3.0	3.0	3.1	.....	29....	3.45	3.0	2.8	3.0	3.1	3.2	.....
15....	3.7	3.2	2.8	3.0	3.0	3.2	.....	30....	3.45	3.0	2.8	3.0	3.1	3.2	.....
								31....	3.45	.....	3.1	3.0	.....	3.2	.....

Daily discharge, in second-feet, of Middle Fork of Powder River at Kaycee, Wyo., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1....	.....	120	36	29	36	120	84	16....	194	210	10	36	36	53	.....
2....	.....	120	36	22	36	73	84	17....	147	108	10	36	36	73	.....
3....	.....	120	29	22	36	73	95	18....	134	95	10	36	44	73	.....
4....	.....	120	29	16	36	63	95	19....	134	73	10	36	44	73	.....
5....	.....	120	22	10	36	53	73	20....	134	53	10	36	44	63	.....
6....	.....	108	22	325	73	53	73	21....	147	53	10	36	53	53	.....
7....	.....	95	22	285	53	53	73	22....	147	73	10	36	53	53	.....
8....	.....	95	22	53	44	73	73	23....	147	53	10	36	53	63	.....
9....	.....	73	22	53	36	53	73	24....	147	53	10	44	53	63	.....
10....	.....	73	16	53	36	53	63	25....	147	63	10	44	53	63	.....
11....	.....	73	16	53	36	53	63	26....	147	53	10	44	53	63	.....
12....	147	63	16	36	36	53	.....	27....	147	53	10	44	53	73	.....
13....	147	53	10	36	36	53	.....	28....	147	53	10	36	53	73	.....
14....	142	36	10	36	36	53	.....	29....	134	36	10	36	53	73	.....
15....	210	73	10	36	36	73	.....	30....	134	36	10	36	53	73	.....
								31....	134	.....	53	36	.....	73	.....

NOTE.—Daily discharge determined from a well-defined rating curve.

Monthly discharge of Middle Fork of Powder River at Kaycee, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	210	134	144	8,850	B.
June.....	210	36	80.2	4,770	A.
July.....	53	10	16.8	1,030	A.
August.....	325	10	54.0	3,320	A.
September.....	73	36	44.5	2,650	A.
October.....	120	53	64.8	3,980	A.
November.....	95	50	60.0	3,570	C.
The period.....				28,200	

NOTE.—Discharge May 1 to 11 estimated at 135 second-feet. Nov. 12 to 30 estimated at 50 second-feet.

NORTH FORK OF POWDER RIVER NEAR KAYCEE, WYO.

Location.—At Jacob Affalter's ranch, on the county road 4 miles north of Kaycee, Wyo.

Records available.—May 11 to December 31, 1911.

Drainage area.—Not measured.

Gage.—An overhanging chain gage on the left bank one-fourth mile above the highway bridge. From May 11 to July 28, 1911, the gage was located 200 feet farther upstream and at a different datum. It was moved because it was within the influence of backwater from beaver dams.

Channel.—Practically permanent. The bed of the stream at the point of control below the gage is composed of permanent gravel and cobblestones, but at the gage it is composed of sand and gravel and is liable to shift during high stages.

Discharge measurements.—Made from the highway bridge one-fourth mile below the gage at high stages and by wading near the gage at low and medium stages.

Winter flow.—Gage heights are affected by ice during the winter months. The channel water is frozen solid at times.

Diversions.—During the irrigation season the greater part of the flow of the stream is diverted above the station.

Accuracy.—Fair. Gage heights before July 28 were affected by backwater from a beaver dam below the gage. After July 28 the records are considered good.

Discharge measurements of North Fork of Powder River near Kaycee, Wyo., for 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 11	W. A. Lamb.....	4.72	45
June 20	R. Richards.....	4.08	6.8
July 29 ^a	B. E. Jones.....	3.25	0.92
Sept. 8 ^a	R. Richards.....	3.51	12.9

^a New gage 300 feet below old station.

Daily gage height, in feet, of North Fork of Powder River near Kaycee, Wyo., for 1911.

[Jacob Affalter, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		4.50	4.00	3.80	3.32	4.30	3.70	16....	5.45	4.15	4.00	3.32	3.30	3.58	3.90
2.....		4.45	4.15	3.40	3.32	4.00	3.70	17....	4.81	4.20	4.00	3.35	3.30	3.60	3.90
3.....		4.42	4.10	3.30	3.35	4.00	3.75	18....	4.66	4.20	4.00	3.30	3.30	3.68	3.90
4.....		4.36	4.08	3.30	3.35	3.80	3.85	19....	4.54	4.15	4.00	3.35	3.30	3.70	3.90
5.....		4.35	4.00	3.30	3.35	3.70	3.85	20....	4.55	4.10	4.05	3.40	3.30	3.70	3.90
6.....		4.08	4.05	3.40	3.35	3.60	3.82	21....	4.54	4.10	4.00	3.40	3.30	3.70	3.90
7.....		3.95	4.00	3.30	3.30	3.60	3.80	22....	4.50	4.10	4.00	3.40	3.30	3.70	3.90
8.....		3.88	4.00	3.30	3.30	3.60	3.80	23....	4.54	4.00	.....	3.32	3.30	3.70	3.85
9.....		3.85	4.05	3.20	3.30	3.60	3.80	24....	4.50	4.00	.....	3.35	3.40	3.70	3.85
10.....		3.85	4.00	3.20	3.30	3.60	3.70	25....	4.45	4.00	.....	3.32	3.45	3.70	3.80
11.....	4.72	4.06	4.00	3.30	3.30	3.58	3.80	26....	4.50	4.00	.....	3.35	3.45	3.70	3.80
12.....	4.52	4.10	4.00	3.30	3.30	3.58	3.90	27....	4.58	4.10	.....	3.38	3.45	3.68	3.80
13.....	4.50	3.98	4.00	3.30	3.30	3.58	3.90	28....	4.60	4.10	3.25	3.30	3.60	3.68	3.80
14.....	4.51	4.08	4.00	3.40	3.30	3.58	3.85	29....	4.58	4.05	3.25	3.30	3.60	3.68	3.80
15.....	5.18	4.15	4.00	3.30	3.30	3.58	3.85	30....	4.78	4.00	3.30	3.30	3.60	3.70	3.80
								31....	4.56	.....	4.00	3.32	.....	3.70	.....

CLEAR CREEK NEAR BUFFALO, WYO.

Location.—In the Bighorn National Forest, at Camp Comfort, in the SW. $\frac{1}{4}$ sec. 8, T. 50 N., R. 83 W., 11 miles west of Buffalo; three-fourths of a mile below the junction of the North and South forks.

Records available.—October 22, to December 31, 1911. From May 1, 1896, to March 11, 1900, a station was maintained by the State engineer at a point 4 miles west of Buffalo, where a measuring flume was built. From October 24, 1902, to December 31, 1904, a station was maintained at Buffalo. The records at the two points are not directly comparable, as a number of irrigation ditches divert water between and a few intermittent tributaries enter.

Drainage area.—110 square miles (measured from topographic sheets.)

Gage.—Vertical staff.

Channel.—Data too meager to determine.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—There are no diversions above the station and the records at this point represent the natural run-off. Below the station, however, there were adjudicated diversions amounting to 333 second-feet prior to July 1, 1912.

Accuracy.—Owing to a lack of discharge measurements no estimates of flow have been made.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

The following discharge measurement was made by H. B. Waha.

October 22, 1911: Gage height, .90 feet; discharge, 26 second-feet.

Daily gage height, in feet, of Clear Creek near Buffalo, Wyo., for 1911.

[A. Hettinger, observer.]

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....				11.....				21.....			
2.....				12.....		.90		22.....		.95	
3.....			.96	13.....				23.....			
4.....				14.....				24.....			1.30
5.....		.88		15.....				25.....			
6.....				16.....				26.....		1.05	
7.....				17.....			1.60	27.....			
8.....				18.....				28.....			
9.....				19.....		1.00		29.....		.80	
10.....			1.00	20.....				30.....			
								31.....			1.00

NOTE.—Ice caused backwater Nov. 5 to Dec. 31.

CLEAR CREEK AT BUFFALO, WYO.

Location.—At concrete bridge at Buffalo, Wyo.

Records available.—May, 1896, to March 11, 1900; October 24, 1902, to November 30, 1904; May 8 to December 31, 1911. The records from May, 1896, to March 11, 1900, were obtained at a point 4 miles above Buffalo. All records since November 30, 1904, have been obtained at Buffalo.

Drainage area.—Not measured.

Gage.—Staff; set at a different datum from the gage used October 24, 1902, to November 30, 1904, but approximately the same site.

Channel.—Practically permanent; bed of stream is composed of cobblestones and firm gravel.

Discharge measurements.—Made from bridge at high stages and by wading at low stages.

Winter flow.—Gage heights affected by ice during the winter months.

Diversions.—The flow of the stream is appropriated and a large part is diverted for irrigation above the gage.

Discharge measurements of Clear Creek at Buffalo, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 8	W. A. Lamb.....	1.90	55
June 21	Raymond Richards.....	2.49	178
July 30	B. E. Jones.....	1.28	12.6
Sept. 9	Raymond Richards.....	1.22	12.8

Daily gage height, in feet, of Clear Creek at Buffalo, Wyo., for 1911.

[John H. Rice, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		2.8	1.4	1.3	1.25	1.2	1.15	16....	2.85	3.4	1.45	1.2	1.25	1.15	
2.....		3.0	1.3	1.35	1.25	1.25	1.25	17....	2.65	2.85	1.75	1.25	1.2	1.2	
3.....		2.55	1.2	1.35	1.2	1.2	1.15	18....	2.45		1.7	1.3	1.15	1.05	
4.....		2.5	1.2	1.4	1.25	1.15	1.15	19....	2.15	2.5	1.4	1.3	1.2	1.2	
5.....		2.5	1.2	1.35	1.2	1.2	1.3	20....	1.95	2.55	1.55	1.25	1.15		
6.....		2.4	1.2	1.4	1.25	1.2	1.3	21....	1.9	2.6	1.45	1.25	1.15		
7.....		2.35	1.1	1.4	1.2	1.25	1.3	22....	1.8	2.5	1.5	1.3	1.2		
8.....	1.9	2.6	1.2	1.4	1.25	1.2	1.3	23....	1.8	2.3	1.55	1.25	1.15	1.15	
9.....	2.2	2.45	1.2	1.35	1.2	1.25		24....	1.95	2.2	1.45	1.3	1.2	1.15	
10....	2.2	2.3	1.15	1.35	1.2	1.2		25....	2.2	2.0	1.4	1.25	1.15	1.2	
11....	1.95	2.2	1.2	1.4	1.25	1.15		26....	2.5	1.9	1.4	1.3	1.2	1.2	
12....	1.85	2.3	1.15	1.35	1.2	1.2		27....	2.4	1.75	1.3	1.25	1.15		
13....	1.9	2.7	1.2	1.3	1.25	1.15		28....	2.1	1.6	1.3	1.3	1.2		
14....	2.05	2.8	1.25	1.3	1.2	1.15		29....	1.9	1.5		1.25	1.15		
15....	3.35	3.3	1.35	1.3	1.2	1.2		30....	1.9	1.3	1.3	1.3	1.15		
								31....	2.0		1.3	1.25		1.25	

NOTE.—Gage heights distorted by ice Nov. 5 to 8.

Daily discharge, in second-feet, of Clear Creek at Buffalo, Wyo., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1....		285	18	14	12	10	8.5	16....	302	505	20	10	12	8.5	.....
2....		355	14	16	12	12	12	17....	232	302	40	12	10	10	.....
3....		198	10	16	10	10	8.5	18....	165	241	36	14	8.5	5.5	.....
4....		180	10	18	12	8.5	8.5	19....	91	180	18	14	10	6.0	.....
5....		180	10	16	10	10	.....	20....	60	198	26	12	8.5	7.0	.....
6....		150	10	18	12	10	.....	21....	54	215	20	12	8.5	7.0	.....
7....		138	7	18	10	12	.....	22....	44	180	23	14	10	8.0	.....
8....	54	215	10	18	12	10	.....	23....	44	125	26	12	8.5	8.5	.....
9....	101	165	10	16	10	12	.....	24....	60	101	20	14	10	8.5	.....
10....	101	125	8.5	16	10	10	.....	25....	101	66	18	12	8.5	10	.....
11....	60	101	10	18	12	8.5	.....	26....	180	54	18	14	10	10	.....
12....	49	125	8.5	16	10	10	.....	27....	150	40	14	12	8.5	10	.....
13....	54	250	10	14	12	8.5	.....	28....	81	29	14	14	10	10	.....
14....	74	285	12	14	10	8.5	.....	29....	54	23	14	12	8.5	11	.....
15....	485	465	16	14	10	10	.....	30....	54	14	14	14	8.5	11	.....
								31....	66	.....	14	12	.....	12	.....

Monthly discharge of Clear Creek at Buffalo, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	485	44	98.9	6,080	C.
June.....	505	14	183	10,900	B.
July.....	40	7	16.1	990	B.
August.....	18	10	14.4	885	B.
September.....	12	8.5	10.1	601	B.
October.....	12	5.5	9.45	581	B.
November.....	.....	.....	a 8.00	476	D.
December.....	.....	.....	a 6.00	369	D.
The period.....	.....	.....	.....	20,900	

a Estimated.

NOTE.—Discharge May 1 to 7 estimated at 50 second-feet.

NOTE.—Daily discharge determined from a fairly well defined rating curve; discharge interpolated for days on which gage heights are missing.

PINEY CREEK AT KEARNEY, WYO.

Location.—At highway bridge 300 yards south of the post office at Kearney, Wyo.

Records available.—September 6, 1902, to June 30, 1906; May 13 to December 31, 1911.

Drainage area.—Not measured.

Gage.—Chain gage on highway bridge. The gage used from September 6, 1902, to June 30, 1906, was at the same site but at a different datum.

Channel.—Liable to change; bed composed of gravel and cobblestones. Current swift at high and medium stages.

Discharge measurements.—At high stages measurements are made from the bridge and at low stages by wading.

Diversions.—The greater part of the flow of this stream during the irrigation season is diverted for irrigation above the gage.

Discharge measurements of Piney Creek at Kearney, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 13	W. A. Lamb.....	2.10	84
June 18	R. Richards.....	2.05	93
July 27	B. E. Jones.....	1.52	20
Sept. 9	R. Richards.....	1.37	17.8

Daily gage height, in feet, of Piney Creek at Kearney, Wyo., for 1911.

[Mrs. R. D. Noyce, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1....		3.15	1.70	1.67	1.22	1.30	1.68	16....	3.15	3.00	1.42	1.38	1.30	1.28	.....
2....		3.00	1.68	1.61	1.22	1.32	1.62	17....	3.00	2.45	1.42	1.38	1.30	1.30	.....
3....		2.75	1.70	1.74	1.22	1.32	1.60	18....	2.75	2.20	1.65	1.38	1.30	1.30	.....
4....		2.75	1.58	1.71	1.19	1.30	1.60	19....	2.55	2.15	1.62	1.36	1.30	1.30	.....
5....		2.70	1.55	1.71	1.17	1.30	1.60	20....	2.52	2.30	1.62	1.36	1.30	1.30	.....
6....		2.45	1.55	1.69	1.25	1.30	1.60	21....	2.38	2.30	1.60	1.33	1.30	1.25	.....
7....		2.28	1.55	1.69	1.27	1.30	1.65	22....	2.32	2.15	1.60	1.30	1.30	1.25	.....
8....		2.45	1.52	1.69	1.27	1.30	1.70	23....	2.20	2.00	1.55	1.33	1.30	1.75	.....
9....		2.55	1.50	1.67	1.30	1.30	.....	24....	2.40	1.95	1.50	1.33	1.30	1.65	.....
10....		2.20	1.50	1.54	1.30	1.25	.....	25....	2.50	1.85	1.50	1.33	1.30	1.65	.....
11....		1.95	1.42	1.54	1.25	1.20	.....	26....	2.75	1.75	1.50	1.33	1.30	1.65	.....
12....		2.10	1.40	1.49	1.30	1.20	.....	27....	2.50	1.65	1.50	1.32	1.30	1.65	.....
13....		2.21	1.40	1.44	1.30	1.20	.....	28....	2.45	1.70	1.42	1.29	1.30	1.60	.....
14....	2.40	2.28	1.40	1.40	1.30	1.20	.....	29....	2.35	1.70	1.40	1.27	1.30	1.60	.....
15....	3.55	2.37	1.40	1.38	1.30	1.30	.....	30....	2.35	1.62	1.42	1.27	1.32	1.60	.....
								31....	2.50	.....	1.58	1.22	.....	1.60	.....

Daily discharge, in second-feet, of Piney Creek at Kearney, Wyo., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1....		395	39	36	8.8	12	37	16....	395	330	18	16	12	11	.....
2....		330	37	31	8.8	13	32	17....	330	160	18	16	12	12	.....
3....		240	39	43	8.8	13	30	18....	240	110	34	16	12	12	.....
4....		240	29	40	7.6	12	30	19....	182	100	32	15	12	12	.....
5....		225	26	40	6.8	12	30	20....	175	130	32	15	12	12	.....
6....		160	26	38	10	12	30	21....	146	130	30	14	12	10	.....
7....		126	26	38	11	12	34	22....	134	100	30	12	12	10	.....
8....		160	24	38	11	12	39	23....	110	74	26	14	12	44	.....
9....		182	23	36	12	12	.....	24....	150	68	23	14	12	34	.....
10....		110	23	26	12	10	.....	25....	170	55	23	14	12	34	.....
11....		68	18	26	10	8	.....	26....	240	44	23	14	12	34	.....
12....		90	17	22	12	8	.....	27....	170	34	23	13	12	34	.....
13....		112	17	19	12	8	.....	28....	160	39	18	12	12	30	.....
14....	150	126	17	17	12	8	.....	29....	140	39	17	11	12	30	.....
15....	598	144	17	16	12	12	.....	30....	140	32	18	11	13	30	.....
								31....	170	.....	29	9	.....	30	.....

NOTE.—Daily discharge determined from a rating curve that is fairly well defined below 150 second-feet.

Monthly discharge of Piney Creek at Kearney, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May 14-31.....	598	110	211	7,530	C.
June.....	395	32	138	8,210	B.
July.....	39	17	24.0	1,530	B.
August.....	43	9	22	1,350	B.
September.....	13	6.8	11.2	666	B.
October.....	44	8	17.5	1,080	B.
November 1-8.....	39	30	32.8	520	B.
The period.....				20,900	

LITTLE MISSOURI RIVER BASIN.

LITTLE MISSOURI RIVER NEAR ALZADA, MONT.

Location.—At Walker's ranch, 2 miles below the mouth of Thompson Creek, near the southwest corner of T. 8 N., R. 60 E., 300 yards below a proposed dam site and 4 miles below Alzada, Mont. Alzada is most conveniently reached by stage or by automobile from Belle Fourche, S. Dak.

Records available.—April 30, 1904, to November 30, 1906; June 18 to December 31, 1911.

Drainage area.—About 780 square miles.

Gage.—Vertical staff on left bank.

Channel.—May shift during high water. Stream, sluggish; banks cut 5 to 15 feet in the sandy soil.

Discharge measurements.—At ordinary stages made by wading; at flood stages must be measured by making one measurement of the Little Missouri from the bridge at Alzada and one of Thompson Creek from the bridge 2 miles above its mouth, and adding the results.

Winter flow.—Probably affected by ice.

The following discharge measurement was made by Mahon and Heidel:

June 18, 1911: Gage height, 0.6 foot; discharge estimated, 1.5 second-feet.

Daily gage height, in feet, of Little Missouri River near Alzada, Mont., for 1911.

[John Walker, observer.]

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		0.55	—0.25	0.6	0.45	0.55	0.7	16.....		0.05	0.7	2.45	0.35	0.55	0.6
2.....		.55	— .25	.6	.45	.5	.7	17.....		.05	.6	1.25	.3	.55	.65
3.....		.5	— .25	.55	.5	.5	.7	18.....	0.6	.0	.55	1.0	.3	.6	.65
4.....		.5	— .25	.55	.5	.55	.7	19.....	.6	.0	3.8	.9	1.1	.65	.65
5.....		.45	— .25	.5	.45	.6	.65	20.....	.5	— .05	3.95	.75	.9	.7	
6.....		.4	— .25	.5	.5	.6	.6	21.....	.5	— .05	3.15	.7	.85	.7	.65
7.....		.4	— .25	.7	.45	.55	.55	22.....	.9	— .1	1.45	.6	.8	.7	.7
8.....		.3	2.75	.7	.45	.5	.5	23.....	.95	— .1	1.1	.6	.7	.7	.7
9.....		.3	3.1	.75	.45	.55	.5	24.....	.8	— .15	1.0	.55	.6	.75	.7
10.....		.3	1.45	.75	.45	.55	.6	25.....	.6	— .2	1.1	.55	.6	.75	.7
11.....		.2	1.2	.9	.45	.55	.6	26.....	.5	— .2	1.05	.5	.6	.7	.7
12.....		.2	.8	.8	.45	.55	.6	27.....	.8	— .2	.9	.45	.55	.7	.7
13.....		.2	.6	.7	.45	.55	.6	28.....	.7	— .2	.75	.5	.55	.7	.7
14.....		.1	1.0	1.6	.4	.55	.6	29.....	.7	— .2	.65	.5	.55	.7	.7
15.....		.1	.8	2.4	.35	.55	.6	30.....	.6	— .25	.65	.45	.55	.7	.7
								31.....		— .25	.65		.55		.7

NOTE.—Gage height Nov. 18 to Dec. 31 distorted by ice.

KNIFE RIVER BASIN.

KNIFE RIVER NEAR BRONCHO, N. DAK.

Location.—At C. D. Smith's ranch, in the SE. $\frac{1}{4}$ sec. 4, T. 142 N., R. 90 W., at the former site of the post office of Broncho; the present post office is about 6 miles from the old site. Spring Creek enters about 15 miles below the station and Elm Creek one-half mile above.

Records available.—May 29, 1903, to December 31, 1911.

Drainage area.—1,260 square miles; the drainage area at the present site is practically the same as at the original site, 2 miles farther downstream, the area at the lower point being perhaps 5 square miles greater.

Gage.—Chain, on left bank just below observer's house; datum unchanged since March 23, 1905, when the station was moved from the original site about 2 miles farther downstream.

Channel.—Practically permanent.

Discharge measurements.—At high stages made from car and cable 500 feet below gage; at low stages by wading.

Winter flow.—Affected by ice.

Accuracy.—Sufficient discharge measurements at high stages have not yet been made to satisfactorily check the rating curve.

Discharge measurements of Knife River near Broncho, N. Dak., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
Apr. 8	J. W. Bliss.....	<i>Feet.</i> 3.76	<i>Sec.-ft.</i> 21
Aug. 16	E. F. Chandler.....	3.90	26

Daily gage height, in feet, of Knife River near Broncho, N. Dak., for 1911.

[C. D. Smith, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		3.9	3.8	4.7	4.1	3.4	3.5	3.5
2.....		4.0	3.7	4.45	4.5	3.4	3.5	3.5
3.....		4.0	3.7	7.6	3.9	3.5	3.5	3.5
4.....		4.2	3.7	6.5	3.8	3.6	3.5	3.5
5.....		4.2	3.6	7.4	3.8	3.5	4.2	3.5
6.....		4.4	3.6	5.3	3.8	3.5	5.5	3.5
7.....		4.4	3.6	4.7	3.8	3.5	5.1	3.5
8.....		4.3	3.6	4.3	3.8	5.1	5.0	3.5
9.....		4.3	3.6	4.1	3.7	4.4	5.7	3.5
10.....		4.3	3.6	4.0	3.6	4.7	5.8	3.5
11.....		4.0	3.6	4.0	3.5	4.7	5.2	3.5
12.....		3.9	3.6	4.0	3.4	4.8	4.9	3.5
13.....		3.9	3.5	4.0	3.4	4.4	4.4	3.8
14.....		4.2	3.5	4.0	3.3	4.4	4.1	3.7
15.....		4.3	3.5	4.0	3.3	4.7	4.1	3.7
16.....		4.1	3.5	3.9	3.3	.....	4.0	3.6
17.....		3.9	3.5	3.9	3.3	4.8	3.9	3.6
18.....		3.9	3.4	4.0	3.3	4.9	3.9	3.8
19.....		3.9	3.4	4.0	3.3	4.4	3.8	4.0
20.....	5.9	3.9	3.4	3.9	3.3	3.8	3.6	4.0
21.....	6.0	3.9	3.4	3.7	3.3	3.7	3.6	3.8
22.....	6.4	3.9	3.4	3.7	3.3	3.5	3.6	3.7
23.....	5.2	3.8	3.5	3.7	3.3	3.5	3.6	3.6
24.....	5.2	3.8	3.9	4.45	3.3	3.5	3.6	3.6
25.....	4.8	3.8	3.9	3.75	3.3	3.5	3.6	3.6
26.....	4.6	3.8	3.8	3.7	3.3	3.5	3.5	3.6
27.....	4.5	3.9	3.7	3.7	3.3	3.5	3.5	3.6
28.....	4.3	3.9	3.5	3.7	3.3	3.5	3.5	3.6
29.....	4.3	3.8	3.5	3.6	3.3	3.5	3.5	3.6
30.....	4.1	3.8	3.9	3.6	3.3	3.5	3.5	3.6
31.....	4.0	.....	4.0	.....	3.3	3.5	.....	3.6

Daily discharge, in second-feet, of Knife River near Broncho, N. Dak., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		31	24	119	40	4	7	7
2.....		39	18	86	82	4	7	7
3.....		39	18	641	25	7	7	7
4.....		58	18	411	19	10	7	7
5.....		58	13	597	19	7	49	7
6.....		80	13	197	19	7	230	7
7.....		80	13	108	19	7	166	7
8.....		69	13	59	19	166	151	7
9.....		69	13	40	14	70	264	7
10.....		69	13	32	10	108	282	7
11.....		39	13	32	7	108	181	7
12.....		31	13	32	4	122	136	7
13.....		31	9	32	4	70	70	19
14.....		58	9	32	2	70	40	14
15.....		69	9	32	2	108	40	14
16.....		48	9	25	2	115	32	10
17.....		31	9	25	2	122	25	10
18.....		31	6	32	2	136	25	19
19.....		31	6	32	2	70	19	32
20.....	316	31	6	25	2	19	10	32
21.....	335	31	6	14	2	14	10	19
22.....	411	31	6	14	2	7	10	14
23.....	194	24	9	14	2	7	10	10
24.....	194	24	31	76	2	7	10	10
25.....	133	24	31	16	2	7	10	10
26.....	105	24	24	14	2	7	7	10
27.....	92	31	18	14	2	7	7	10
28.....	69	31	9	14	2	7	7	10
29.....	69	24	9	10	2	7	7	10
30.....	48	24	31	10	2	7	7	10
31.....	39	.....	39	.....	2	7	.....	10

NOTE.—Daily discharge determined from rating curves as follows: Mar. 20 to June 2, curve poorly defined; June 3 to Oct. 31 (1905 to 1910 curve), fairly well defined.

Monthly discharge of Knife River near Broncho, N. Dak., for 1911.

[Drainage area, 1,260 square miles.]

Month.	Discharge in second-feet.				Run-off		Accu- racy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....			5.0	0.0040	0.005	307	
February.....			4.0	.0032	.003	222	
March.....	411		83.1	.066	.08	5,110	C.
April.....	80	24	42.0	.033	.04	2,500	C.
May.....	31	6	14.8	.012	.01	910	C.
June.....	641	10	92.8	.074	.08	5,520	B.
July.....	82	2	10.2	.0081	.009	627	B.
August.....	166	4	45.6	.036	.04	2,800	B.
September.....	282	7	61.1	.048	.05	3,640	B.
October.....	32	7	11.5	.0091	.01	707	B.
November.....			8.0	.0064	.007	476	
December.....			5.0	.0040	.005	307	
The year.....			31.9	.025	.34	23,100	

NOTE.—Means for January, February, November, and December estimated; discharge Mar. 1 to 15 estimated at 30 second-feet.

HEART RIVER BASIN.

HEART RIVER NEAR RICHARDTON, N. DAK.

Location.—In or near sec. 21, T. 138 N., R. 92 W., about 11 miles south of Richardton, opposite the observer's house, which is 1 mile below the highway bridge at which the station was formerly maintained.

Records available.—May 18, 1903, to September 30, 1911.

Drainage area.—1,250 square miles.

Gage.—Readings in 1911, up to September 4, were obtained from a staff gage set in the margin of the channel at the ford about 30 rods above observer's house and about 1 mile below the highway bridge. This staff gage and the chain gage at the highway bridge were found to give identical readings until about May 15, when slides into the river below the highway bridge caused the gage heights at highway bridge to be worthless. On September 4, 1911, an overhanging chain gage was installed opposite the observer's house, its zero being set so that a reading of 3.3 on the rod gage 30 rods above is 23.3 on the chain gage. On account of a beaver dam below the gage, readings during October are uncertain.

Channel.—Not permanent.

Discharge measurements.—At high stages, made from bridge; at ordinary and low stages, by wading.

Winter flow.—Affected by ice.

Accuracy.—Sufficient high and medium stage measurements have not yet been made to define the upper part of the rating curve.

Discharge measurements of Heart River near Richardton, N. Dak., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Fect.</i>	<i>Sec.-ft.</i>
Apr. 9	J. W. Bliss	a 3.90	29.2
Aug. 14	E. F. Chandler	3.49	2.0
Sept. 4	.....do.....	b 3.27	0.05
		c 23.27	
a Ice present.		b From old staff gage.	c From new chain gage.

Daily gage height, in feet, of Heart River near Richardton, N. Dak., for 1911.

[W. F. Church, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....		4.1	3.8	4.0	3.8	3.3	3.3
2.....		4.0	3.8	3.9	3.8	3.3	3.3
3.....		4.0	3.8	3.9	3.7	3.3	3.3
4.....		4.0	3.8	4.5	3.7	3.4	^a 23.3
5.....		4.0	3.7	5.4	3.6	3.4	23.35
6.....		3.9	3.7	4.7	3.6	4.0	23.4
7.....		3.9	3.7	4.45	3.5	3.9	23.4
8.....		3.9	3.7	4.3	3.5	3.9	23.4
9.....		3.9	3.7	4.1	3.5	3.8	23.65
10.....	4.6	3.8	3.7	4.1	3.5	3.8	23.95
11.....	4.7	3.9	3.7	4.0	3.5	3.7	23.82
12.....	4.8	3.9	3.7	4.0	3.4	3.6	24.25
13.....	4.8	4.0	3.7	3.9	3.4	3.6	24.28
14.....	4.9	4.0	3.7	3.9	3.4	3.6	24.28
15.....	5.0	4.1	3.7	3.9	3.4	3.6	24.18
16.....	5.1	4.1	3.8	3.9	3.4	3.5	24.10
17.....	5.2	4.0	3.8	3.8	3.4	3.5	24.00
18.....	5.3	4.0	3.8	3.8	3.3	3.5	24.00
19.....	5.7	4.0	3.8	3.8	3.3	3.5	23.95
20.....	5.0	3.9	3.8	3.8	3.3	3.5	23.90
21.....	4.9	3.9	3.8	3.8	3.3	3.4	23.85
22.....	4.5	3.9	3.9	3.7	3.3	3.4	23.80
23.....	4.5	3.9	4.0	3.7	3.3	3.4	23.72
24.....	4.5	3.9	3.9	3.7	3.3	3.4	23.70
25.....	4.5	3.9	3.9	3.7	3.3	3.4	23.70
26.....	4.6	3.9	3.9	3.6	3.3	3.4	23.65
27.....	4.6	3.9	3.9	3.6	3.3	3.4	23.65
28.....	4.5	3.9	3.9	3.6	3.3	3.4	23.60
29.....	4.5	3.9	3.8	3.5	3.3	3.3	23.60
30.....	4.2	3.8	3.8	4.0	3.3	3.3	23.55
31.....	4.1		3.8		3.3	3.3	

^a New gage Sept. 3, 1911.

CANNONBALL RIVER BASIN.

CANNONBALL RIVER NEAR STEVENSON, N. DAK.

Location.—On the west side of the river near the south side of sec. 23, T. 133 N., R. 82 W., at M. H. Burdick's house, immediately above the ford, about 1 mile southeast of the Stevenson schoolhouse and about 5 miles above Timmer, N. Dak. This station is about 1 mile above the gage at the old Stevenson station, at which observations are still occasionally made.

Records available.—June 10, 1903, to November 30, 1908; August 9 to December 31, 1911.

Drainage area.—3,670 square miles.

Gages.—Standard chain on projecting cantilever timber; a temporary rod gage on the left bank was used until the chain gage was ready.

Channel.—Bed of stream composed of gravel and stones, in places covered with silt to the depth of 1 foot. At the rapids 600 feet below the gage the bed is of clean gravel and stones. During floods the silt may be washed away and later redeposited at some points.

Discharge measurements.—At low and medium stages made by wading at the ford 15 rods below the gage or at the riffle 55 rods below; at medium and high stages measurements may be made by use of the car and cable at the old Stevenson station, about 1 mile farther downstream. The discharge is practically the same at the two points, except that a small draw, which enters midway between the gage and the cable on the north side, carries a small flow for a few hours after a rain.

Winter flow.—Affected by ice.

Discharge measurements of Cannonball River near Stevenson, N. Dak., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 23	Joy W. Bliss.....	3.48	94
Aug. 9	E. F. Chandler.....	3.32	74
Sept. 5 ^a	.....do.....	12.63	2.0
Nov. 3 ^a	Geo. Ebner.....	12.71	1.6

^a New gage; different datum.*Daily gage height, in feet, of Cannonball River near Stevenson, N. Dak., for 1911.*

Day.	Mar.	Apr.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		3.03		12.6	12.6	12.7	.....
2.....		3.03		12.6	12.6	12.7	.....
3.....		3.03		12.5	12.6	12.7	.....
4.....				12.6	12.6	12.7	.....
5.....				12.7	12.6	12.7	.....
6.....				13.3	12.6	12.7	12.9
7.....				13.5	12.6	12.7	.....
8.....				13.3	12.6	12.7	.....
9.....			13.6	13.0	12.6	12.8	.....
10.....			13.9	12.9	12.6	12.8	.....
11.....			13.75	12.8	12.6	12.7	.....
12.....			13.45	12.75	12.7	12.8	.....
13.....			13.3	12.8	12.7	12.8	.....
14.....			13.05	12.9	13.2	12.8	.....
15.....			13.0	12.8	13.0	12.8	.....
16.....			12.9	12.85	12.9	12.8	.....
17.....			12.8	12.8	12.9	12.8	.....
18.....			12.85	12.8	12.8	12.8	.....
19.....			12.85	12.75	12.8	12.8	.....
20.....			12.85	12.7	12.8	12.8	.....
21.....			12.8	12.7	12.7	12.9	.....
22.....	3.48		12.75	12.7	12.7	.....	.....
23.....	3.56		12.7	12.65	12.7	.....	.....
24.....	3.30		12.75	12.6	12.7	.....	.....
25.....	3.05		12.7	12.6	12.7	.....	13.5
26.....	3.05		12.7	12.6	.....	.....	.....
27.....	3.05		12.65	12.6	12.7	.....	.....
28.....	3.04		12.7	12.6	12.7	.....	.....
29.....	3.04		12.65	12.6	12.7	.....	.....
30.....	3.04		12.65	12.6	12.65	.....	.....
31.....	3.04		12.65	.....	12.6	.....	.....

GRAND RIVER BASIN.

NORTH BRANCH OF GRAND RIVER AT HALEY, N. DAK.

Location.—About 20 rods south of the post office at Haley, N. Dak., near the north-east corner of sec. 36, T. 129 N., R. 100 W.

Records available.—May 17, 1908, to December 31, 1911.

Drainage area.—500 square miles.

Gage.—Staff.

Channel.—Bed of stream composed of gravel and silt.

Discharge measurements.—At high stages made from car and cable 200 feet below gage; at low stages by wading.

Winter flow.—Affected by ice.

Accuracy.—The gage heights obtained at this station are not of sufficient value to publish as the observer did not read the gage so long as there was no visible change in the flow, but recorded the same gage height day after day. However, he states that he kept close watch of the stream and that there was no perceptible change during the spring until the last of June, when it dropped suddenly about 0.2 in gage height, as he had recorded. The flow during the rest of the season after August 13, when a hydrographer visited the station, probably varied only slightly.

Discharge measurements of North Branch of Grand River at Haley, N. Dak., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Fet.</i>	<i>Sec.-ft.</i>
Apr. 6	J. W. Bliss.....	1.00	2.27
Aug. 13	E. F. Chandler.....	0.66	0.16

GRAND RIVER NEAR WAKPALA, S. DAK.

Location.—At the new steel highway bridge 4 miles south of Wakpala, S. Dak., a station on the Chicago, Milwaukee & Puget Sound Railway, in or near sec. 8, T. 19 N., R. 29 E.

Records available.—September 9 to December 31, 1911.

Drainage area.—5,300 square miles.

Gage.—Standard chain on the foot-guard rail at the downstream side of the bridge.

Channel.—Probably shifts somewhat; bed composed of sand; current medium; banks steep.

Discharge measurements.—Made from highway bridge; at very low stages measurements may be made by wading at the ford 40 rods below the bridge.

Discharge measurements of Grand River near Wakpala, S. Dak., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Fet.</i>	<i>Sec.-ft.</i>
Sept. 9	E. F. Chandler.....	2.73	11.8
Nov. 2	Geo. Ebner.....	2.52	2.3

WHITE RIVER BASIN.

WHITE RIVER NEAR INTERIOR, S. DAK.

Location.—At the steel highway bridge near the southwest corner of sec. 7, T. 4 S., R. 18 E., where the county line between Stanley and Pennington counties intersects White River, 3 miles southwest of Interior, S. Dak., a station on the Chicago, Milwaukee & St. Paul Railway.

Records available.—June 24, 1904, to November 30, 1906, at old station in T. 3 S., R. 18 E.; August 24 to November 30, 1911.

Drainage area.—4,090 square miles. The area above the present site is about 15 square miles less than the area above the station maintained during 1904–1906 near Westover.

Gage.—A vertical rod attached to the lower side of the first pier (nearest the shore) at the left end of the bridge, installed August 31, 1911, and supposed to read the same as the temporary rod gage which was placed August 24 on a tree on the left bank at the turn of the river near the southwest corner of NW. $\frac{1}{4}$ sec. 17.

Channel.—Probably changes gradually; bed composed of sand and some quicksand; left bank steep and clean; right bank gently sloping and clean; current, medium. At low stages all the water may pass under one span (67-foot); at the highest stage the water passes under two 67-foot spans and 120 feet of trestle approach, but probably two-thirds of the flow passes under the two spans.

Discharge measurements.—Made from the highway bridge.

Discharge measurements of White River near Interior, S. Dak., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
Aug. 24	E. F. Chandler.....	<i>Feet.</i> 10.46	<i>Sec.-ft.</i> 5,548
31	.....do.....	3.66	38.3
Nov. 10	Gorie Monley.....	3.75	93

Daily gage height, in feet, of White River near Interior, S. Dak., for 1911.

[D. M. Waller, observer.]

Day.	Aug.	Sept.	Oct.	Nov.	Day.	Aug.	Sept.	Oct.	Nov.
1.....		3.65	4.7	4.1	16.....		5.2	5.6	4.1
2.....		3.65	4.65	4.0	17.....		5.15	5.1	4.6
3.....		3.7	4.0	5.8	18.....		5.05	4.3	4.75
4.....		3.75	4.5	5.7	19.....		5.0	4.5	4.8
5.....		3.8	4.7	5.6	20.....		4.9	5.5	4.9
6.....		9.2	4.7	5.55	21.....		4.7	4.8	5.0
7.....		7.0	4.0	4.0	22.....		4.65	4.65	5.3
8.....		7.5	4.65	4.0	23.....		4.7	4.5	5.2
9.....		6.4	4.65	4.05	24.....	10.5	4.85	4.4	4.8
10.....		6.35	4.7	4.1	25.....	8.2	4.8	4.4	4.7
11.....		6.0	4.7	4.1	26.....	5.2	4.75	4.1	4.75
12.....		5.6	4.7	4.1	27.....	3.9	4.7	5.4	4.8
13.....		5.45	4.75	4.1	28.....	3.7	4.8	4.0	5.0
14.....		5.3	4.75	4.1	29.....	3.7	4.75	4.1	4.8
15.....		5.25	4.9	4.1	30.....	3.65	4.7	4.15	4.7
					31.....	3.65		4.2	

WHITE RIVER AT WESTOVER, S. DAK.

Location.—Near the east side of sec. 32, T. 3 S., R. 29 E., 12 miles south and slightly east from Murdo, S. Dak., a station on the Chicago, Milwaukee & St. Paul Railway; about 1 mile below the entrance of Little White River.

Records available.—August 25 to December 31, 1911.

Drainage area.—7,850 square miles.

Gage.—A series of vertical rods. When the bridge is completed a permanent rod or chain gage will be placed.

Channel.—Likely to scour and fill in flood seasons; bed composed of sand and quicksand with some gravel and stones.

Discharge measurements.—At low stages made by wading at the ford near the gage; at higher stages by the use of the ferry cable and a boat.

Winter flow.—Affected by ice.

Discharge measurements of White River at Westover, S. Dak., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 25	E. F. Chandler.....	11.59	7,370
30	.....do.....	8.52	397
Nov. 8	Gorie Monley.....	8.35	135

NIOBRARA RIVER BASIN.

NIOBRARA RIVER AT NIOBRARA, NEBR.

Location.—At the Government highway bridge spanning the main channel in the SE. $\frac{1}{4}$ sec. 18, T. 32 N., R. 56 W., half a mile from the depot at Niobrara. The station is $1\frac{1}{2}$ miles above the mouth. No tributaries enter below.

Records available.—August 19, 1910, to October 5, 1911. From May 11 to October 25, 1902, a station was maintained at a highway bridge 1 mile southwest of Niobrara.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Shifting and within the influence of backwater from Missouri River.

Discharge measurements.—Made from bridge.

Winter flow.—During the winter months ice causes backwater for short periods.

Divisions.—Prior to September 1, 1912, there were approved diversions of 561 second-feet for irrigation and 2,755 second-feet for power from Niobrara River above the station. There were also approved diversions of 180 second-feet for irrigation and 453 second-feet for power from tributaries entering above. In Wyoming there are adjudicated diversions of 24 second-feet from the Niobrara and tributaries.

Accuracy.—Owing to the shifting channel and insufficient discharge measurements, no estimates of discharge have been made.

Cooperation.—Station maintained in cooperation with the State engineer, by whom the field data are furnished.

Discharge measurements of Niobrara River at Niobrara, Nebr., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 31	A. A. Dobson.....	0.85	2,240	Aug. 4	A. B. Price.....	1.50	1,080
Apr. 26	A. B. Price.....	1.30	1,860	26	.....do.....	1.50	1,150
May 27	.....do.....	1.40	1,960	Sept. 25	.....do.....	1.40	1,100
June 22	.....do.....	1.40	1,140	Oct. 5	.....do.....	1.30	1,210

Daily gage height, in feet, of Niobrara River at Niobrara, Nebr., for 1911.

[A. F. Reid, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1....	0.9	1.8	1.4	.....	1.3	1.2	1.3	16....	.....	1.6	1.4	1.3	1.4	1.5	1.5
2....	1.0	1.6	1.3	1.1	1.3	1.3	1.4	17....	.....	1.0	1.4	1.3	1.4	1.4	1.4
3....	1.1	1.6	1.3	1.1	1.4	1.3	1.3	18....	.....	.9	1.5	1.5	1.4	1.5	1.4
4....	1.1	1.6	1.2	1.2	1.5	1.5	.....	19....	.....	.9	1.4	1.5	1.5	1.6	1.5
5....	1.2	1.5	1.3	1.3	1.5	1.5	1.3	20....	.....	1.0	1.3	1.5	1.5	1.6	1.3
6....	1.3	1.5	1.3	1.3	1.5	1.6	.....	21....	.....	1.2	1.3	1.5	1.4	1.5	1.4
7....	1.1	1.5	1.4	1.2	1.6	1.5	.....	22....	.....	1.2	1.5	1.4	1.4	1.4	1.4
8....	1.1	1.5	1.4	1.2	1.6	1.5	.....	23....	.....	1.2	1.5	1.4	1.4	1.5	1.4
9....	1.0	1.5	1.3	1.4	1.7	1.4	.....	24....	.....	1.2	1.4	1.3	1.5	1.5	1.4
10....	.8	1.5	1.3	1.2	1.6	1.4	.....	25....	.....	1.2	1.4	1.3	1.5	1.6	1.3
11....	.9	1.4	1.3	1.2	1.6	1.4	.....	26....	.....	1.3	1.4	1.4	1.5	1.5	1.4
12....	.9	1.4	1.2	1.3	1.6	1.4	.....	27....	.....	1.2	1.4	1.6	1.4	1.4	1.4
13....	.9	1.4	1.2	1.3	1.5	1.3	.....	28....	.....	1.2	1.3	1.4	1.3	1.5	1.4
14....	.9	1.5	1.3	1.3	1.5	1.4	.....	29....	.....	1.2	1.4	1.2	1.3	1.5	1.4
15....	.8	1.4	1.4	1.4	1.5	1.4	.....	30....	.....	1.4	1.2	1.0	1.3	1.4	1.3
								31....	0.85	.....	1.2	1.0	1.3	1.4	.....

BIG SIOUX RIVER BASIN.

ROCK RIVER AT LUVERNE, MINN.

Location.—At the Rock Island Railroad bridge at Luverne, Minn., $3\frac{1}{2}$ miles above the mouth of Elk Creek.

Records available.—August 23, 1911, to December 31, 1911.

Drainage area.—440 square miles.

Gage.—Vertical staff.

Channel.—Probably permanent; small rapids just below gage; severe floods will cause a change.

Discharge measurements.—Made from the railroad bridge at flood stage, from the highway bridge at medium stage, and at a wading section in low water.

Winter flow.—From December to March the river is frozen over at the station and measurements are made through the ice to determine the winter discharge.

Artificial control.—The flow of the river is not artificially controlled above Luverne, as there are no dams except a low rock dam a short distance above the station, which does not regulate the flow but simply raises the water level about 2 feet.

Cooperation.—Station maintained in cooperation with the State Drainage Commission.

Discharge measurements of Rock River at Luverne, Minn., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 23	Robert Follansbee.....	1.64	16.6
Sept. 23	S. B. Soulé.....	2.15	^a 53.9
Dec. 10	C. J. Emerson.....	1.95	^b 37

^a Discharge does not include overflow channel, estimated flow about 10 second-feet.

^b Overflow channel overlooked—may have been some flow.

Daily gage height, in feet, and discharge, in second-feet, of Rock River at Luverne, Minn., for 1911.

[C. W. Pinkerton, observer.]

Day.	Aug.		Sept.		Oct.		Nov.		Dec.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1.			1.5	13	1.9	32	2.40	81		
2.			1.5	13	1.9	32	2.35	75		
3.			1.5	13	1.9	32	2.30	69		
4.			3.3	211	2.0	40	2.38	79	1.90	
5.			2.75	130	2.2	58	2.32	71		
6.			2.4	81	6.6	976	2.35	75		
7.			2.0	40	7.0	1,080	2.40	81	1.90	
8.			1.9	32	6.35	911	2.45	88		
9.			1.9	32	5.4	667	2.50	95		
10.			3.25	203	4.5	456	2.42	84	1.94	
11.			3.5	246	3.8	303	2.35	75	1.92	
12.			3.1	180	3.3	211	2.10	48	1.92	
13.			2.45	88	3.5	246	2.30	69	1.90	
14.			2.2	58	4.0	346	2.20	58	1.90	
15.			2.1	48	3.5	246	2.15	53	1.92	
16.			1.9	32	3.7	283	2.10	48	1.82	
17.			1.9	32	4.9	547	2.05	44		
18.			2.6	109	5.4	667	2.02	42	1.82	
19.			2.9	151	5.2	618	2.00	40		
20.			3.0	165	4.5	456	2.00	40		
21.			2.9	151	4.0	346	2.00	40	1.80	
22.			2.4	81	3.5	246	2.00	40		
23.	1.6	16	2.2	58	3.2	195	1.90	32		
24.	1.6	16	2.0	40	3.1	180	1.85			
25.	1.6	16	2.0	40	2.95	158	1.90		1.80	
26.	1.6	16	1.9	32	2.88	148	1.95			
27.	1.6	16	1.9	32	2.8	137	1.95			
28.	1.6	16	1.9	32	2.75	130			1.80	
29.	1.6	16	1.8	25	2.7	123				
30.	1.6	16	1.8	25	2.62	112	1.90			
31.	1.5	13			2.6	109				

NOTE.—Relation of gage height to discharge affected by ice about Nov. 24 to Dec. 31. Daily discharge computed from a rating curve well defined between 16 and 346 second-feet (gage heights 1.6 and 4 feet). Discharge Nov. 25 to Dec. 31 estimated, because of ice, from observer's notes, climatologic records, and one discharge measurement; mean discharge Nov. 24 to 30 estimated 26 second-feet, varying from about 30 to 24 second-feet; mean discharge Dec. 1 to 31 estimated 23 second-feet, varying from about 37 to 10 second-feet.

Monthly discharge of Rock River at Luverne, Minn., for 1911.

[Drainage area, 440 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accu- racy.
	Maximum.	Minimum.	Mean.	Per square mile.		
August 23-31	16	13	15.7	0.036	0.01	B.
September	246	13	79.8	.181	.20	B.
October	1,080	32	326	.741	.85	B.
November	95		a 53.6	.122	.14	C.
December			b 23	.052	.06	D.

a Partially estimated.

b Estimated.

NOTE.—See footnotes to table of daily discharge.

PLATTE RIVER BASIN.

NORTH PLATTE RIVER AT SARATOGA, WYO.

Location.—At highway bridge in Saratoga, 2 miles below the mouth of Spring Creek.

Records available.—June 9, 1903, to October 31, 1906; April 1 to December 17, 1909; April 27 to November 10, 1911.

Drainage area.—2,920 square miles. Measured from Land Office maps.

Gage.—A chain gage was installed at the bridge in 1911. The original gage was a vertical staff located 100 yards below the bridge. The relation between the two gages has not been determined.

Channel.—Practically permanent, except that tie drives may cause backwater for a few days.

Discharge measurements.—Made from bridge.

Winter flow.—Ice causes backwater during the winter months, and the records are discontinued.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions of 86 second-feet, from the North Platte above Saratoga, in Wyoming, and 934 second-feet from tributaries entering above. In the Colorado portion of the drainage area there are adjudicated decrees for diversions of 3,060 second-feet from the head waters of the North Platte.

Accuracy.—Conditions are favorable for accurate results and the estimates should be reliable.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of North Platte River at Saratoga, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 25	Fletcher and Kingdon..	5.00	1,560	June 10	R. H. Fletcher.....	7.69	6,780
May 4	.....do.....	5.15	1,640	.....19	.....do.....	7.22	5,710
May 29	R. H. Fletcher.....	6.40	4,090	July 10	.....do.....	5.10	1,440
June 1	.....do.....	7.04	5,280	Oct. 5	G. H. Russell.....	4.57	795

Daily gage height, in feet, of North Platte River at Saratoga, Wyo., for 1911.

[Garrett Price, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1		5.5	6.9	5.3	4.21	3.73	4.31	4.0
2		5.25	7.6	5.3	4.16	3.73	4.31	3.9
3		5.2	7.3	5.45	4.11	3.73	4.41	3.85
4		5.15	7.4	5.6	4.01	3.79	4.31	3.85
5		5.3	7.4	5.5	3.96	3.81	4.30	4.0
6		5.8	7.3	5.35	3.96	3.81	4.95	3.95
7		6.0	7.3	5.35	4.01	3.71	4.8	3.65
8		6.4	^a 7.6	5.4	3.99	3.73	4.6	3.8
9		6.8	7.8	5.2	3.81	3.73	4.45	3.95
10		6.8	7.4	5.15	3.79	3.69	4.4	4.0
11		6.5	7.3	4.96	3.71	3.69	4.35	-----
12		6.4	7.2	4.79	3.73	3.66	4.2	-----
13		6.2	7.2	4.71	3.79	3.66	4.15	-----
14		6.3	7.3	4.71	3.79	3.69	4.1	-----
15		6.7	7.2	4.71	3.73	3.66	4.1	-----
16		6.8	7.4	4.61	3.71	3.66	4.1	-----
17		6.9	8.0	4.76	3.73	3.73	4.1	-----
18		6.8	7.8	4.73	3.86	3.61	4.1	-----
19		6.7	7.4	4.71	3.89	3.66	4.15	-----
20		6.5	7.3	4.79	3.89	3.66	4.05	-----
21		6.4	7.4	4.79	3.91	3.63	3.8	-----
22		6.3	7.4	4.73	3.93	3.61	3.85	-----
23		6.1	7.0	4.76	4.09	3.63	4.0	-----
24		6.3	6.5	4.78	4.11	3.66	4.15	-----
25		5.0	6.4	4.69	4.11	3.71	4.1	-----
26		5.2	6.8	6.2	4.53	4.06	3.81	4.1
27		5.4	6.6	5.2	4.46	4.01	3.86	4.1
28		5.5	6.4	5.8	4.41	3.91	3.81	4.0
29		5.6	6.4	5.45	4.43	3.86	3.91	4.05
30		5.6	6.6	5.45	4.33	3.81	4.01	4.05
31		6.8	-----	4.23	3.83	-----	4.05	-----

^a Maximum stage reached during this flood was at a gage height of 11 feet.

Daily discharge, in second-feet, of North Platte River at Saratoga, Wyo., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1		2,240	5,040	1,890	478	208	559	340
2		1,800	6,570	1,890	442	208	559	286
3		1,720	5,910	2,150	407	208	650	262
4		1,630	6,130	2,420	346	234	559	262
5		1,890	6,130	2,240	318	243	550	340
6		2,800	5,910	1,980	318	243	1,320	313
7		3,180	5,910	1,980	346	200	1,100	178
8		3,990	6,570	2,060	335	208	850	238
9		4,830	7,030	1,720	243	208	690	313
10		4,830	6,130	1,640	234	192	640	340
11		4,200	5,910	1,330	200	192	595	-----
12		3,990	5,690	1,090	208	182	470	-----
13		3,580	5,690	983	234	182	435	-----
14		3,780	5,910	983	234	192	400	-----
15		4,620	5,690	983	208	182	400	-----
16		4,830	6,130	862	200	182	400	-----
17		5,040	7,490	1,050	208	208	400	-----
18		4,830	7,030	1,010	267	164	400	-----
19		4,620	6,130	983	281	182	435	-----
20		4,200	5,910	1,090	281	182	370	-----
21		3,990	6,130	1,090	291	171	238	-----
22		3,780	6,130	1,010	302	164	262	-----
23		3,380	5,250	1,050	394	171	340	-----
24		3,780	4,200	1,050	407	182	435	-----
25	1,300	3,990	3,990	958	407	200	400	-----
26	1,720	4,830	3,580	773	376	243	400	-----
27	2,060	4,410	1,720	700	346	267	400	-----
28	2,240	3,990	2,800	650	291	243	340	-----
29	2,420	3,990	2,150	670	267	291	370	-----
30	2,420	4,410	2,150	577	243	346	370	-----
31		4,830	-----	494	252	-----	370	-----

NOTE.—Daily discharge determined from a rating curve that is fairly well defined above 750 second-feet.

Monthly discharge of North Platte River at Saratoga, Wyo., for 1911.

[Drainage area, 2,920 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
April 25-30.....	2,420	1,300	2,030	0.695	0.16	24,200	B.
May.....	5,040	1,630	3,810	1.30	1.50	234,000	B.
June.....	7,490	1,720	5,370	1.84	2.05	320,000	B.
July.....	2,420	494	1,270	.435	.50	78,100	B.
August.....	478	200	302	.103	.12	18,600	C.
September.....	346	164	209	.072	.08	12,400	C.
October.....	1,320	238	507	.174	.20	31,200	C.
November 1-10.....	340	178	287	.098	.04	5,690	C.
The period.....						724,000	

NORTH PLATTE RIVER AT PATHFINDER, WYO.

Location.—Half a mile south of Pathfinder, 800 feet below the mouth of the canyon, in sec. 24, T. 29 N., R. 84 W. The nearest tributary is Canyon Creek, which enters 2 miles above.

Records available.—May 9, 1905, to December 3, 1911.

Drainage area.—About 12,000 square miles.

Gage.—Chain gage; datum unchanged.

Channel.—Condition not known, as only final results are furnished.

Discharge measurements.—Made from car and cable.

Winter flow.—Ice causes slight backwater for short periods.

Controlled flow.—The Pathfinder dam, one-fourth mile above the station, forms a reservoir of 1,025,000 acre-feet capacity. This reservoir materially changes the natural run-off of the river, as is seen by a comparison with the records of inflow.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions of 58 second-feet from the North Platte between Saratoga and Pathfinder, and 1,550 second-feet from intervening tributaries. Near Whalen, 150 miles below, the water from the Pathfinder reservoir is diverted by the interstate canal and used to irrigate land in Nebraska and Wyoming. Further canals are contemplated by the Reclamation Service.

Cooperation.—Station maintained in cooperation with United States Reclamation Service, by which the records are furnished.

The following discharge measurement was made by H. D. Comstock:

May 25, 1911: Gage height, 3.40 feet; discharge, 1,640 second-feet.

Daily gage height, in feet, of North Platte River at Pathfinder, Wyo., for 1911.

[United States Reclamation Service Engineers, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.25	2.3	1.6	2.1	4.0	4.8	5.45	4.7	3.9	1.6	2.05	1.4
2.....	1.25	2.5	1.6	3.05	4.05	4.2	5.2	4.65	3.9	2.3	2.0	1.4
3.....	1.25	2.55	1.6	3.05	2.1	4.2	5.2	4.65	3.9	3.0	1.9	1.4
4.....	1.25	2.1	1.6	2.8	2.1	4.25	5.2	4.65	3.9	2.9	2.0	1.45
5.....	1.25	2.55	1.6	2.8	2.15	4.3	5.2	4.65	3.9	2.8	2.0	1.5
6.....	1.25	2.2	2.0	4.05	2.2	4.1	5.2	4.65	3.85	2.8	2.0	1.55
7.....	1.2	2.3	2.6	3.2	2.2	4.3	5.2	4.65	3.85	2.6	1.9	1.55
8.....	1.2	2.2	2.95	3.2	2.25	4.2	5.2	4.65	3.8	3.3	1.9	1.5
9.....	1.15	2.2	3.1	3.2	2.25	4.2	4.95	4.6	3.8	3.3	1.9	1.5
10.....	2.3	2.2	3.2	3.2	2.3	4.65	4.95	4.6	3.8	2.2	1.8	1.5
11.....	1.15	2.1	3.3	3.2	2.3	4.65	4.95	4.6	3.8	2.3	1.6	1.5
12.....	2.1	2.15	3.4	3.2	2.3	4.7	5.0	4.6	4.25	2.3	1.4	1.5
13.....	1.4	2.1	3.4	3.2	2.4	5.05	5.0	4.55	4.2	2.35	1.0	1.4
14.....	1.6	2.05	3.4	3.2	3.65	5.4	4.75	4.55	4.15	2.35	1.15	1.4
15.....	1.5	2.0	5.1	3.6	3.65	5.75	4.75	4.55	4.15	2.3	1.3	1.3
16.....	1.4	1.8	5.3	3.6	3.65	5.75	4.75	4.5	4.1	2.35	1.5	1.3
17.....	1.35	2.2	4.0	3.55	3.7	5.2	4.75	4.5	4.15	2.35	1.65	1.4
18.....	2.25	2.2	3.0	3.5	3.5	5.15	4.75	4.5	4.1	2.3	1.8	1.4
19.....	2.2	2.15	1.7	4.0	3.5	5.15	4.75	4.5	4.2	2.25	1.9	1.4
20.....	1.3	1.8	1.8	4.0	3.45	5.1	4.75	4.45	4.15	2.2	2.0	1.4
21.....	1.5	2.3	1.9	3.95	3.5	4.85	4.7	4.45	4.15	2.2	2.1	1.35
22.....	1.9	2.7	1.95	3.9	3.4	5.25	4.7	4.4	4.2	2.15	2.1	1.3
23.....	2.4	1.8	2.0	3.75	3.4	5.3	4.7	4.4	4.55	2.15	2.1	1.2
24.....	2.4	1.9	2.0	3.9	3.4	5.3	4.7	4.35	4.45	2.1	2.1	1.25
25.....	1.4	1.7	2.05	4.15	3.4	5.3	4.7	4.35	4.55	2.0	2.05	1.2
26.....	1.4	1.8	2.1	4.15	3.4	5.3	4.7	4.35	4.50	2.0	2.0	1.2
27.....	1.6	1.9	2.1	4.15	3.4	2.0	4.7	4.0	4.3	2.1	2.0	1.2
28.....	1.5	1.55	2.1	4.1	3.6	2.0	4.7	4.0	1.5	2.1	1.8	1.15
29.....	1.6	.....	2.1	4.0	3.9	5.0	4.7	3.95	1.6	2.1	1.6	1.2
30.....	1.7	.....	2.1	4.1	4.2	5.45	4.7	3.95	1.9	2.1	1.4	1.1
31.....	1.9	.....	2.1	.....	4.2	.....	4.7	3.9	.....	2.1	.....	1.15

NOTE.—Ice present Jan. 23 and 24, Feb. 17 to 27, and Dec. 15 to 27.

Daily discharge, in second-feet, of North Platte River at Pathfinder, Wyo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	294	760	438	661	2,250	3,200	3,730	3,070	2,140	188	650	354
2.....	294	880	438	1,220	2,305	2,470	3,890	3,005	2,140	1,320	626	354
3.....	294	915	438	1,300	1,210	2,470	3,750	3,005	2,140	755	592	354
4.....	294	661	438	1,095	661	2,525	3,750	3,005	2,140	1,125	592	364
5.....	294	915	438	1,095	685	2,580	3,750	3,005	2,140	1,095	615	385
6.....	294	710	615	1,900	710	2,360	3,700	3,005	2,085	1,095	615	406
7.....	276	760	950	1,765	710	2,580	3,750	3,005	2,085	1,020	592	417
8.....	276	710	1,215	1,435	735	2,470	3,750	3,005	2,030	1,237	569	406
9.....	259	710	1,345	1,435	735	2,470	3,470	2,940	2,030	1,525	569	396
10.....	760	710	1,435	1,435	760	2,900	3,400	2,940	2,030	770	547	396
11.....	259	661	1,525	1,435	760	3,005	3,400	2,940	2,030	735	481	396
12.....	661	685	1,615	1,435	760	3,070	3,450	2,940	2,480	760	396	396
13.....	354	661	1,615	1,435	820	3,310	3,450	2,880	2,470	790	284	375
14.....	438	638	1,615	1,435	1,720	3,810	3,450	2,880	2,415	790	237	354
15.....	396	615	2,740	1,755	1,865	4,530	3,160	2,880	2,415	775	286	333
16.....	354	525	3,940	1,815	1,865	4,645	3,135	2,820	2,360	775	354	313
17.....	333	610	3,290	1,790	1,920	4,230	3,135	2,820	2,415	790	427	333
18.....	760	560	1,400	1,740	1,715	3,730	3,135	2,820	2,360	775	492	354
19.....	710	560	675	2,080	1,715	3,680	3,135	2,820	2,470	748	547	354
20.....	313	500	525	2,250	1,665	3,650	3,135	2,760	2,415	722	592	354
21.....	396	500	569	2,220	1,715	3,160	3,070	2,760	2,415	710	638	344
22.....	569	500	592	2,170	1,615	3,530	3,070	2,700	2,470	698	661	323
23.....	720	450	615	2,060	1,615	3,860	3,070	2,700	2,710	685	661	294
24.....	720	569	615	1,945	1,615	3,900	3,070	2,640	2,760	673	661	285
25.....	354	481	638	2,270	1,615	3,900	3,070	2,640	2,880	638	650	285
26.....	354	525	661	2,430	1,615	3,900	3,070	2,640	2,880	615	626	276
27.....	438	450	661	2,420	1,615	890	3,070	2,250	2,800	638	615	276
28.....	396	300	661	2,360	1,855	615	3,070	2,250	1,800	661	570	268
29.....	438	.....	661	2,250	2,140	3,440	3,070	2,195	438	661	481	268
30.....	481	.....	661	2,360	2,470	4,110	3,070	2,195	569	661	396	243
31.....	569	.....	661	.....	2,500	.....	3,070	2,140	.....	661	.....	243

NOTE.—Daily discharge represents the outflow from the Pathfinder reservoir.

Monthly discharge of North Platte River at Pathfinder, Wyo., for 1911.

[Drainage area, 12,000 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
January.....	760	259	430	0.036	0.04	26,400
February.....	915	300	626	.052	.05	34,800
March.....	3,940	438	1,090	.091	.105	66,800
April.....	2,430	661	1,770	.147	.16	105,000
May.....	2,500	661	1,480	.124	.14	91,100
June.....	4,640	615	3,170	.264	.29	188,400
July.....	3,890	3,070	3,330	.278	.32	205,000
August.....	3,070	2,140	2,760	.230	.26	170,000
September.....	2,880	438	2,220	.185	.21	132,000
October.....	1,520	188	809	.067	.08	49,700
November.....	661	237	534	.044	.05	31,800
December.....	417	243	339	.028	.03	20,800
The year.....	4,640	188	1,550	.13	1.75	1,120,000

NOTE.—Table shows outflow from Pathfinder reservoir.

Daily inflow, in second-feet, to Pathfinder reservoir at Pathfinder, Wyo., for 1911.

[United States Reclamation Service engineers, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	334	1,085	554	1,280	3,150	5,200	2,380	570	398	760	560	354
2.....	334	930	438	1,230	3,180	5,950	2,070	525	428	760	510	354
3.....	334	865	438	1,120	3,080	6,060	1,950	548	359	900	435	354
4.....	334	479	443	1,770	2,800	6,840	2,200	576	294	1,030	642	406
5.....	334	1,066	492	2,000	2,490	6,700	2,200	526	318	1,095	681	385
6.....	334	544	685	3,300	2,500	6,600	2,400	412	302	1,260	615	502
7.....	316	785	1,320	2,100	2,210	6,990	2,220	353	246	894	380	417
8.....	316	780	2,320	2,670	3,080	7,040	2,240	422	226	1,870	614	310
9.....	299	760	2,000	1,820	4,100	7,530	2,190	420	256	1,440	569	396
10.....	400	760	2,500	1,815	5,150	8,090	1,800	485	397	1,350	501	396
11.....	459	611	3,200	1,450	5,320	9,080	1,680	633	337	1,350	356	492
12.....	461	670	2,770	1,450	5,600	8,570	1,310	646	378	948	209	300
13.....	354	616	2,540	1,450	5,410	6,920	945	415	438	1,010	128	375
14.....	438	658	2,250	1,360	4,270	6,700	955	488	688	795	277	354
15.....	396	596	1,180	1,050	4,500	6,630	1,010	342	681	684	372	290
16.....	354	490	763	872	4,780	7,180	1,010	357	378	664	384	313
17.....	333	610	307	1,070	5,320	7,230	810	377	250	650	523	375
18.....	735	520	1,250	1,210	5,660	10,140	830	440	250	645	532	354
19.....	710	555	1,410	610	6,290	10,740	870	474	250	653	668	354
20.....	313	475	1,620	791	6,230	9,100	890	613	250	644	804	354
21.....	396	500	1,360	731	5,770	8,690	1,070	542	250	660	885	302
22.....	569	500	1,080	978	4,800	6,830	1,070	457	250	668	793	323
23.....	720	430	1,490	1,180	4,840	7,160	1,090	506	250	550	661	294
24.....	720	619	1,440	1,450	4,410	6,780	1,110	441	250	618	566	267
25.....	354	502	1,700	1,690	3,700	6,340	1,140	484	250	502	515	285
26.....	354	540	1,520	1,820	3,720	5,430	750	524	250	558	626	276
27.....	438	385	1,460	1,960	4,250	4,320	810	429	250	695	408	276
28.....	416	234	1,240	1,970	3,770	3,610	840	447	250	661	318	212
29.....	460	.....	735	2,200	3,810	4,030	839	451	271	661	315	268
30.....	530	.....	781	2,740	3,140	2,750	478	401	576	661	258	243
31.....	613	.....	1,220	.....	5,560	.....	527	430	.....	661	.....	243

Monthly inflow to Pathfinder reservoir at Pathfinder, Wyo., for 1911.

[Drainage area, 12,000 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
January.....	735	313	434	0.036	0.04	26,700
February.....	1,080	234	627	.052	.05	34,800
March.....	3,200	307	1,370	.114	.13	84,300
April.....	3,300	610	1,570	.131	.15	93,500
May.....	6,290	2,210	4,320	.360	.42	266,000
June.....	10,700	2,750	6,840	.570	.64	407,000
July.....	2,400	475	1,350	.112	.13	82,900
August.....	646	342	475	.040	.05	29,200
September.....	688	226	332	.028	.03	19,800
October.....	1,870	530	850	.071	.08	52,200
November.....	885	128	507	.042	.05	30,200
December.....	502	212	336	.028	.03	20,700
The year.....	10,700	128	1,580	.132	1.79	1,150,000

NORTH PLATTE RIVER AND INTERSTATE CANAL AT WHALEN, WYO.

Location.—At the head of the Interstate canal at Whalen, in sec. 11, T. 26 N., R. 65 W. The nearest important tributary is Cottonwood Canyon Creek, an intermittent stream which enters $1\frac{1}{2}$ miles below.

Records available.—May 1, 1909, to December 31, 1911. These records represent the discharge passing the overfall weir at Whalen and also the amount of water passing the head gates of the canal, which are located just above the Whalen weir. From June 14, 1900, to November 17, 1908, a station was maintained at Guernsey. The flow between the two points is very nearly comparable, as only a few intermittent tributaries enter between the two points.

Drainage area.—Not measured.

Gage.—To determine the flow over the weir a vertical staff is used, its zero being at the weir crest. The discharge is then computed by a weir formula. There are also four sluice gates in the dam, through which the discharge is computed. There is also a second gage in the river 75 feet downstream from the crest gage, having its zero 10.00 feet below that of the weir gage. This latter gage is only used in computing the discharge through the gates when the openings are submerged. The discharge through the head gates of the canal is computed from the nine gate openings. There is a vertical staff located in the canal 1,000 feet below the head gates, which is used in computing the discharge when the head-gate openings are submerged.

Discharge measurements.—In order to check the coefficients used in the discharge computations, a car and cable have been erected 1 mile downstream. Sufficient measurements have not yet been made to complete the checking.

Artificial control.—The discharge represents largely the effect of the Pathfinder reservoir which stores water for use in the Interstate canal.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions from North Platte River of 319 second-feet between Pathfinder reservoir and the Wyoming-Nebraska line, exclusive of the diversion by the United States Reclamation Service. It is not known what percentage of these diversions is above the stations.

Cooperation.—Station maintained by the United States Reclamation Service, by which the records are furnished.

Discharge measurements of North Platte River and Interstate canal at Whalen, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 8	Paul Rothi.....	2.09	721	Apr. 28	Paul Rothi.....	2.71	1,390
11	do.....	2.02	686	May 4	do.....	3.63	2,550
18	do.....	2.19	828	30	do.....	1.82	533
22	do.....	2.60	1,330	June 17	do.....	4.71	4,700
25	do.....	2.60	1,212	Sept. 19	do.....	2.55	1,180

Daily discharge, in second-feet, of North Platte River and Interstate canal at Whalen, Wyo., for 1911.

[United States Reclamation Service engineers, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	259	1,871	667	808	2,722	2,456	1,774	2,848	2,177	2,000	835	239
2.....	170	1,919	615	771	2,838	2,650	3,682	2,848	2,119	1,269	646	249
3.....	160	1,273	601	802	2,838	2,322	3,523	2,868	2,115	1,012	646	593
4.....	175	1,206	642	893	2,838	2,598	3,626	2,883	2,115	879	730	539
5.....	578	1,022	607	1,287	2,872	2,309	3,474	2,883	2,058	954	835	648
6.....	521	1,140	622	1,626	2,142	2,182	3,474	2,883	2,058	1,163	950	606
7.....	521	916	697	1,494	1,637	2,309	3,245	2,006	1,290	1,290	835	556
8.....	521	1,079	774	1,313	1,636	2,329	3,425	3,179	1,978	1,247	835	556
9.....	521	911	1,311	2,025	1,427	2,282	3,425	2,883	2,005	1,218	835	556
10.....	521	713	1,224	1,697	1,499	2,417	3,425	2,798	2,008	1,218	835	556
11.....	521	741	1,409	1,580	1,486	2,347	3,327	2,798	1,963	1,147	362	498
12.....	575	821	1,407	1,568	1,601	2,486	3,248	2,798	1,981	1,533	280	498
13.....	519	783	1,467	1,598	1,601	2,718	3,275	2,797	1,976	1,216	308	498
14.....	759	961	1,512	1,598	1,484	2,729	3,202	2,756	2,070	781	340	498
15.....	820	1,040	1,552	1,607	1,323	2,943	3,212	2,791	2,280	833	386	498
16.....	a1,296	918	1,599	1,584	1,265	4,384	3,244	2,791	2,295	1,079	448	498
17.....	a1,260	945	1,763	1,559	1,803	5,872	3,585	2,709	2,294	1,079	448	498
18.....	810	901	3,479	1,821	2,011	5,766	3,585	2,709	2,218	1,014	481	498
19.....	765	682	3,469	1,849	2,011	4,796	3,585	2,709	2,218	950	656	498
20.....	675	339	2,416	1,696	1,953	4,181	3,513	2,745	2,294	950	765	498
21.....	525	259	1,714	1,682	1,961	4,073	3,567	2,745	2,294	950	823	441
22.....	525	234	1,289	2,127	1,965	3,965	3,426	2,745	2,294	950	1,093	441
23.....	470	157	952	2,100	1,936	3,425	3,308	2,745	2,294	950	1,093	441
24.....	470	375	952	2,100	1,942	3,658	3,012	2,665	2,295	950	890	441
25.....	470	519	785	2,100	1,821	3,788	2,955	2,665	2,373	950	828	441
26.....	540	691	918	2,102	1,741	3,651	2,985	2,665	2,707	950	711	441
27.....	675	519	1,015	2,132	1,630	3,758	2,965	2,620	2,707	950	642	441
28.....	675	564	894	2,332	1,626	3,758	2,930	2,595	2,838	950	324	b 400
29.....	675	.....	803	2,375	1,638	2,734	2,838	2,517	2,924	892	317	b 350
30.....	997	.....	826	2,739	1,675	1,634	2,843	2,306	2,606	835	230	b 350
31.....	1,150	.....	836	.....	2,344	.....	2,848	2,177	.....	835	.....	b 330

a Discharge too high on account of backwater.

b Partly estimated.

NOTE.—Daily discharge has been computed by engineers of the United States Reclamation Service and is published without change or verification.

Monthly discharge of North Platte River and Interstate canal at Whalen, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	1,300	160	617	37,900
February.....	1,920	157	839	46,600
March.....	3,480	601	1,250	76,900
April.....	2,740	771	1,700	101,000
May.....	2,870	1,260	1,910	117,000
June.....	5,870	1,630	3,220	192,000
July.....	3,680	1,770	3,250	200,000
August.....	3,240	2,180	2,750	169,000
September.....	2,920	1,900	2,250	134,000
October.....	2,000	781	1,060	65,200
November.....	1,090	230	647	38,500
December.....	648	239	471	29,000
The year.....	5,870	157	1,670	1,210,000

NOTE.—Monthly discharge computed by engineers of the United States Geological Survey from data furnished by the United States Reclamation Service and published herewith.

Daily discharge, in second-feet, of Interstate canal at Whalen, Wyo., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		448	740	1,165	175	1,250	1,225	204
2.....		461	469	1,300	674	1,250	1,225	51
3.....		478	469	1,225	950	1,270	1,225	0
4.....		482	469	1,225	1,160	1,285	1,225	195
5.....		535	400	1,230	1,210	1,285	1,225	270
6.....		601	73	1,230	1,210	1,285	1,225	275
7.....		667	101	1,230	1,210	770	1,225	280
8.....		680	341	1,250	1,260	910	1,145	170
9.....		822	350	1,270	1,260	1,180	1,115	
10.....		862	549	1,270	1,260	1,200	1,115	
11.....		956	592	1,270	1,200	1,200	1,010	
12.....		944	645	1,270	1,275	1,200	900	
13.....		974	703	1,270	1,300	1,200	895	
14.....		974	698	1,200	1,320	1,225	920	
15.....		1,009	712	1,240	1,330	1,260	985	
16.....		1,040	715	1,260	560	1,260	1,000	
17.....		1,053	723	1,285	0	1,260	1,000	
18.....		1,090	713	1,285	0	1,260	1,000	
19.....		1,120	713	1,285	0	1,260	1,000	
20.....		1,055	732	1,285	0	1,295	1,000	
21.....		1,040	811	1,285	52	1,295	1,000	
22.....		1,050	815	1,285	416	1,295	1,000	
23.....		1,090	920	1,260	624	1,295	1,000	
24.....		1,090	990	1,190	943	1,295	1,000	
25.....		1,090	1,035	1,110	1,070	1,295	1,000	
26.....		1,090	1,050	1,080	1,100	1,295	1,000	
27.....		1,120	1,080	1,080	1,170	1,250	1,000	
28.....	20	1,185	1,130	1,080	1,225	1,225	950	
29.....	178	1,160	1,130	850	1,240	1,225	751	
30.....	346	850	1,130	250	1,245	1,225	238	
31.....	414		1,130		1,250	1,225		

NOTE.—Determination of daily discharge published as furnished by the United States Reclamation Service without change or verification.

Monthly discharge of Interstate canal at Whalen, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	0	0	0	0
February.....	0	0	0	0
March.....	414	0	30.9	1,900
April.....	1,180	448	900	53,600
May.....	1,130	73	714	43,900
June.....	1,280	250	1,180	70,200
July.....	1,330	0	895	55,000
August.....	1,300	770	1,230	75,600
September.....	1,220	238	1,020	60,700
October.....	280	0	46.6	2,870
November.....			0	0
December.....			0	0
The year.....	1,330	0	502	364,000

NOTE.—Monthly discharge computed by engineers of the United States Geological Survey from data furnished by the United States Reclamation Service and published herewith.

NORTH PLATTE RIVER NEAR MITCHELL, NEBR.

Location.—At highway bridge 1 mile south of Mitchell, on line between secs. 27 and 28, T. 23 N., R. 56 W. The nearest tributary is Spottedtail Creek, an intermittent stream entering just below the station. The only important tributary between the station and the Wyoming line is Horse Creek.

Records available.—June 3, 1901, to December 23, 1911. From May 29, 1897, to October 31, 1900, a station was maintained near Gehring. Although no tributaries enter between the two points, the records are not directly comparable during the irrigation season, as water is diverted for irrigation.

Drainage area.—24,400 square miles.

Gage.—Chain gage; datum lowered 1.00 foot on May 3, 1902, to avoid negative readings.

Channel.—Very slightly shifting.

Discharge measurements.—Made from bridge.

Winter flow.—The river is frozen over during the winter months and records are discontinued.

Artificial control.—The Pathfinder reservoir of the United States Reclamation Service controls the flow at this station to a certain extent.

Diversions.—Prior to September 1, 1912, there were approved diversions of 2,188 second-feet from the North Platte between the Wyoming-Nebraska line and Mitchell, and 75 second-feet from intervening tributaries.

Accuracy.—Conditions are favorable for accurate results and the estimates should be reliable.

Cooperation.—Station maintained in cooperation with the State engineer, by whom the field data are furnished.

Discharge measurements of North Platte River near Mitchell, Nebr., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
June 8	R. H. Willis.....	1.90	80.4
13	.....do.....	2.60	1,000
Aug. 4	.....do.....	2.35	710
Sept. 17	R. H. Fletcher.....	2.38	710

Daily gage height, in feet, of North Platte River near Mitchell, Nebr., for 1911.

[B. H. Newbold, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.6	1.8	2.2	2.4	2.2	.....	2.5	2.6
2	2.7	2.1	.....	2.4	2.1	2.7	2.5	2.6
3	2.9	2.0	2.7	2.4	.....	2.5	2.4	.....
4	2.9	.....	2.7	2.4	2.1	2.6	2.4	2.8
5	2.9	2.3	2.7	2.4	2.1	2.5	.....	2.7
6	3.1	2.1	2.5	.....	2.1	2.5	2.5	2.7
7	.....	2.0	2.4	2.4	2.1	2.4	2.5	.....
8	2.9	2.0	2.5	.....	2.2	.....	2.5	2.7
9	2.6	2.0	.....	2.9	2.2	2.5	2.5	2.7
10	2.5	2.0	2.5	2.6	.....	2.6	2.5	.....
11	.....	.....	.....	2.6	2.2	2.6	2.5	2.6
12	2.4	2.6	2.4	2.5	2.2	2.6	.....	2.6
13	2.4	2.6	2.4	.....	2.2	2.6	2.5	2.6
14	.....	2.6	2.4	2.5	2.3	2.7	2.6	2.5
15	2.3	2.5	2.3	2.5	2.2	.....	2.7	2.5
16	2.3	2.6	.....	2.4	2.2	2.6	2.6	2.6
17	2.2	2.8	2.9	2.4	2.4	2.5	2.6	.....
18	2.2	.....	3.0	2.4	2.3	2.5	2.5	2.6
19	2.2	3.6	3.0	2.4	2.3	2.5	.....	2.5
20	2.2	3.3	3.0	.....	2.3	2.5	2.4	2.5
21	.....	3.1	3.0	2.4	2.3	2.5	2.4	2.5
22	2.3	3.1	3.0	2.4	2.3	.....	2.5	2.5
23	2.3	3.1	.....	2.4	2.4	2.5	2.7	2.5
24	2.2	3.0	3.0	2.4	.....	2.5	2.6	.....
25	2.2	.....	2.7	2.3	2.4	2.5	2.5	.....
26	2.2	3.1	2.6	2.2	2.4	2.5	.....	.....
27	2.2	3.1	2.5	.....	2.5	2.5	2.5	.....
28	.....	3.2	2.5	2.2	2.6	.....	2.6	.....
29	2.1	2.9	2.4	2.2	2.65	.....	2.6	.....
30	2.0	2.8	.....	2.2	2.7	2.5	2.7	.....
31	1.9	.....	2.4	2.2	.....	2.5	.....	.....

Daily discharge, in second-feet, of North Platte River near Mitchell, Nebr., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	990	50	360	730	440	1,380	920	1,140
2	1,230	210	840	730	340	1,380	920	1,140
3	1,830	130	1,320	730	340	920	730	1,380
4	1,830	290	1,320	730	340	1,140	730	1,640
5	1,830	450	1,320	730	340	920	825	1,380
6	2,560	210	850	730	340	920	920	1,380
7	2,200	130	750	730	340	730	920	1,380
8	1,830	130	930	730	440	825	920	1,380
9	990	130	930	1,920	440	920	920	1,380
10	780	130	930	1,140	440	1,140	920	1,260
11	600	560	930	1,140	440	1,140	920	1,140
12	600	990	730	920	440	1,140	920	1,140
13	600	990	730	920	440	1,140	920	1,140
14	525	990	730	920	570	1,380	1,140	920
15	450	780	530	920	440	1,260	1,380	920
16	450	990	1,220	730	440	1,140	1,140	1,140
17	320	1,510	1,900	730	730	920	1,140	1,140
18	320	3,060	2,200	730	570	920	920	1,140
19	320	4,600	2,200	730	570	920	825	920
20	320	3,300	2,200	730	570	920	730	920
21	385	2,570	2,200	730	570	920	730	920
22	450	2,570	2,200	730	570	920	920	920
23	450	2,570	2,200	730	730	920	1,380	920
24	320	2,200	2,200	730	730	920	1,140	.....
25	320	2,380	1,410	570	730	920	920	.....
26	320	2,570	1,150	440	730	920	920	.....
27	320	2,570	930	440	920	920	920	.....
28	265	2,900	930	440	1,140	920	1,140	.....
29	210	1,900	730	440	1,260	920	1,140	.....
30	130	1,580	730	440	1,380	920	1,380	.....
31	80	.....	730	440	.....	920	.....	.....

NOTE.—Daily discharge determined as follows: May 1 to June 13, from a fairly well defined rating curve; June 14 to Aug. 4, by indirect method for shifting channels; Aug. 5 to Dec. 23, from well-defined curve (1910); discharge interpolated for days for which gage heights are missing.

Monthly discharge of North Platte River near Mitchell, Nebr., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	2,560	80	769	47,300	B.
June.....	4,600	50	1,450	86,300	B.
July.....	2,200	360	1,230	75,600	A.
August.....	1,920	440	758	46,600	A.
September.....	1,380	340	592	35,200	A.
October.....	1,380	730	1,010	62,100	A.
November.....	1,380	730	978	58,200	A.
December.....	1,640	-----	1,090	67,000	B.
The period.....	-----	-----	-----	478,000	-----

NORTH PLATTE RIVER AT NORTH PLATTE, NEBR.

Location.—At highway bridge half a mile north of North Platte, in sec. 28, T. 14 N., R. 30 W., 1 mile below mouth of Scout Creek and $4\frac{1}{2}$ miles above the junction with the South Platte.

Records available.—February 25, 1895, to December 23, 1911.

Drainage area.—28,500 square miles.

Gage.—A staff gage installed October 15, 1910. From October 5, 1894, to May 31, 1910, the gage was a vertical staff at the railroad bridge 2 miles east of North Platte. On March 25, 1910, the station was moved 2 miles upstream to its present site and a chain gage reading to a different datum was installed. This gage was stolen July 1, 1910, and the records interrupted until October 15, 1910, when the present gage reading to a different datum was placed in position.

Channel.—Very shifting.

Discharge measurements.—Made from highway bridge.

Winter flow.—The river frequently freezes to the bottom during the winter, as it is very shallow.

Diversions.—Prior to September 1, 1912, there were approved diversions of 3,626 second-feet from the North Platte between Mitchell and North Platte, and 927 second-feet from intervening tributaries.

Accuracy.—Owing to the very shifting channel the estimates have been obtained by the indirect method and can be considered only fair.

Cooperation.—Station maintained in cooperation with the State engineer, by whom the field data were furnished.

Discharge measurements of North Platte River at North Platte, Nebr., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 24	A. A. Dobson.....	3.85	3,400	Aug. 24	A. B. Price.....	2.80	610
Apr. 22	A. B. Price.....	2.00	89.2	Sept. 24	.....do.....	2.50	222
May 20	.....do.....	2.90	547	Oct. 6	R. H. Fletcher.....	4.00	3,500
May 25	.....do.....	2.40	416	Oct. 28	A. B. Price.....	3.40	1,420
June 21	.....do.....	3.00	891	Nov. 26	.....do.....	3.10	1,200
Aug. 11	.....do.....	3.20	969				

Daily gage height, in feet, of North Platte River at North Platte, Nebr., for 1911.

[Zack Carter, observer.]

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		3.1	2.9	2.8	2.5	2.7	2.7	2.5		3.15	3.45
2.		3.2		2.9	2.5		2.7	2.5	2.9	3.15	3.55
3.		3.35	2.9	3.1	2.45	2.85	2.65		3.05	3.65	
4.		3.2	2.8	3.3		2.85	2.55	2.65	3.25	4.0	3.6
5.			2.8	3.4	2.3	2.8	2.5	2.6	3.55		3.6
6.	4.45	3.4	2.7	3.5	2.1	2.7		2.6	3.85	3.55	3.65
7.	4.4	3.4	2.7		1.95	2.6	3.65	2.5	3.65	3.4	3.7
8.	4.35	3.5	2.6	3.8	1.95	2.25	3.55	2.5		3.55	3.6
9.	4.3	3.3		3.65	2.0		3.5	2.5	3.5	3.6	3.65
10.	4.2	3.2	2.6	3.5	1.95	2.7	3.35		3.35	3.55	
11.	4.0	3.2	2.4	3.7		2.6	3.05	2.5	3.3	3.45	3.65
12.			2.25	3.7	2.05	2.5	3.0	2.5	3.35		3.6
13.	3.9	3.2	2.1	3.3	1.75	2.7		2.5	3.3	3.3	3.55
14.	3.8	3.2	2.0		1.7	2.7	3.25	2.5	3.35	3.2	3.45
15.	3.8	3.3	1.95	3.05	1.7	2.7	3.45	2.65		3.35	3.45
16.	3.8	3.3		3.0	1.7		3.3	2.6	3.6	3.45	3.4
17.	3.7	3.1	2.0	3.1	2.55	2.6	3.1		3.55	3.55	
18.	3.7	2.95	2.25	2.8		2.6	3.1	2.6	3.6	3.6	3.4
19.			2.4	2.55	2.05	2.5	3.05	2.55	3.55		3.4
20.	3.6	3.0	2.3	2.4	2.0	2.5		2.5	3.45	3.6	3.45
21.	3.55	3.1	2.2		2.95	2.4	3.15	2.4	3.4	3.6	3.5
22.	3.4	3.2	2.0	2.4	2.7	2.55	2.95	2.45		3.5	3.6
23.	3.5	3.4		2.4	3.6		2.9	2.5	3.5	3.35	3.7
24.	3.45	3.75	2.0	2.5	3.6	3.5	2.8	2.5	3.45	3.2	
25.	3.5	3.85	2.0	2.5		3.45	2.75	2.6	3.45	3.0	
26.			2.0	2.3	3.55	3.3	2.7	2.6	3.45	3.1	
27.	3.3	3.75	2.0	2.45	3.4	3.35		2.7	3.4	3.0	
28.	3.4	3.5	2.2		3.3	3.2	2.7	2.75	3.4	3.1	
29.		3.35	2.3	2.8	3.05	3.15	2.6	2.8		3.25	
30.		3.1		2.65	2.75		2.6	2.8	3.3	3.35	
31.		2.95		2.6		2.85	2.6		3.25		

NOTE.—River free from ice Feb. 13; frozen over Dec. 24 to 31.

Daily discharge, in second-feet, of North Platte River at North Platte, Nebr., for 1911.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		1,200	850	600	480	480	400	320	562	900	2,050
2.		1,400	850	650	480	565	400	320	625	900	2,350
3.		1,780	850	925	440	650	370	360	925	1,950	2,420
4.		1,400	750	1,300	370	650	300	400	1,300	3,080	2,500
5.		1,650	750	1,750	300	590	270	350	1,850	2,390	2,500
6.		1,900	650	2,000	200	480	1,110	350	3,000	1,700	2,680
7.		1,900	650	2,320	150	370	1,950	300	2,300	1,550	2,850
8.		2,200	550	2,650	150	160	1,700	300	2,080	1,900	2,500
9.		1,650	525	2,150	175	305	1,570	300	1,850	2,050	2,680
10.		1,400	500	1,750	150	450	1,240	300	1,500	1,900	2,680
11.		1,400	375	2,150	175	370	740	300	1,400	1,650	2,680
12.		1,400	275	2,150	200	300	670	300	1,500	1,480	2,500
13.	3,550	1,400	225	1,200	110	450	860	300	1,400	1,300	2,350
14.	3,200	1,400	175	988	100	450	1,050	250	1,400	1,100	2,050
15.	3,200	1,650	165	775	100	450	1,600	350	1,720	1,300	2,050
16.	3,200	1,650	170	700	100	410	1,250	325	2,030	1,650	1,900
17.	2,850	1,200	175	850	495	370	900	325	1,900	2,100	1,900
18.	2,850	975	275	475	338	370	900	325	2,030	2,250	1,900
19.	2,680	988	375	275	180	300	825	300	1,900	2,250	1,900
20.	2,500	1,050	300	200	160	300	938	250	1,620	2,250	2,050
21.	2,350	1,200	250	185	825	225	1,050	200	1,400	2,250	2,200
22.	1,900	1,400	175	170	360	300	750	230	1,520	2,000	2,500
23.	2,200	1,900	132	225	2,150	975	675	250	1,650	1,600	2,850
24.	2,050	3,020	90	300	2,150	1,650	550	250	1,530	1,250	
25.	2,200	3,250	90	375	2,080	1,530	540	280	1,530	900	
26.	1,920	3,080	90	350	2,000	1,200	480	280	1,530	1,050	
27.	1,650	2,900	90	450	1,600	1,300	480	360	1,430	1,050	
28.	1,900	2,050	160	610	1,380	1,130	480	400	1,430	1,200	
29.		1,650	200	770	925	950	400	500	1,290	1,520	
30.		1,050	400	600	540	750	400	500	1,150	1,780	
31.		900		560		550	400		1,050		

NOTE.—Daily discharge determined from a series of parallel rating curves and by the indirect method for shifting channels. Discharge interpolated for days for which gage heights are missing.

Monthly discharge of North Platte River at North Platte, Nebr., for 1911.

[Drainage area, 28,500 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
February 13-28.....	3,550	1,650	2,510	0.088	0.05	79,600
March.....	3,250	900	1,680	.059	.07	103,000
April.....	850	90	370	.013	.01	22,000
May.....	2,650	170	982	.034	.04	60,400
June.....	2,150	100	629	.022	.02	37,400
July.....	1,650	160	614	.022	.03	37,800
August.....	1,950	400	814	.029	.03	50,100
September.....	500	200	319	.011	.01	19,000
October.....	3,000	562	1,560	.055	.06	95,900
November.....	3,080	900	1,680	.059	.07	100,000
December.....	2,850	1,900	2,390	.084	.10	147,000
The period.....						752,000

Discharge estimated at 2,500 second-feet Dec. 24 to 31.

PLATTE RIVER NEAR COLUMBUS, NEBR.

Location.—At Meridian bridge 3 miles south of Columbus on line between sec. 36, T. 17 N., R. 1 W., and sec. 31, T. 17 N., R. 1 E., about 10 miles below the mouth of Prairie Creek and 5 miles above the mouth of Loup River.

Records available.—June 4, 1895, to December 31, 1911.

Drainage area.—56,900 square miles.

Gage.—A chain gage installed July 25, 1910. The bridge and the original gage previously used were washed out early in 1910. The new gage is at the same point as the old, but its datum is possibly slightly different. The datum of the original gage was unchanged up to the time of its destruction.

Channel.—Extremely shifting; at this point the river flows in the channels known as the main, middle, and south channels. The gage is located in the main channel.

Discharge measurements.—Made from bridges spanning each channel.

Winter flow.—The river freezes over during the winter and records are discontinued.

Diversions.—Prior to September 1, 1912, there were approved diversions of 4,888 second-feet for irrigation and 1,500 second-feet for power from Platte River between the junction of the two branches and Columbus, and this diversion, together with the evaporation from the wide shallow channels, frequently causes the flow to cease at this point during the late summer and fall.

Accuracy.—The extremely shifting channel makes it impossible to make estimates of daily discharge without almost weekly discharge measurements, as the gage heights are little if any index of the flow.

Cooperation.—Station maintained in cooperation with the State engineer, by whom the field data were furnished.

Discharge measurements of Platte River near Columbus, Nebr., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 23	A. A. Dobson.....	1.45	803	Aug. 25	A. B. Price.....	0.90	761
Apr. 25	A. B. Price.....	0	73.1	Sept. 11	.....do.....	.10	93
May 18	.....do.....	1.15	1090	Sept. 24	.....do.....	— .30	29.7
May 26	.....do.....	.80	387	Oct. 4	.....do.....	1.80	36.9
				Nov. 10	.....do.....	3.15	1,400

Daily gage height, in feet, of Platte River near Columbus, Nebr., for 1911.

[W. D. Benson, observer.]

Day.	Mar.	Apr.	May.	Aug.	Sept.	Oct.	Nov.	Dec.
1		1.8	0.5			+0.3		3.05
2		1.8	.3			+ .15	2.55	
3		1.85	.2					
4		1.7	.5			1.8	2.8	3.35
5		1.6	.65			2.15	2.75	3.1
6		1.65	.7			3.0	2.95	
7		1.65	.7			2.85	3.0	
8		1.65	.7			2.7	3.3	
9		1.6	.8			3.4	2.65	
10			.9			3.5	2.45	3.3
11		1.55	.7		+0.1	3.65		3.1
12	2.1		.5		+ .35	3.5		3.15
13		1.2			— .05	3.45		3.05
14	1.8	(*)	1.65		— .25	3.35		3.0
15	1.55		1.3		+ .95	3.2		2.95
16	1.5					3.1		3.1
17	1.35		1.3		+ .8	3.0		3.0
18	1.3		1.15		+ .45	2.9		
19	1.3				.35	3.05		2.85
20	1.3				.25	3.0	3.15	
21	1.2		1.0		.15	3.15	3.3	2.9
22	1.2		.9		— .05	3.05	3.2	2.75
23	1.45		.8			2.8		2.65
24	1.65		.75		— .3	3.0		
25	1.65	.0	.65	.9		3.0	3.35	2.95
26	1.4	.2	.8			2.95		
27	1.5	.2	.75			3.05		
28	1.65		.5			3.2		
29	1.8	.75	.45			3.1		
30	2.05	.4	.2		.05	3.2		
31	1.85			1.15		3.15		

* Sand bar under gage.

NOTE.—Channel dry Apr. 17 to 25, May 31 to Aug. 24, and Sept. 25 to 30. Ice caused backwater at gage from Nov. 11 to Dec. 31.

PLATTE RIVER NEAR LESHARA, NEBR.

Location.—At highway bridge 2 miles southeast of Leshara, about sec. 34, T. 16 N., R. 9 E.; 7 miles above the entrance of Otoe Creek.

Records available.—May 19 to December 31, 1911.

Drainage area.—Not measured.

Gage.—Chain; datum unchanged.

Channel.—Extremely shifting.

Discharge measurements.—Made from the highway bridge.

Winter flow.—Data too meager to determine.

Diversions.—Prior to September 1, 1912, there were approved diversions of 2,500 second-feet for power and irrigation and 4,000 second-feet for power from Platte River between the mouth of Loup River and this station. Below there were approved diversions of 2,500 second-feet for power.

Accuracy.—Daily records can be considered only approximately accurate.

Cooperation.—Station maintained by the State engineer, by whom the field data are furnished.

Discharge measurements of Platte River near Leshara, Nebr., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 19	A. B. Price	2.85	4,070	Aug. 10	A. B. Price	2.60	2,250
30	do.	2.70	2,880	27	do.	2.80	2,730
June 12	do.	2.20	1,510	Sept. 11	do.	4.00	7,710
23	do.	2.30	1,170	Oct. 3	do.	2.90	2,950
July 8	do.	2.05	1,110	Nov. 9	do.	3.00	4,220
31	do.	2.20	1,320				

Daily gage height, in feet, of Platte River near Leshara, Nebr., for 1911.

[H. M. Eggers, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		2.50	2.28	2.25	2.48	2.80	3.30	3.15
2.....		2.52	2.28	2.25	2.39	2.90	3.00	3.05
3.....		2.55	2.05	2.40	2.38	2.90	2.95	3.00
4.....		2.50	1.80	2.88	2.40	2.80	2.60	3.20
5.....		2.44	2.05	2.62	2.40	2.85	2.85	3.60
6.....		2.30	1.95	2.47	2.38	3.08	2.20	3.40
7.....		2.25	2.05	2.50	2.39	5.20	2.60	3.30
8.....		2.40	2.00	2.66	2.50	4.26	3.00	3.35
9.....		2.52	2.35	2.75	2.55	3.55	3.05	3.42
10.....		2.40	2.26	2.60	2.61	3.42	3.20	3.35
11.....		2.35	2.38	2.58	2.60	3.30	3.15	3.55
12.....		2.22	2.36	2.70	3.60	3.23	3.10	3.40
13.....		2.3	2.56	2.75	2.83	3.20	3.30	3.30
14.....		2.40	2.46	2.60	3.23	3.35	3.10	3.25
15.....		2.30	3.15	2.58	2.60	3.21	3.00	3.20
16.....		2.39	2.72	2.53	2.57	3.05	2.80	3.15
17.....		2.30	2.73	2.50	2.80	3.00	2.65	3.05
18.....		2.29	2.90	2.68	2.70	3.10	2.45	3.00
19.....	2.85	2.30	2.30	2.85	2.62	3.15	3.40	2.80
20.....		2.35	2.20	2.90	2.58	2.95	4.00	2.85
21.....		2.54	2.20	2.85	2.57	3.12	3.70	2.95
22.....		2.32	2.40	2.80	2.70	3.10	3.00	3.10
23.....		2.30	2.30	2.60	2.60	3.07	2.90	3.00
24.....	3.25	2.28	2.40	3.25	2.50	3.00	2.60	2.90
25.....	3.05	2.25	3.50	3.15	2.58	3.05	2.64	2.85
26.....	2.70	2.13	3.30	2.20	2.50	3.00	2.80	2.95
27.....	2.60	2.13	3.89	2.70	2.55	3.05	3.00	2.80
28.....	2.72	2.20	2.87	2.68	2.58	2.95	3.10	2.70
29.....	2.60	2.60	2.51	2.57	2.45	3.15	3.30	3.10
30.....	2.65	2.43	2.50	2.55	2.85	3.10	3.29	3.00
31.....	2.62	.....	2.33	2.52	.....	3.16	.....	3.05

Daily discharge, in second-feet, of Platte River near Leshara, Nebr., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		2,200	1,350	1,400	1,870	2,700	5,300	4,800
2.....		2,250	1,350	1,400	1,670	3,020	4,050	4,400
3.....		2,320	1,050	1,690	1,650	3,020	3,850	4,200
4.....		2,200	820	2,960	1,690	2,700	2,700	5,000
5.....		2,050	1,050	2,200	1,690	2,860	3,500	6,850
6.....		1,750	1,000	1,840	1,650	3,630	1,740	5,900
7.....		1,650	1,120	1,910	1,670	14,300	2,860	5,450
8.....		1,950	1,060	2,310	1,910	9,100	4,220	5,680
9.....		2,250	1,590	2,560	2,030	5,520	4,420	5,990
10.....		1,950	1,420	2,150	2,180	5,300	4,610	5,680
11.....		1,600	1,650	2,100	2,150	4,750	4,800	6,600
12.....		1,400	1,610	2,410	5,750	4,450	4,600	5,900
13.....		1,550	2,050	2,560	2,800	4,350	5,450	5,450
14.....		1,750	1,820	2,150	4,220	5,000	4,600	5,220
15.....		1,300	3,900	2,100	2,150	4,430	4,200	5,000
16.....		1,610	2,470	1,980	2,080	3,780	3,500	4,800
17.....		1,300	2,500	1,910	2,700	3,600	3,000	4,400
18.....		1,280	3,020	2,360	2,410	3,950	2,420	4,200
19.....	4,070	1,300	1,490	2,860	2,200	4,400	5,900	3,500
20.....	4,350	1,380	1,310	3,020	2,100	3,650	8,850	3,680
21.....		4,620	1,700	1,310	2,860	4,300	7,350	4,020
22.....		4,900	1,170	1,690	2,700	4,200	4,200	4,600
23.....		5,170	1,150	1,490	2,150	4,050	3,850	4,200
24.....		5,450	1,140	1,690	4,300	1,910	3,850	3,850
25.....		4,300	1,080	5,300	3,900	2,100	4,000	2,970
26.....		3,050	1,050	4,500	1,310	1,910	3,850	3,500
27.....		2,750	1,050	7,150	2,410	2,030	4,000	4,200
28.....		2,810	1,140	2,920	2,360	1,980	3,850	3,150
29.....		2,450	1,750	1,930	2,080	1,800	4,450	4,600
30.....		2,600	1,430	1,910	2,030	2,860	4,400	4,200
31.....		2,510	.....	1,550	1,960	.....	4,700	4,400

NOTE.—Daily discharge determined from several poorly defined rating curves and by indirect method for shifting channels.

Monthly discharge of Platte River near Leshara, Nebr., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May 19-31.....	5,450	2,450	3,770	100,000	C.
June.....	2,320	1,050	1,590	94,600	C.
July.....	7,150	820	2,100	129,000	C.
August.....	4,300	1,310	2,320	143,000	C.
September.....	5,750	1,650	2,260	134,000	C.
October.....	14,300	2,700	4,530	279,000	C.
November.....	8,850	1,740	4,300	256,000	C.
December.....	6,850	3,150	4,740	291,000	C.
The period.....				1,430,000	

BIG CREEK NEAR DOWNINGTON, WYO.

Location.—In the NE. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 32, T. 13 N., R. 81 W., below all important tributaries. One small creek enters below the gaging station. This station is in the Hayden National Forest.

Records available.—Gage heights, May 7 to June 17, 1911.

Drainage area.—Not measured.

Gage.—Staff.

Accuracy.—As no discharge measurements have been made, no estimates of discharge can be made.

Cooperation.—This station is maintained in cooperation with the United States Forest Service.

Daily gage height, in feet, of Big Creek near Downington, Wyo., for 1911.

Day.	May.	June.	Day.	May.	June.	Day.	May.	June.
1.....		2.6	11.....	2.2	3.1	21.....	2.3	.....
2.....		3.0	12.....	2.2	3.2	22.....	2.3	.....
3.....		3.1	13.....	2.4	3.2	23.....	2.2	.....
4.....		3.1	14.....	2.4	3.1	24.....	2.4	.....
5.....		3.2	15.....	2.6	3.1	25.....	2.6	.....
6.....		3.3	16.....	2.6	4.1	26.....	2.4	.....
7.....	2.7	4.0	17.....	2.5	3.2	27.....	2.4	.....
8.....	2.4	3.5	18.....	2.4	.....	28.....	2.5	.....
9.....	2.4	3.3	19.....	2.3	.....	29.....	2.5	.....
10.....	2.2	3.2	20.....	2.4	.....	30.....	2.6	.....
						31.....	2.8	.....

MULLEN CREEK NEAR FRENCH, WYO.

Location.—At old highway bridge in sec. 33, T. 15 N., R. 80 W., 10 miles east of French post office. There is no important tributary between the station and the junction with the South Fork, 6 miles below. This station is in the Cheyenne National Forest.

Records available.—Fragmentary records, June 21 to September 24, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Data too meager to determine condition.

Discharge measurements.—Made by wading.

Winter flow.—No information.

Diversions.—No water is diverted above the station, and therefore the records represent the natural run-off.

Accuracy.—Owing to insufficient data no estimates of flow can be made.

Cooperation.—Station maintained in cooperation with the State engineer.

The following discharge measurement was made by R. H. Fletcher:

June 21, 1911: Gage height, 1.90 feet; discharge, 72 second-feet.

Daily gage height, in feet, of Mullen Creek near French, Wyo., for 1911.

[Martin Farrell, observer.]

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1					16		1.25		
2		1.4			17				.9
3				1.05	18				
4					19				
5					20			1.1	
6			1.1		21	1.9			
7					22				
8					23				
9		1.3			24		1.2		.9
10				1.0	25				
11					26			1.1	
12					27	1.6			
13			1.05		28				
14					29				
15					30		1.1		
					31				

FRENCH CREEK NEAR FRENCH, WYO.

Location.—In sec. 4, T. 14 N., R. 81 W., about 3½ miles southeast of French. The station is 2 miles above the mouth, and is below all tributaries. This station is in the Cheyenne National Forest.

Records available.—April 30 to July 15, 1911.

Drainage area.—Fifty-seven square miles (measured from Forest atlas).

Gage.—Vertical staff.

Channel.—Somewhat shifting.

Discharge measurements.—Made by wading.

Diversions.—No water is diverted above the station, and therefore the records represent the natural flow. Prior to July 1, 1912, there were adjudicated diversions for 3 second-feet below the station. From North French Creek there is an adjudicated diversion of 4 second-feet.

Accuracy.—Conditions are favorable for good results, and the estimates should be reliable.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of French Creek near French, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-feet.</i>
Apr. 30	Fletcher and Kingdon	1.60	46.6
May 31	R. H. Fletcher	2.60	453
June 11	do.	2.50	385
June 21	do.	2.65	429
July 12	do.	1.82	85.9

Daily gage height, in feet, and discharge, in second-feet, of French Creek near French, Wyo., for 1911.

[Mrs. J. W. Jenkins, observer.]

Day.	April.		May.		June.		July.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....			1.55	44	2.90	610	2.20	225
2.....			1.52	40	2.90	610	2.15	202
3.....			1.50	38	2.85	580	2.10	180
4.....			1.55	44	2.85	580	2.10	180
5.....			1.72	69	2.80	550	2.05	160
6.....			1.92	114	2.90	610	2.00	140
7.....			2.00	140	3.05	702	2.00	140
8.....			2.20	225	3.35	898	2.00	140
9.....			2.35	300	2.95	640	1.95	124
10.....			2.25	250	2.90	610	1.90	107
11.....			2.12	189	3.00	670	1.85	95
12.....			2.00	140	2.85	580	1.80	83
13.....			2.20	225	2.85	580	1.80	83
14.....			2.28	265	2.85	580	1.80	83
15.....			2.45	352	3.00	670	1.80	83
16.....			2.50	380	3.25	832		
17.....			2.55	408	2.95	640		
18.....			2.55	408	2.85	580		
19.....			2.35	300	2.85	580		
20.....			2.18	216	2.95	640		
21.....			2.12	189	2.90	610		
22.....			2.20	225	2.80	550		
23.....			2.30	275	2.70	490		
24.....			2.35	300	2.60	435		
25.....			2.48	369	2.50	380		
26.....			2.45	352	2.40	325		
27.....			2.35	300	2.32	285		
28.....			2.45	352	2.30	275		
29.....			2.55	408	2.25	250		
30.....	1.62	53	2.70	490	2.20	225		
31.....			2.75	520				

NOTE.—Daily discharge determined from a rating curve that is fairly well defined at all gage heights.

Monthly discharge of French Creek near French, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	520	38	256	15,700	B.
June.....	898	225	552	32,800	B.
July 1-15.....	225	83	135	4,020	B.

BRUSH CREEK NEAR SARATOGA, WYO.

Location.—On the county bridge half a mile above the mouth, about sec. 8, T. 15 N., R. 82 W. It is 18 miles southeast of Saratoga. There is no tributary below the station, and none for several miles above.

Records available.—April 28 to October 15, 1911.

Drainage area.—Not measured.

Gage.—Chain gage type.

Channel.—Apparently permanent.

Discharge measurements.—Made from bridge.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions from Brush Creek amounting to 87 second-feet, and from its tributaries 27 second-feet. Nearly all the diversions are above the station.

Accuracy.—Conditions are favorable for accurate results, and the estimates of flow should be reliable.

Cooperation.—Station maintained in cooperation with State engineer.

Discharge measurements of Brush Creek near Saratoga, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 28	Fletcher and Kingdon	2.75	111	June 22	R. H. Fletcher.....	3.80	410
June 1	R. H. Fletcher.....	4.35	759	July 12	do.....	1.65	17.7
11	do.....	3.80	339	Oct. 7	G. H. Russell.....	2.23	42.3

Daily gage height, in feet, of Brush Creek near Saratoga, Wyo., for 1911.

[Garland Gross, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1		2.6	4.3	2.05	1.2	1.35	2.35
2		2.6	4.45	2.1	1.25	1.3	2.45
3		2.7	4.1	2.05	1.25	1.35	2.65
4		3.0	4.1	2.1	1.25	1.25	2.55
5			3.7	1.95	1.15	1.25	2.5
6		3.15	4.1	2.05	1.15	1.2	2.55
7		3.7	4.1	2.0	1.25	1.25	2.4
8		3.85	4.2	1.85	1.25	1.2	2.25
9		3.85	4.4	1.65	1.35	1.35	2.5
10		3.5	3.7	1.65	1.45	1.3	2.4
11		3.45	4.1	1.7	1.45	1.35	2.15
12		3.55	4.2	1.65	1.45	1.35	1.95
13		3.4	4.1	1.7	1.45	1.3	1.8
14		3.65	4.2	1.7	1.4	1.2	1.85
15		3.9	4.8	1.75	1.3	1.25	1.65
16		3.95	4.6	1.6	1.25	1.25	
17		4.05	4.6	1.6	1.25	1.2	
18		4.0	4.6	1.65	1.25	1.2	
19		3.6	4.25	1.55	1.15	1.35	
20		3.4	4.35	1.55	1.25	1.3	
21		3.3	4.2	1.8	1.4	1.35	
22		3.35	4.2	1.8	1.5	1.35	
23		3.65	4.05	1.7	1.6	1.6	
24		3.45	3.95	1.65	1.65	1.6	
25		3.35	3.05	1.6	1.55	1.6	
26		3.15	2.55	1.5	1.45	1.6	
27		3.8	2.3	1.5	1.4	1.5	
28		2.78	2.05	1.45	1.3	1.25	
29		2.5	2.0	1.35	1.3	1.25	
30		4.1	2.0	1.25	1.4	1.55	
31		2.0	4.3	1.3	1.4		

Daily discharge, in second-feet, of Brush Creek near Saratoga, Wyo., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1		88	690	32	4	7	57
2		88	815	35	5	6	68
3		103	540	32	5	7	96
4		154	540	35	5	5	81
5		170	345	26	3	5	74
6		186	540	32	3	4	81
7		345	540	29	5	5	62
8		408	610	22	5	4	48
9		408	770	14	7	7	74
10		280	345	14	9	6	62
11		265	540	16	9	7	39
12		295	610	14	9	7	26
13		250	540	16	9	6	20
14		328	610	16	8	4	22
15		430	1,140	18	6	5	14
16		455	950	13	5	5	14
17		510	950	13	5	4	14
18		480	950	14	5	4	14
19		310	650	12	3	7	14
20		250	730	12	5	6	14
21		223	610	20	8	7	14
22		236	610	20	10	7	14
23		328	510	16	13	13	14
24		265	455	14	14	13	14
25		236	164	13	12	13	14
26		186	81	10	9	13	14
27		385	52	10	8	10	14
28	116	310	32	9	6	5	14
29	74	365	29	7	6	5	14
30	29	540	29	5	8	12	14
31		690		6	8		14

NOTE.—Daily discharge determined from a rating curve fairly well-defined between 10 and 860 second-feet. Discharge estimated Oct. 15 to 31.

Monthly discharge of Brush Creek near Saratoga, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
April 28-30.			73	434	B.
May	690	88	309	19,000	B.
June	1,140	29	533	31,700	B.
July	35	5	17.6	1,080	B.
August	14	3	7.0	430	B.
September	13	4	33.8	2,080	D.
October	96	14	a 15.0	892	
November			a 10.0	615	
December					
The period				56,600	

a Discharges estimated.

ENCAMPMENT RIVER AT ENCAMPMENT, WYO.

Location.—At the lower end of the smelter grounds at Encampment, in sec. 6, T. 14 N., R. 83 W. The nearest tributary is the North Fork, which enters 1 mile above.

Records available.—May 2 to November 10, 1911.

Drainage area.—235 square miles (measured from topographic sheets and King's Atlas).

Gage.—Chain gage type.

Channel.—A short distance below the station is a low diversion dam which may cause backwater whenever additional brush or drift collects on its crest.

Discharge measurements.—Made from car and cable.

Winter flow.—Ice causes backwater during the winter months, and the records are discontinued.

Diversions.—Three large irrigation ditches divert water at a point 1 mile above the station. The smelter company has a pipe line which diverts water above the station, but as the tailrace of the power plant which the pipe line supplies is located just above the station, the amount diverted passes the gage. Water is also diverted below the station. Prior to July 1, 1912, there were adjudicated diversions from Encampment River amounting to 61 second-feet and from tributaries entering above 31 second-feet.

Accuracy.—The lodging of débris on the point of control makes the conditions somewhat uncertain, and therefore the estimates of flow can not be considered better than fair or possibly good.

Coöperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of Encampment River at Encampment, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 2	Fletcher and Kingdon	4.00	331	June 20	R. H. Fletcher	5.35	1,250
30	R. H. Fletcher	5.80	1,540	July 11	do	3.50	200
June 10	do	5.55	1,450	Oct. 7	G. H. Russell	3.90	177

Daily gage height, in feet, of Encampment River at Encampment, Wyo., for 1911.

[Paul N. Elderkin, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1		6.4	4.20	2.80	3.10	4.15	3.4
2	4.00	6.3	4.1	2.8	3.3	3.65	3.3
3	3.85	6.2	4.1	2.8	3.2	3.85	3.15
4	3.95	6.2	4.1	2.7	3.3	3.6	3.2
5	4.5	6.2	4.0	2.7	3.25	4.5	3.35
6		5.0	6.0	3.8	2.7	3.3	4.0
7		5.1	6.0	3.7	2.8	3.15	3.9
8		5.6	6.6	3.6	2.7	3.1	3.8
9		5.5	5.6	3.5	2.8	3.1	3.8
10		5.4	5.5	3.5	2.9	3.15	3.75
11		5.2	5.7	3.5	3.1	3.15	3.7
12		5.3	5.3	3.5	3.1	3.15	3.65
13		5.6	5.2	3.65	3.1	3.1	3.65
14		5.8	5.4	3.6	3.1	3.15	3.6
15		5.9	6.3	3.75	3.1	3.15	3.6
16		5.8	6.2	3.5	3.1	3.15	3.5
17		5.6	6.4	3.4	3.1	3.0	3.6
18		5.5	5.4	3.4	3.0	2.95	3.6
19		5.4	5.2	3.55	3.0	3.0	3.6
20		5.2	5.4	3.4	3.0	3.1	3.4
21		5.0	5.4	3.5	3.1	3.05	3.5
22		5.0	5.2	3.4	3.1	3.1	3.5
23		5.1	5.2	3.4	3.1	3.3	3.5
24		5.2	5.0	3.4	3.1	3.2	3.45
25		5.4	4.8	3.4	3.1	3.2	3.45
26		6.0	4.6	3.2	3.1	3.1	3.4
27		6.0	4.6	3.1	3.1	3.1	3.4
28		5.9	4.45	3.0	3.0	3.2	3.4
29		5.8	4.35	2.8	3.0	3.1	3.4
30		5.8	4.25	2.8	3.0	4.1	3.3
31		6.2		2.85	3.1		3.35

Daily discharge, in second-feet, of Encampment River at Encampment, Wyo., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	300	2,240	432	72	114	385	85
2.....	344	2,130	386	72	151	180	74
3.....	289	2,030	386	72	132	230	62
4.....	325	2,030	386	62	151	150	65
5.....	595	2,030	344	62	142	440	80
6.....	935	1,830	272	62	151	220	65
7.....	1,020	1,830	242	72	123	190	80
8.....	1,440	2,460	215	62	114	150	98
9.....	1,360	1,440	192	72	114	150	80
10.....	1,260	1,360	192	84	123	140	80
11.....	1,100	1,540	192	114	123	130	.....
12.....	1,180	1,180	192	114	123	122	.....
13.....	1,440	1,100	228	114	114	122	.....
14.....	1,640	1,260	215	114	123	113	.....
15.....	1,730	2,130	257	114	123	113	.....
16.....	1,640	2,030	192	114	123	98	.....
17.....	1,440	2,240	171	114	98	113	.....
18.....	1,360	1,260	171	98	91	113	.....
19.....	1,260	1,100	204	98	98	113	.....
20.....	1,100	1,260	171	98	114	85	.....
21.....	935	1,260	192	114	106	98	.....
22.....	935	1,100	171	114	114	98	.....
23.....	1,020	1,100	171	114	151	98	.....
24.....	1,100	935	171	114	132	92	.....
25.....	1,260	790	171	114	132	92	.....
26.....	1,830	655	132	114	114	85	.....
27.....	1,830	655	114	114	114	85	.....
28.....	1,730	566	98	98	132	85	.....
29.....	1,640	510	72	98	114	85	.....
30.....	1,640	457	72	98	375	74	.....
31.....	2,030	.....	78	114	.....	80	.....

NOTE.—Daily discharge determined as follows: May 2 to Sept. 29, from curve fairly well defined; Oct. 8 to Nov. 10, from poorly defined curve; Sept. 30 to Oct. 7, by indirect method for shifting channels.

Monthly discharge of Encampment River at Encampment, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	2,030	289	1,220	75,000	C.
June.....	2,460	457	1,420	84,500	C.
July.....	432	72	209	12,900	C.
August.....	114	62	96.5	5,930	C.
September.....	375	91	131	7,800	C.
October.....	440	74	140	8,610	D.
November 1-10.....	98	62	76.9	1,530	D.
The period.....	.....	.....	.....	196,000	.....

COW CREEK NEAR SARATOGA, WYO.

Location.—At highway bridge in sec. 36, T. 16 N., R. 84 W., and 9 miles south of Saratoga. There are no tributaries between the station and the mouth, 4 miles below. Calf Creek enters about 2 miles above.

Records available.—May 3, 1911, to October 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Shifting.

Discharge measurements.—Made from bridge during high water, and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months and the records are discontinued.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions from Cow Creek of 84 second-feet and from its tributaries, 27 second-feet, nearly all above the station.

Accuracy.—Owing to the shifting channel the estimates have been obtained by the indirect method and can only be considered fair.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of Cow Creek near Saratoga, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 3	Fletcher and Kingdon.	2.30	34.1	June 20	R. H. Fletcher.....	3.00	150
29	R. H. Fletcher.....	2.75	95.6	July 11	.....do.....	2.00	2.1
June 10	.....do.....	3.10	140	Oct. 6	G. H. Russell.....	2.34	24.4

Daily gage height, in feet, of Cow Creek near Saratoga, Wyo., for 1911.

[Margaret Sullivan, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		2.95	2.30	2.0	2.05	2.2	16....	3.00	3.45	2.05	2.0	2.0	2.2
2.....		2.90	2.22	2.0	2.05	2.2	17....	2.95	3.35	2.05	2.0	2.0	2.2
3.....	2.30	3.15	2.22	2.0	2.05	2.2	18....	2.95	3.25	2.0	2.0	2.0	2.2
4.....	2.30	3.25	2.28	2.0	2.05	2.3	19....	2.98	3.00	2.0	2.0	2.0	2.2
5.....	2.30	3.18	2.30	2.0	2.0	2.32	20....	2.92	3.00	2.05	2.0	2.0	2.2
6.....	2.55	3.29	2.40	2.0	2.02	2.35	21....	2.90	2.95	2.0	2.0	2.0	2.2
7.....	2.65	3.28	2.15	2.0	2.0	2.25	22....	2.75	2.92	2.0	2.05	2.0	2.2
8.....	2.80	3.38	2.0	2.0	2.0	2.22	23....	2.65	2.80	2.0	2.0	2.0	2.2
9.....	3.05	3.40	2.0	2.0	2.0	2.2	24....	2.75	2.75	2.0	2.0	2.0	2.2
10....	3.05	3.10	2.0	2.05	2.0	2.2	25....	2.85	2.70	2.0	2.0	2.0	2.2
11....	2.70	2.98	2.0	2.0	2.0	2.2	26....	3.00	2.68	2.0	2.0	2.0	2.2
12....	2.60	2.95	2.0	2.0	2.0	2.2	27....	2.85	2.60	2.05	2.0	2.0	2.2
13....	2.48	3.00	2.0	2.0	2.0	2.2	28....	2.90	2.40	2.0	2.0	2.0	2.2
14....	2.78	3.05	2.1	2.0	2.0	2.2	29....	2.75	2.45	2.0	2.05	2.0	2.2
15....	2.98	3.15	2.15	2.0	2.0	2.2	30....	2.70	2.45	2.05	2.05	2.05	2.2
							31....	2.65	.....	2.0	2.05	.....	2.2

Daily discharge, in second-feet, of Cow Creek near Saratoga, Wyo., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1....	25	129	30	2	5	• 16	16....	143	218	5	2	2	8
2....	25	116	20	2	5	• 16	17....	134	204	5	2	2	8
3....	30	147	20	2	5	14	18....	134	184	2	2	2	8
4....	30	180	28	2	5	25	19....	139	143	2	2	2	8
5....	30	162	30	2	2	25	20....	129	143	5	2	2	8
6....	66	184	44	2	3	24	21....	125	134	2	2	2	8
7....	82	183	13	2	2	13	22....	98	129	2	5	2	8
8....	107	193	2	2	2	10	23....	82	107	2	2	2	8
9....	152	197	2	2	2	8	24....	98	98	2	2	2	8
10....	152	142	2	5	2	8	25....	116	90	2	2	2	8
11....	90	126	2	2	2	8	26....	143	87	2	2	2	8
12....	74	121	2	2	2	8	27....	116	74	5	2	2	8
13....	56	129	2	2	2	8	28....	125	44	2	2	2	8
14....	104	143	8	2	2	8	29....	98	52	2	5	2	8
15....	139	160	13	2	2	8	30....	86	52	5	5	5	8
							31....	78	.....	2	5	.....	8

NOTE.—Daily discharge determined as follows: May 3 to 29 and June 21 to Sept. 30 from curve fairly well defined at all gage heights; Oct. 7 to 31, from poorly-defined curve; May 30 to June 20 and Oct. 1 to 6 by indirect method for shifting channels.

Monthly discharge of Cow Creek near Saratoga, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	152	25	97.0	5,960	C.
June.....	218	44	136	8,090	C.
July.....	44	2	8.5	523	C.
August.....	5	2	2.5	154	C.
September.....	5	2	2.5	149	C.
October.....	25	8	10.5	646	C.
The period.....				15,500	

SPRING CREEK NEAR SARATOGA, WYO.

Location.—At highway bridge, in sec. 23, T. 17 N, R. 84 W., and 2 miles southwest of Saratoga. There is no tributary between the station and the mouth, three-fourths of a mile below.

Records available.—May 3 to October 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Somewhat shifting.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions of 5 second-feet from Spring Creek, 85 second-feet from North Spring Creek, and 104 second-feet from South Spring Creek. These diversions are all above the station.

Accuracy.—Owing to the somewhat shifting channel the estimates of discharge can not be considered better than fair or possibly good.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of Spring Creek near Saratoga, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 3	Fletcher and Kingdon.	1.00	41.3	June 20	R. H. Fletcher.....	2.05	219
29	R. H. Fletcher.....	2.00	176	July 11	.....do.....	.52	a 1.5
June 10	.....do.....	3.00	356	Oct. 6	G. H. Russell.....	1.23	56.0

a Estimated.

Daily gage height, in feet, and discharge, in second-feet, of Spring Creek near Saratoga, Wyo., for 1911.

[Vada Lyons, observer.]

Day.	May.		June.		July.		August.		September.		October.	
	Gage-height.	Dis-charge.	Gage-height.	Dis-charge.	Gage-height.	Dis-charge.	Gage-height.	Dis-charge.	Gage-height.	Dis-charge.	Gage-height.	Dis-charge.
1.....		35	2.0	175	1.1	62	0.5	6	0.2	1	0.9	27
2.....		35	2.3	225	1.15	70	.45	5	.2	1	.9	27
3.....	1.0	41	2.2	208	1.0	50	.4	4		0	1.0	37
4.....	1.0	41	2.25	216	.9	40	.4	4		0	.9	25
5.....	1.05	46	2.25	216	.8	25	.4	4		0	.95	29
6.....	1.2	63	2.35	232	.8	25	.4	4		0	1.2	52
7.....	1.4	87	2.35	232	.75	21	.4	4		0	1.0	31
8.....	1.5	100	2.6	278	.65	13		0		0	.9	21
9.....	1.75	136	3.0	356	.5	7		0		0	.9	21
10.....	1.95	167	2.7	297	.5	7		0		0	.9	21
11.....	1.85	151	2.2	217	.5	6		0		0	.9	21
12.....	1.55	107	2.25	227	.5	6	.6	9		0	.9	21
13.....	1.55	107	2.15	210	.5	6	.6	9	.6	9	.9	21
14.....	1.75	136	2.4	263	.7	13	.5	6	.6	9	.9	21
15.....	2.0	175	2.45	271	.7	13	.4	4	.6	9	.9	21
16.....	1.95	167	2.4	263	.7	13	.5	6	.65	11	.9	21
17.....	2.1	191	2.9	368	.7	13	.5	6	.7	13	.9	21
18.....	2.1	191	2.6	310	.65	11	.5	6	.7	13	.9	21
19.....	2.05	183	2.2	237	.6	9	.45	5	.6	9	.9	21
20.....	2.0	175	2.15	236	.6	9	.45	5	.6	9	.9	21
21.....	1.8	143	2.25	254	.6	9	.5	6	.6	9	.9	21
22.....	1.6	114	2.1	228	.6	9	.5	6	.6	9	.9	21
23.....	1.6	114	1.95	192	.6	9	.6	9	.6	9	.9	21
24.....	1.55	107	1.8	168	.6	9	.5	6	.6	9	.9	21
25.....	1.7	128	1.55	130	.6	9	.55	7.5	.6	9	.9	21
25.....	1.85	151	1.45	115	.55	7.5	.5	6	.6	9	.9	21
27.....	1.9	159	1.3	95	.5	6	.5	6	.6	9	.9	21
28.....	1.85	151	1.1	70	.5	6	.45	5	.7	13	.9	21
29.....	1.8	143	1.15	70	.5	6	.4	4	.7	13	.9	21
30.....	1.8	143	1.1	62	.5	6	.25	1.5	.7	13	.9	21
31.....	1.95	167			.5	6	.2	1			.9	21

NOTE.—Daily discharge determined as follows: May 3 to June 10, July 12 to Sept. 30, and Oct. 7 to 31 from rating curves poorly defined; all other periods by indirect method for shifting channels. Channel dry Aug. 8 to 11 and Sept. 3 to 12.

Monthly discharge of Spring Creek near Saratoga, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	191	35	124	7,620	C.
June.....	368	62	214	12,700	C.
July.....	70	6	16.2	996	C.
August.....	9	0	4.7	289	C.
September.....	13	0	6.2	369	C.
October.....	52	21	23.6	1,450	C.
The period.....				23,400	

JACK CREEK NEAR SARATOGA, WYO.

Location.—At Burdick's ranch, in sec. 28, T. 18 N., R. 84 W., about 5 miles northwest of Saratoga. There is no tributary between the station and the mouth, 1 mile below. There is no tributary for a distance of several miles above.

Records available.—April 26 to October 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Apparently permanent.

Discharge measurements.—Made from private bridge.

Winter flow.—Ice causes backwater during the winter months, and the records are discontinued.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions of 92 second-feet from Jack Creek. These diversions are all above the station.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of Jack Creek near Saratoga, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 26	Fletcher and Kingdon	1.55	37.9	June 20	R. H. Fletcher	1.72	54.1
May 28	R. H. Fletcher	1.65	45.2	July 13	do	.78	1.7
June 9	do	2.20	100	Oct. 6	G. H. Russell	1.50	31.9

Daily gage height, in feet, of Jack Creek near Saratoga, Wyo., for 1911.

[Mrs A. E. Dahl, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1		1.68	1.70	0.92	0.60	0.60	0.95
2		1.62	1.70	.92	.60	.60	1.00
3		1.60	1.78	.98	.55	.60	1.00
4		1.62	1.72	.92	.55	.60	1.00
5		1.72	1.70	.95	.55	.60	1.10
6		1.92	1.70	.92	.55	.65	1.50
7		2.05	1.70	.90	.55	.65	1.30
8		2.00	1.70	.90	.55	.65	1.20
9		2.30	2.10	.82	.55	.60	1.10
10		2.30	2.05	.80	.55	.60	1.10
11		2.00	1.80	.78	.60	.60	1.10
12		1.90	1.72	.72	.60	.60	1.10
13		1.90	1.62	.68	.60	.60	1.05
14		2.05	1.65	.65	.60	.60	1.05
15		2.15	1.85	.65	.60	.60	1.05
16		2.15	2.30	.65	.60	.60	1.10
17		2.05	2.60	.65	.65	.65	1.05
18		1.95	1.95	.68	.60	.65	1.05
19		1.90	1.80	.70	.60	.65	1.05
20		1.85	1.70	.70	.60	.65	1.05
21		1.80	1.72	.70	.60	.65	1.05
22		1.65	1.68	.70	.60	.65	1.05
23		1.60	1.62	.70	.72	.65	1.05
24		1.65	1.52	.70	.70	.70	1.05
25		1.65	1.50	.70	.68	.70	1.05
26	1.58	1.70	1.48	.70	.60	.70	1.10
27	1.65	1.75	1.32	.68	.60	.90	1.10
28	1.68	1.68	1.15	.65	.60	.85	1.10
29	1.72	1.65	1.10	.62	.60	.80	1.10
30	1.70	1.60	.92	.60	.60	.85	1.10
31		1.65		.60	.60		1.10

Daily discharge, in second-feet, of Jack Creek near Saratoga, Wyo., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		47	49	4.6	0.5	0.5	5.5
2.....		43	49	4.6	.5	.5	7.0
3.....		41	56	6.4	.2	.5	7.0
4.....		43	51	4.6	.2	.5	7.0
5.....		51	49	5.5	.2	.5	11
6.....		69	49	4.6	.2	.8	34
7.....		82	49	4.0	.2	.8	21
8.....		77	49	4.0	.2	.8	16
9.....		111	88	2.4	.2	.5	11
10.....		111	82	2.0	.2	.5	11
11.....		77	58	1.8	.5	.5	11
12.....		67	51	1.2	.5	.5	11
13.....		67	43	.9	.5	.5	9.0
14.....		82	45	.8	.5	.5	9.0
15.....		94	62	.8	.5	.5	9.0
16.....		94	111	.8	.5	.5	11
17.....		82	149	.8	.8	.8	9.0
18.....		72	72	.9	.5	.8	9.0
19.....		67	58	1.0	.5	.8	9.0
20.....		62	49	1.0	.5	.8	9.0
21.....		58	51	1.0	.5	.8	9.0
22.....		45	47	1.0	.5	.8	9.0
23.....		41	43	1.0	1.2	.8	9.0
24.....		45	35	1.0	1.0	1.0	9.0
25.....		45	64	1.0	.9	1.0	9.0
26.....	40	49	33	1.0	.5	1.0	11
27.....	45	54	22	.9	.5	4.0	11
28.....	47	47	14	.8	.5	3.0	11
29.....	51	45	11	.6	.5	2.0	11
30.....	49	41	4.6	.5	.5	3.0	11
31.....		45		.5	.5		11

NOTE.—Daily discharge determined from a fairly well-defined rating curve.

Monthly discharge of Jack Creek near Saratoga, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy
	Maximum.	Minimum.	Mean.		
April 26-30.....			46.4	460	B.
May.....	111	41	63.0	3,870	B.
June.....	149	4.6	52.1	3,100	B.
July.....	6.4	.5	2.00	123	C.
August.....	1.2	.2	.48	30	C.
September.....	4.0	.5	.98	58	C.
October.....	34	5.5	10.9	670	D.
November.....			a 8.00	476	D.
December.....			a 6.00	369	D.
The period.....				9,160	

a Estimated.

PASS CREEK NEAR WALCOTT, WYO.

Location.—At Crone's ranch, 4 miles south of Walcott. There is no important tributary between the station and the mouth, several miles below.

Records available.—May 4 to October 4, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Apparently permanent.

Discharge measurements.—Made by wading.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions from Pass Creek of 155 second-feet, and from tributaries, 33 second-feet. It is probable that the greater part of the diversions is above the station.

Accuracy.—Conditions are favorable for accurate results, and the estimates should be reliable.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of Pass Creek near Walcott, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 4	Fletcher and Kingdon	2.05	20.6	June 19	R. H. Fletcher	3.00	88.9
28	R. H. Fletcher	2.30	39.9	July 10	do.	1.28	^a 1.0
June 9	do.	1.90	17.3	Oct. 4	G. H. Russell	1.39	1.0

^a Estimated.

Daily gage height, in feet, and discharge, in second-feet, of Pass Creek near Walcott, Wyo. for 1911.

[A. Crone, observer.]

Day.	May.		June.		July.		Day	May.		June.		July.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.		Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1		20	2.10	25	1.35	1.0	16		27	3.35	118	1.2	.0
2		20	2.2	31	1.3	.5	17		28	4.7	241	1.2	.0
3		21	2.2	31	1.3	.5	18		28	4.25	198	1.2	.0
4	2.05	22	2.15	28	1.3	.5	19		29	2.9	81	1.2	.0
5		22	2.0	20	1.3	.5	20		29	2.75	69	1.2	.0
6		22	1.95	18	1.3	.5	21		30	2.45	48	1.2	.0
7		23	1.95	18	1.3	.5	22		30	2.45	48	1.2	.0
8		23	1.9	15	1.25	.2	23		31	2.25	34	1.2	.0
9		24	1.9	15	1.2	.0	24		31	2.4	44	1.2	.0
10		24	2.3	37	1.25	.2	25		32	2.25	34	1.2	.0
11		25	2.05	22	1.25	.2	26		32	1.65	6.8	1.1	.0
12		25	1.95	18	1.25	.2	27		33	1.6	5.5	1.1	.0
13		26	2.25	34	1.2	.0	28	2.25	34	1.5	3.5		.0
14		26	2.2	31	1.2	.0	29	2.1	25	1.45	2.5		.0
15		27	1.6	5.5	1.2	.0	30	2.0	20	1.45	2.5		.0
							31	2.0	20				.0

NOTE.—Daily discharge determined from a rating curve fairly well defined below 90 second-feet. Discharge interpolated May 1 to 3 and May 5 to 27. No flow during August and September.

Monthly discharge of Pass Creek near Walcott, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	34	20	26.1	1,600	C.
June.....	241	2.5	42.8	2,550	B.
July.....	1	.0	.15	9.2	B.
August.....			0	0	
September.....			0	0	
The period.....				4,160	

MEDICINE BOW RIVER NEAR MEDICINE BOW, WYO.

Location.—At Johnson's ranch, in sec. 7, T. 20 N., R. 79 W., 14 miles southwest of Medicine Bow. The nearest tributary enters 3 miles below.

Records available.—June 4 to November 4, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Slightly shifting.

Discharge measurements.—Made from bridge and by wading.

Winter flow.—Ice causes backwater during the winter months and the records are discontinued.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions from Medicine Bow River of 230 second-feet, a large portion of which are above the station.

Accuracy.—Conditions are favorable for good results and the estimates should be reliable.

Cooperation.—Station maintained in cooperation with the State engineer and with Johnson & Crownberg.

Discharge measurements of Medicine Bow River near Medicine Bow, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
June 4	Fletcher and Whiting.	6.90	676	June 28	J. A. Whiting.....	5.80	158
13	R. H. Fletcher.....	6.87	637	July 14	R. H. Fletcher.....	5.05	7.3
23	.....do.....	6.50	492	Oct. 8	G. H. Russell.....	5.39	28.0

Daily gage height, in feet, of Medicine Bow River near Medicine Bow, Wyo., for 1911.

[Mrs. S. W. Johnson, observer.]

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		5.7	5.0	.....	5.22	5.27	16....	7.6	5.15	4.8	4.82	5.52	.....
2.....		5.75	5.0	.....	5.22	5.27	17....	7.8	5.15	4.8	5.32	5.47	.....
3.....		5.7	5.0	.....	5.32	5.27	18....	7.6	5.15	4.8	5.32	5.42	.....
4.....	6.9	5.7	4.95	.....	5.32	5.27	19....	7.1	5.15	4.75	5.32	5.42	.....
5.....	7.2	5.6	4.95	.....	5.42	.....	20....	6.9	5.25	4.75	4.92	5.42	.....
6.....	7.2	5.55	4.95	.....	5.47	.....	21....	6.9	5.25	4.75	4.92	5.37	.....
7.....	7.1	5.45	4.95	.....	5.72	.....	22....	6.8	5.25	4.75	4.92	5.37	.....
8.....	7.05	5.35	4.9	4.82	5.67	.....	23....	6.55	5.25	4.75	4.92	5.37	.....
9.....	7.8	5.35	4.9	4.82	5.67	.....	24....	6.45	5.25	4.85	4.92	5.37	.....
10.....	6.7	5.35	4.9	4.82	5.62	.....	25....	6.3	5.2	4.85	4.97	5.37	.....
11.....	6.85	5.35	4.9	4.82	5.62	.....	26....	6.15	5.15	4.85	5.07	5.32	.....
12.....	6.85	5.3	4.85	4.82	5.62	.....	27....	6.0	5.15	4.85	5.17	5.32	.....
13.....	6.9	5.25	4.85	4.82	5.57	.....	28....	5.9	5.1	4.95	5.27	5.32	.....
14.....	6.9	5.2	4.85	4.82	5.57	.....	29....	5.8	5.1	4.9	5.27	5.32	.....
15.....	6.95	5.15	4.8	4.82	5.57	.....	30....	5.75	5.05	.....	5.27	5.32	.....
							31....	.....	5.05	.....	.....	5.27	.....

NOTE.—Channel dry Aug. 30 to Sept. 7.

Daily discharge, in second-feet, of Medicine Bow River near Medicine Bow, Wyo., for 1911.

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	.....	128	5.0	0.0	18	10	16....	1,080	14	1.0	1.2	42	.....
2.....	.....	145	5.0	.0	18	10	17....	1,200	14	1.0	36	35	.....
3.....	.....	128	5.0	.0	25	10	18....	1,080	14	1.0	36	28	.....
4.....	680	128	3.5	.0	25	10	19....	790	14	.0	36	28	.....
5.....	845	98	3.5	.0	35	.....	20....	680	26	.0	2.6	28	.....
6.....	845	85	3.5	.0	40	.....	21....	680	26	.0	2.6	22	.....
7.....	790	61	3.5	.0	95	.....	22....	626	26	.0	2.6	22	.....
8.....	762	41	2.0	1.2	70	.....	23....	496	26	.0	2.6	22	.....
9.....	1,200	41	2.0	1.2	70	.....	24....	445	26	1.5	2.6	22	.....
10....	573	41	2.0	1.2	60	.....	25....	372	19	1.5	4.1	22	.....
11....	653	41	2.0	1.2	60	.....	26....	304	14	1.5	8.5	16	.....
12....	653	32	1.5	1.2	60	.....	27....	240	14	1.5	16	16	.....
13....	680	26	1.5	1.2	50	.....	28....	200	10	3.5	28	16	.....
14....	680	19	1.5	1.2	50	.....	29....	162	10	2.0	28	16	.....
15....	708	14	1.0	1.2	50	.....	30....	145	7.5	.0	28	16	.....
							31....	.....	7.5	.0	.....	10	.....

NOTE.—Daily discharge determined as follows: June 4 to Sept. 30 from fairly well defined rating curve; Oct. 9 to Nov. 4, curve poorly defined; Oct. 1 to 8, by indirect method for shifting channels.

Monthly discharge of Medicine Bow River near Medicine Bow, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
June 4-30.....	1,200	145	651	34,900	B.
July.....	145	7.5	41.8	2,570	B.
August.....	5.0	.0	1.84	113	B.
September.....	36	.0	8.15	485	B.
October.....	95	10	35.1	2,160	C.
November.....	.....	.....	α 10	595	D.
December.....	.....	.....	α 10	615	D.
The period.....	.....	.....	.....	41,400	

α Estimated.

ROCK CREEK NEAR ARLINGTON, WYO.

Location.—At highway bridge in sec. 25, T. 19 N., R. 79 W., $1\frac{1}{2}$ miles upstream from Arlington post office; 1 mile below the mouth of Overland Creek, the nearest tributary.

Records available.—April 22 to November 4, 1911.

Drainage area.—70 square miles (measured from Forest Service Atlas).

Gage.—Vertical staff.

Channel.—Shifting.

Discharge measurements.—Made from bridge.

Winter flow.—Ice causes backwater during the winter months and the records are discontinued.

Diversions.—One small ditch diverts water above the station for irrigation.

Accuracy.—As the channel shifts the estimates have been obtained by the indirect method and can be considered only fair except for those months when the measurements indicated no shift, when they are probably good.

Cooperation.—Station maintained in cooperation with the State engineer and the Rock Creek Conservation Co.

Discharge measurements of Rock Creek near Arlington, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		Feet.	Sec.-ft.			Feet.	Sec.-ft.
May 26	Fletcher and Whiting..	2.80	436	July 9	Fletcher and Cum- mings.....	1.60	98.5
June 3	.....do.....	3.10	686	Aug. 23	F. T. Cummings.....	1.40	61.8
7	Fletcher and Cum- mings.....	3.45	995	Aug. 22	.....do.....	1.20	28.8
18	Fletcher and Whiting..	2.60	465	Nov. 3	.....do.....	1.30	23.5
27	J. A. Whiting.....	2.30	200				

Daily gage height, in feet, of Rock Creek near Arlington, Wyo., for 1911.

[Leon Clearwater, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		1.5	3.1	2.2	1.4	1.2	1.1	1.4
2.		1.4	3.4	2.1	1.4	1.1	1.2	1.4
3.		1.4	3.1	1.9	1.4	1.2	1.1	1.4
4.		1.5	3.2	1.8	1.3	1.2	1.1	1.3
5.		1.6	3.3	1.8	1.4	1.1	1.1	.....
6.		1.6	3.5	1.8	1.4	1.3	1.2	.....
7.		1.9	3.9	1.7	1.3	1.2	1.3	.....
8.		2.0	3.6	1.8	1.3	1.1	1.3	.....
9.		2.4	3.1	1.6	1.3	1.1	1.4	.....
10.		2.5	2.9	1.6	1.4	1.0	1.4	.....
11.		2.0	2.8	1.6	1.3	1.0	1.3	.....
12.		2.2	2.7	1.7	1.3	1.0	1.4	.....
13.		2.2	2.9	1.6	1.2	1.0	1.4	.....
14.		2.3	3.0	1.6	1.3	1.0	1.4	.....
15.		2.3	3.1	1.5	1.3	1.0	1.4	.....
16.		2.5	3.3	1.6	1.2	1.1	1.4	.....
17.		2.6	3.6	1.6	1.1	1.1	1.4	.....
18.		2.7	2.8	1.5	1.2	1.2	1.4	.....
19.		2.8	2.8	1.6	1.1	1.1	1.5	.....
20.		2.4	3.0	1.5	1.2	1.1	1.4	.....
21.		2.3	3.1	1.4	1.1	1.1	1.4	.....
22.	1.1	2.2	2.8	1.4	1.2	1.0	1.4	.....
23.	1.2	2.3	2.6	1.4	1.3	1.1	1.4	.....
24.	1.2	2.4	2.5	1.4	1.2	1.1	1.4	.....
25.	1.3	2.5	2.4	1.4	1.2	1.1	1.4	.....
26.	1.3	2.8	2.2	1.4	1.2	1.1	1.4	.....
27.	1.4	2.9	2.2	1.4	1.15	1.0	1.4	.....
28.	1.5	2.5	2.4	1.4	1.1	1.0	1.4	.....
29.	1.6	2.6	2.5	1.3	1.1	1.0	1.4	.....
30.	1.5	2.9	2.3	1.4	1.1	1.1	1.4	.....
31.		3.0	.....	1.4	1.2	.....	1.3	.....

Daily discharge, in second-feet, of Rock Creek near Arlington, Wyo., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		72	690	195	57	33	24	35
2.		57	950	170	57	24	33	35
3.		57	690	140	57	33	24	35
4.		72	770	120	44	33	24	26
5.		89	860	120	57	24	24	.....
6.		89	1,050	127	57	44	33	.....
7.		148	1,450	107	44	33	44	.....
8.		171	1,150	127	44	24	44	.....
9.		294	690	89	44	24	57	.....
10.		335	590	89	57	17	57	.....
11.		171	520	89	44	17	40	.....
12.		226	460	107	44	17	52	.....
13.		226	600	89	33	17	52	.....
14.		258	700	89	44	17	52	.....
15.		258	780	72	44	17	52	.....
16.		335	1,000	89	33	24	52	.....
17.		380	1,310	89	24	24	52	.....
18.		430	590	72	33	33	52	.....
19.		490	590	89	24	24	64	.....
20.		294	640	72	33	24	52	.....
21.		258	720	57	24	24	43	.....
22.	24	226	510	57	33	17	43	.....
23.	33	258	340	57	44	24	43	.....
24.	33	294	300	57	33	24	43	.....
25.	44	335	270	57	33	24	43	.....
26.	44	490	175	57	33	24	43	.....
27.	57	550	175	57	28	17	43	.....
28.	72	335	230	57	24	17	43	.....
29.	89	380	265	44	24	17	43	.....
30.	72	550	220	57	24	24	43	.....
31.		620	.....	57	33	.....	33	.....

NOTE.—Daily discharge determined as follows: Apr. 22 to June 7 and July 10 to Oct. 5, from poorly defined rating curve; June 8 to July 9 and Oct. 6 to Nov. 4, by indirect method for shifting channels.

Monthly discharge of Rock Creek near Arlington, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
Apr. 22-30.....	89	24	52.0	928	C.
May.....	620	57	282	17,300	C.
June.....	1,450	175	643	38,300	C.
July.....	195	44	88.9	5,470	C.
August.....	57	24	38.9	2,390	C.
September.....	44	17	23.8	1,420	C.
October.....	64	24	43.5	2,670	C.
The period.....				68,500	

ROCK CREEK NEAR ROCK RIVER, WYO.

Location.—At Phelan's ranch, in sec. 6, T. 20 N., R. 76 W., 1 mile southeast of Rock River. No important tributary between the station and the mouth, several miles below.

Records available.—March 25 to December 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Shifting.

Discharge measurements.—Made from private bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions from Rock Creek of 232 second-feet, and from tributaries, 73 second-feet, chiefly above the station.

Accuracy.—As the channel shifts the estimates have been obtained by the indirect method and can be considered only fair.

Cooperation.—Station maintained in cooperation with the State engineer and the Rock Creek Conservation Co.

Discharge measurements of Rock Creek near Rock River, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 26	Fletcher and Whiting..	1.60	200	June 25	Whiting and Cummings	1.60	238
June 2	.....do.....	2.40	568	July 8	Fletcher and Whiting..	.70	24.2
8	Fletcher and Cummings	2.80	762	22	F. T. Cummings.....	.50	18.0
17	Fletcher and Whiting..	3.30	896	Nov. 4	.....do.....	.80	a 10.0

a Estimated.

Daily gage height, in feet, of Rock Creek near Rock River, Wyo., for 1911.

[E. E. Clark, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		0.8	0.4	2.0	1.2	0.2	.....	0.3	0.6	0.9
2.....		.8	.4	2.3	1.2	.2	.....	.3	.7	.9
3.....		.8	.4	2.2	1.2	.3	.....	.3	.8	.9
4.....		.7	.5	2.45	1.2	.4	.....	.4	.8	.9
5.....		.7	.4	2.5	1.1	.4	.....	.4	.8	.9
6.....		.7	.4	2.4	1.0	.4	.....	.3	.8	.9
6.....		.6	.4	3.0	1.0	.4	.....	.3	.8	.9
8.....		.5	.4	3.0	1.0	.4	.....	.3	.8	.9
9.....		.5	.6	2.9	.9	.4	.....	.4	.8	.9
10.....		.5	.8	2.5	.8	.4	.....	.4	.8	.9

Daily gage height, in feet, of Rock Creek near Rock River, Wyo., for 1911—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11.....		0.5	1.0	2.0	.8	0.4		0.4	0.8	0.9
12.....		.3	1.0	2.0	.8	.4		.4	.8	.9
13.....		.3	1.0	2.1	.8	.3		.4	.8	.9
14.....		.3	1.1	2.1	.7	.3		.4	.8	.9
15.....		.3	1.1	2.0	.7	.2		.4	.8	.9
16.....		.3	1.3	3.0	.7	.4		.4	.8	.9
17.....		.3	1.4	3.3	.7	.6		.4	.8	.9
18.....		.3	1.5	2.0	.8	.6		.3	.8	.9
19.....		.3	1.5	2.0	.7	.6			.8	.9
20.....		.3	1.5	2.0	.7	.6		.3	.8	.9
21.....		.3	1.4	2.95	.6	.6		.4	.8	.9
22.....		.4	1.4	2.85	.6	.6		.4	.8	.9
23.....		.4	1.4	2.0	.6	.5		.5	.8	.9
24.....		.4	1.4	1.5	.6	.5		.5	.8	.9
25.....	1.3	.4	1.4	1.5	.3	.4		.5	.8	.9
26.....	1.3	.4	1.6	1.5		.4	0.1	.5	.9	.9
27.....	1.4	.3	1.7	1.3		.3	.1	.5	.9	.9
28.....	1.5	.4	1.5	1.3		.2	.2	.5	.9	.9
29.....	1.3	.4	1.5	1.2			.3	.5	.9	.9
30.....	1.0	.4	1.6	1.2			.3	.5	.9	.9
31.....	.8		2.0		.2			.6		.9

NOTE.—Channel dry July 26-29 and Aug. 29 to Sept. 25. River frozen over Nov. 2 to Dec. 31. Gage heights were read to top of ice and do not represent the discharge.

Daily discharge, in second-feet, of Rock Creek near Rock River, Wyo., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		37	3	383	110	4	0	7	25
2.....		37	3	515	110	4	0	7	
3.....		37	3	470	110	7	0	7	
4.....		25	8	584	110	11	0	11	
5.....		25	3	607	90	11	0	11	
6.....		25	3	560	67	11	0	7	
7.....		15	3	857	67	11	0	7	
8.....		8	3	857	67	11	0	7	
9.....		8	15	800	51	11	0	11	
10.....		8	37	580	37	11	0	11	
11.....		8	67	360	37	11	0	11	
12.....		1	67	360	45	11	0	11	
13.....		1	67	380	45	7	0	11	
14.....		1	85	380	30	7	0	11	
15.....		1	85	340	30	4	0	11	
16.....		1	127	780	37	11	0	11	
17.....		1	151	900	37	25	0	11	
18.....		1	176	305	52	25	0	7	
19.....		1	176	330	37	25	0	7	
20.....		1	176	330	35	25	0	7	
21.....		1	151	780	25	25	0	11	
22.....		3	151	730	25	25	0	11	
23.....		3	151	370	25	17	0	17	
24.....		3	151	200	25	17	0	17	
25.....	127	3	151	210	7	11	0	17	
26.....	127	3	202	210	7	11	1	17	
27.....	151	1	229	140	6	7	1	17	
28.....	176	3	190	140	5	4	4	17	
29.....	127	3	190	120	4	0	7	17	
30.....	67	3	230	120	4	0	7	17	
31.....	37		360		4	0		25	

NOTE.—Daily discharge determined as follows: June 3-8 and July 23 to Nov. 1, from fairly well defined rating curve; Mar. 25 to May 26 from a poorly defined rating curve; all other periods by indirect method for shifting channels.

Monthly discharge of Rock Creek near Rock River, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off ^a (total in acre-feet).
	Maximum.	Minimum.	Mean.	
March 25-31.....	176	37	116	1,610
April.....	37	1	8.9	530
May.....	360	3	110	6,760
June.....	900	120	457	27,200
July.....	110	4	43.2	2,660
August.....	25	0	11.6	713
September.....	7	0	.7	42
October.....	25	7	11.8	726
The period.....				40,200

BOXELDER CREEK NEAR CAREYHURST, WYO.

Location.—At highway bridge in sec. 7, T. 33 N., R. 73 W., 1 mile south of Careyhurst. No tributary between the station and the mouth, 1 mile below. The nearest tributary is a small stream about 2 miles above.

Records available.—May 17 to October 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Data too meager to determine.

Discharge measurements.—Made from bridge.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions from Boxelder Creek of 51 second-feet, and from the tributaries, 46 second-feet. All these diversions are above the station.

Accuracy.—As only three discharge measurements have been made the estimates of flow can be considered only fair.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of Boxelder Creek near Careyhurst, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
May 18	R. H. Fletcher.....	<i>Feet.</i> 3.00	<i>Sec.-ft.</i> 105
June 21	E. O. Christiansen.....	2.81	80.0
Oct. 13	G. H. Russell.....	2.06	2.7

Daily gage height, in feet, of Boxelder Creek near Careyhurst, Wyo., for 1911.

[R. D. Moffett, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1.....	2.6	2.25	1.9	1.9	1.9	1.9	16.....	2.5	1.9	1.9	1.9	1.9	2.1
2.....	2.6	2.1	1.9	1.9	1.9	1.9	17.....	3.0	3.15	1.9	1.9	1.9	2.1
3.....	2.55	2.05	1.9	1.9	1.9	1.9	18.....	3.0	2.9	2.0	1.9	1.9	2.2
4.....	2.35	1.95	1.9	1.9	1.95	1.95	19.....	3.0	2.75	2.0	1.9	1.9	2.2
5.....	2.25	1.9	1.9	1.9	1.9	1.9	20.....	3.0	2.75	2.0	1.9	1.9	2.2
6.....	2.15	1.9	2.0	1.9	1.9	1.9	21.....	2.9	2.8	2.3	1.9	1.9	2.2
7.....	2.1	1.9	1.95	1.9	1.9	1.9	22.....	2.9	2.75	2.1	1.9	1.9	2.2
8.....	2.1	1.9	1.9	1.9	2.05	2.05	23.....	2.8	2.7	2.05	1.9	1.9	2.2
9.....	2.2	1.9	1.9	1.9	2.05	2.05	24.....	2.7	2.65	1.95	1.9	1.9	2.2
10.....	2.15	1.9	1.9	1.9	2.05	2.05	25.....	2.65	2.6	1.9	1.9	1.9	2.3
11.....	2.1	1.9	1.9	1.9	2.0	2.0	26.....	2.6	2.6	1.9	1.9	1.9	2.3
12.....	2.0	1.9	1.9	1.9	2.0	2.0	27.....	2.6	2.5	1.9	1.9	1.9	2.3
13.....	2.0	1.9	1.9	1.9	2.0	2.0	28.....	2.6	2.45	1.9	1.9	1.9	2.3
14.....	2.0	1.9	1.9	1.9	2.0	2.0	29.....	2.6	2.35	1.9	1.9	1.9	2.3
15.....	2.0	1.9	1.9	1.9	1.9	2.1	30.....	2.6	2.3	1.9	1.9	1.9	2.3
							31.....	2.6		1.9	1.9	.....	2.3

Daily discharge, in second-feet, of Boxelder Creek near Careyhurst, Wyo., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1.....		54	16	0.0	0.0	0.0	16.....		42	0.0	0.0	0.0	4.5
2.....		54	4.5	.0	.0	.0	17.....	105	126	.0	.0	.0	4.5
3.....		48	3.0	.0	.0	.0	18.....	105	92	1.5	.0	.0	11
4.....		26	.8	.0	.0	.8	19.....	105	72	1.5	.0	.0	11
5.....		16	.0	.0	.0	.0	20.....	105	72	1.5	.0	.0	11
6.....		7.8	.0	1.5	.0	.0	21.....	92	79	20	.0	.0	11
7.....		4.5	.0	.8	.0	.0	22.....	92	72	4.5	.0	.0	11
8.....		4.5	.0	.0	.0	3.0	23.....	79	66	3.0	.0	.0	11
9.....		11	.0	.0	.0	3.0	24.....	66	60	.8	.0	.0	11
10.....		7.8	.0	.0	.0	3.0	25.....	60	54	.0	.0	.0	20
11.....		4.5	.0	.0	.0	1.5	26.....	54	54	.0	.0	.0	20
12.....		1.5	.0	.0	.0	1.5	27.....	54	42	.0	.0	.0	20
13.....		1.5	.0	.0	.0	1.5	28.....	54	36	.0	.0	.0	20
14.....		1.5	.0	.0	.0	1.5	29.....	54	26	.0	.0	.0	20
15.....		1.5	.0	.0	.0	4.5	30.....	54	20	.0	.0	.0	20
							31.....	54		.0	.0		20

NOTE.—Daily discharge determined from a fairly well-defined rating curve.

Monthly discharge of Boxelder Creek near Caryhurst, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May 17-31.....	105	54	75.5	2,250	C.
June.....	126	1.5	38.6	2,300	C.
July.....	20	.0	1.84	113	C.
August.....	1.5	.0	.07	4.3	C.
September.....	.0	.0	.00	.0	C.
October.....	20	.0	7.92	487	C.
November.....			α 12	714	D.
December.....			α 8	492	D.
The period.....				6,360	

α Estimated.

LARAMIE RIVER AT GLENDEVEY, COLO.

Location.—At highway bridge one-eighth mile west of Glendevy in sec. 36, T. 10 N., R. 76 W., in the Medicine Bow National Forest; McIntyre Creek enters a short distance below and Spring Creek above.

Records available.—June 24, 1904, to October 31, 1905; August 18, 1910, to November 30, 1911.

Drainage area.—102 square miles¹ (measured from Clason's 1911 sectional map of Colorado).

Gage.—Automatic gage installed by the State engineer November 17, 1910, replaced vertical staff previously used. The datum of the gages has remained constant.

Channel.—Permanent.

Discharge measurements.—Made from cable at bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—There are court decrees for diversions of 65 second-feet from Laramie River above the station and for 749 second-feet from tributaries entering above. Of this latter amount 688 second-feet are for diversion into the Cache La Poudre basin.

¹ Revised since previous reports.

Accuracy.—Conditions are favorable for excellent results, and the estimates should be reliable.

Cooperation.—Since its reestablishment the station has been maintained in cooperation with the State engineer and the United States Forest Service.

Discharge measurements of Laramie River at Glendevy, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Dats.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 14	C. E. Turner.....	2.90	288	Aug. 20	C. E. Turner.....	2.04	41.4
July 8	.....do.....	2.78	232	Sept. 17	.....do.....	1.84	23.1
18	.....do.....	2.30	88.2	Oct. 7	.....do.....	2.12	53.4
23	.....do.....	2.35	96.0	18	C. C. Hezmalhalch....	1.95	30.1
Aug. 18	.....do.....	2.00	36.1				

Daily gage height, in feet, of Laramie River at Glendevy, Colo., for 1911.

[Albert L. Fairhuret, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	1.75	1.6	1.8	1.85	2.3	3.25	2.6	2.1	1.9	2.3	1.7
2.....	1.8	1.6	1.8	1.9	2.25	3.35	2.85	2.1	1.9	2.15	1.75
3.....	1.9	1.7	1.7	1.95	2.25	3.25	2.85	2.1	1.9	2.1	1.75
4.....	1.85	1.8	1.75	1.95	2.3	3.25	2.9	2.1	1.95	2.05	1.8
5.....	1.75	1.8	1.8	1.9	2.5	3.3	2.85	2.1	1.9	2.15	1.8
6.....	1.85	1.75	1.8	1.9	2.5	3.3	2.85	2.05	1.95	2.3	1.75
7.....	1.8	1.7	1.8	1.75	2.65	3.45	2.85	2.05	1.9	2.25	1.85
8.....	1.7	1.6	1.8	1.8	2.85	3.35	2.7	2.0	1.9	2.2	1.85
9.....	1.65	1.65	1.8	1.9	3.0	3.65	2.7	2.0	1.9	2.1	1.85
10.....	1.65	1.75	1.8	1.9	2.9	3.25	2.45	2.0	1.85	2.05	1.9
11.....	1.6	1.8	1.8	1.9	2.65	3.2	2.3	2.05	1.8	1.95	1.9
12.....	1.7	1.75	1.8	1.85	2.7	3.2	2.25	2.05	1.8	1.9	1.9
13.....	1.8	1.6	2.0	1.75	2.8	3.2	2.35	2.0	1.8	1.9	1.9
14.....	1.7	1.5	1.95	1.65	2.85	3.25	2.55	2.0	1.85	1.9	1.85
15.....	1.7	1.5	1.95	1.7	3.05	3.4	2.4	1.95	1.9	1.7	1.85
16.....	1.7	1.55	1.8	1.85	3.15	3.5	2.35	1.95	1.85	1.85	1.9
17.....	1.7	1.75	1.75	2.0	3.15	3.5	2.35	2.0	1.85	1.95	1.85
18.....	1.75	1.85	1.8	1.95	3.1	3.3	2.3	2.0	1.8	1.9	1.85
19.....	1.75	1.7	1.8	2.05	2.85	3.2	2.45	2.05	1.85	1.9	1.85
20.....	1.7	1.6	1.8	2.0	2.6	3.4	2.35	2.0	1.85	1.9	1.8
21.....	1.7	1.6	1.8	2.1	2.5	3.8	2.3	2.05	1.85	1.9	1.8
22.....	1.7	1.6	1.8	2.2	2.6	3.7	2.25	2.0	1.9	1.9	1.75
23.....	1.75	1.6	1.7	2.1	2.65	3.7	2.35	2.15	2.15	1.9	1.8
24.....	1.75	1.65	1.8	2.1	2.85	3.6	2.3	2.0	1.95	1.9	1.75
25.....	1.75	1.7	1.85	2.25	2.9	3.2	2.25	2.0	1.9	1.8	1.8
26.....	1.75	1.65	1.9	2.3	2.85	2.9	2.25	1.95	1.85	1.75	1.8
27.....	1.8	1.6	1.8	2.3	3.0	2.9	2.25	1.9	1.9	1.8	1.7
28.....	1.85	1.6	1.8	2.25	3.0	2.75	2.25	1.9	1.95	1.8	
29.....	1.8		1.9	2.2	3.05	2.7	2.2	1.9	1.95	1.8	
30.....	1.75		1.85	2.2	3.05	2.65	2.15	1.85	2.05	1.75	
31.....	1.65		1.7		3.15		2.1	1.85		1.75	

Daily discharge, in second-feet, of Laramie River at Glendevy, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	16	10	19	22	84	461	166	49	26	84	14
2.....	19	10	19	26	74	517	264	49	26	57	16
3.....	26	14	14	31	74	461	264	49	26	49	16
4.....	22	19	16	31	84	461	285	49	31	42	19
5.....	16	19	19	26	135	488	264	49	26	57	19
6.....	22	16	19	26	135	488	264	42	31	84	16
7.....	19	14	19	16	184	576	264	42	26	74	22
8.....	14	10	19	19	264	517	201	36	26	65	22
9.....	12	12	19	26	332	705	201	36	26	49	22
10.....	12	16	19	26	285	461	122	36	22	42	26

Daily discharge, in second-feet, of Laramie River at Glendevey, Colo., for 1911—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
11.....	10	19	19	26	184	434	84	42	19	31	26
12.....	14	16	19	22	201	434	74	42	19	26	26
13.....	19	10	36	16	242	434	96	36	19	26	26
14.....	14	8	31	12	264	461	150	36	22	26	22
15.....	14	8	31	14	357	546	108	31	26	14	22
16.....	14	9	19	22	408	606	96	31	22	22	26
17.....	14	16	16	36	408	606	96	36	22	31	22
18.....	16	22	19	31	382	488	84	36	19	26	22
19.....	16	14	19	42	264	434	122	42	22	26	22
20.....	14	10	19	36	166	546	96	36	22	26	19
21.....	14	10	19	49	135	812	84	42	22	26	19
22.....	14	10	19	65	166	740	74	36	26	26	16
23.....	16	10	14	49	184	740	96	57	57	26	19
24.....	16	12	19	49	264	670	84	42	31	26	16
25.....	16	14	22	74	285	434	74	36	26	19	19
26.....	16	12	26	84	264	285	74	31	22	16	19
27.....	19	10	19	84	332	285	74	26	26	19	14
28.....	22	10	19	74	332	222	74	26	31	19	15
29.....	19	.....	26	65	357	201	65	26	31	19	15
30.....	16	.....	22	65	357	184	57	22	42	16	15
31.....	12	.....	14	.....	408	.....	49	22	.....	16	.....

NOTE.—Daily discharge determined from a rating curve well defined between 5 and 450 second-feet. Discharge estimated Nov. 27 to 30. Ice present Nov. 27 to Dec. 31.

Monthly discharge of Laramie River at Glendevey, Colo., for 1911.

[Drainage area, 102 square miles.]

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	26	10	16.2	998	A.
February.....	22	8	12.9	607	A.
March.....	36	14	20.3	1,250	A.
April.....	84	12	38.8	2,310	A.
May.....	408	74	246	15,100	A.
June.....	812	184	490	29,200	A.
July.....	285	49	132	8,140	A.
August.....	57	22	37.8	2,320	A.
September.....	57	19	26.4	1,570	A.
October.....	84	14	35	2,150	A.
November.....	26	14	19.7	1,170	A.
December.....	.....	.....	a 12	738	D.
The year.....	812	8.0	98.0	65,600	

a Estimated.

LARAMIE RIVER NEAR JELM, WYO.

Location.—At highway bridge in sec. 15, T. 12 N., R. 77 W., 4 miles south of Jelms post office, one-fourth mile below the Colorado-Wyoming line.

Records available.—May 7 to November 30, 1911. From June 22, 1904, to October 31, 1905, a station was maintained at Decker's ranch, half a mile south of the State line. The records at the two stations are practically comparable as there are no tributaries nor diversions of any amount between.

Drainage area.—365 square miles (Clason's 1911 sectional map of Colorado).

Gage.—In 1911 an automatic recording gage was installed by the State engineer of Colorado. This is referred to the same datum as the vertical staff used at first.

Channel.—Practically permanent.

Discharge measurements.—Made from bridge.

Winter flow.—Ice causes backwater during the winter months and the records are discontinued.

Diversions.—Between this station and that at Glendevey, Colo., there are court decrees for diversions of 236 second-feet from Laramie River and 204 second-feet from intervening tributaries. These diversions are all in Colorado.

Accuracy.—Conditions are favorable for accurate results, and the estimates should be excellent.

Cooperation.—Station maintained in cooperation with the State engineers of Colorado and Wyoming.

Discharge measurements of Laramie River near Jelm, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 7	Fletcher and Kingdon	2.15	382	July 14	C. E. Turner	1.83	254
15	C. E. Turner	2.60	677	15	R. H. Fletcher	1.60	197
June 6	R. H. Fletcher	3.00	1,060	20	C. E. Turner	1.60	182
15	do	2.80	890	Aug. 19	do	1.14	65.2
24	do	2.35	556	22	do	1.19	75.1
July 10	C. E. Turner	1.75	225	Sept. 19	B. S. Clayton	1.00	45.3
14	do	1.99	309	Oct. 8	C. E. Turner	1.31	93.0

Daily gage height, in feet, of Laramie River near Jelm, Wyo., for 1911.

[Mrs. C. D. Oviatt, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1		2.80	1.85	1.30	1.00	1.30	1.05
2		2.90	2.30	1.30	1.00	1.30	1.05
3		2.90	2.30	1.30	1.00	1.15	1.15
4		2.85	2.10	1.30	1.05	1.10	1.20
5		2.95	2.20	1.30	1.05	1.20	1.20
6		2.90	2.20	1.25	1.00	1.45	1.30
7	2.15	2.85	2.05	1.20	1.00	1.35	1.30
8	2.35	2.95	2.00	1.20	1.00	1.25	1.25
9	2.50	3.15	1.85	1.15	1.00	1.20	1.20
10	2.60	2.80	1.70	1.20	1.00	1.20	1.20
11	2.20	2.75	1.40	1.25	.95	1.20	1.05
12	2.20	2.75	1.50	1.30	.95	1.15	1.10
13	2.40	2.70	1.55	1.20	.95	1.10	1.10
14	2.55	2.70	1.85	1.10	.95	1.10	1.20
15	2.65	2.70	1.70	1.00	1.00	1.15	.....
16	2.70	3.00	1.60	1.10	1.00	1.10	.....
17	2.75	3.00	1.65	1.20	1.00	1.15	.....
18	2.80	2.65	1.60	1.20	1.00	1.15	.....
19	2.70	2.55	1.55	1.15	.95	1.10	.....
20	2.50	2.85	1.60	1.15	.95	1.10	.....
21	2.30	2.85	1.55	1.20	1.00	1.15	.....
22	2.25	2.75	1.60	1.20	1.00	1.15	.....
23	2.25	2.50	1.55	1.35	1.15	1.10	.....
24	2.45	2.40	1.50	1.20	1.20	1.10	.....
25	2.60	2.30	1.45	1.15	1.00	1.10	.....
26	2.75	2.15	1.45	1.15	.95	1.10	.....
27	2.55	2.05	1.40	1.05	.90	1.15	.....
28	2.55	2.00	1.40	1.00	.90	1.10	.....
29	2.60	1.95	1.40	1.05	.90	1.10	.....
30	2.65	1.90	1.35	1.00	1.00	1.10	.....
31	2.75	.....	1.35	1.00	.....	1.10	.....

NOTE.—Gage heights distorted by ice Nov. 15 to Dec. 31.

Daily discharge, in second-feet, of Laramie River near Jelm, Wyo., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		877	278	94	43	94	50
2.....		965	492	94	43	94	50
3.....		970	488	94	43	65	65
4.....		972	378	94	50	56	74
5.....		1,020	428	94	50	74	74
6.....		978	423	84	43	132	94
7.....	387	933	348	74	43	106	94
8.....	497	1,020	323	74	43	84	84
9.....	592	1,210	260	65	43	74	74
10.....	665	888	207	74	43	74	74
11.....		412	845	118	84	38	74
12.....		412	845	145	94	38	65
13.....		527	803	160	74	38	56
14.....		628	803	260	56	38	56
15.....		700	803	198	43	43	65
16.....		745	1,070	194	56	43	56
17.....		790	1,070	205	74	43	65
18.....		833	765	184	74	43	65
19.....		760	690	165	65	38	56
20.....		610	933	175	65	38	56
21.....		485	933	160	74	43	65
22.....		458	846	175	74	43	65
23.....		460	653	160	106	65	56
24.....		590	583	145	74	74	56
25.....		705	515	132	65	43	56
26.....		820	425	132	65	38	56
27.....		670	370	118	50	33	65
28.....		673	345	118	43	33	56
29.....		712	323	118	50	33	56
30.....		753	300	106	43	43	56
31.....		833		106	43		56

NOTE.—Daily discharge determined from two rating curves well defined between 25 and 1,250 second-feet; indirect method for shifting channels was used from May 16 to June 6, June 25 to July 10, and July 15-20; discharge estimated Nov. 15 to 30. Ice present Nov. 15 to Dec. 31.

Monthly discharge of Laramie River near Jelm, Wyo., for 1911.

[Drainage area, 365 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accu- racy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
May 7-31.....	833	387	629	1.72	1.60	31,200	A.
June.....	1,210	300	792	2.17	2.42	47,100	A.
July.....	492	106	223	.611	.70	13,700	A.
August.....	106	43	71.4	.196	.23	4,390	A.
September.....	74	33	43.1	.118	.13	2,560	A.
October.....	132	56	68.1	.187	.22	4,180	A.
November.....	94	50	62.3	.171	.19	3,710	B.
December.....			α 50	.137	.16	3,070	D.
The period.....						110,000	

α Estimated.

LARAMIE RIVER AT WOODS LANDING, WYO.

Location.—At highway bridge at Woods Landing, in sec. 11, T. 13 N., R. 77 W., a short distance below the mouth of Wood Creek, the nearest tributary.

Records available.—May 7 to November 11, 1911. During 1889, 1890, and 1891 a station was maintained at Woods Landing by the State engineer, and the results were published in his reports. From April 12, 1896, to September 30, 1900, a station was maintained at a point 400 feet above the present site, and as no streams intervene nor ditches divert water the records at the two points are comparable.

Drainage area.—Not measured.

Gage.—Vertical staff; no determined relation between present gage and gages used prior to 1900.

Channel.—A short distance below the bridge there is a diversion dam which is the control point for the station. As this dam is not permanent conditions are somewhat changeable.

Discharge measurements.—Made from bridge during high stages and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months and the records are discontinued.

Diversions.—Practically no water is diverted between the stations near Jelm and Woods Landing.

Cooperation.—During 1911 station was maintained in cooperation with the State engineer.

Discharge measurements of Laramie River at Woods Landing, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
May 7	Fletcher and Kingdon.	<i>Feet.</i> 2.35	<i>Sec.-ft.</i> 427	June 24	R. K. Fletcher.....	<i>Feet.</i> 2.14	<i>Sec.-ft.</i> 587
June 6	R. K. Fletcher.....	2.74	1,060	July 15	do.....	1.54	196
15	do.....	2.54	927	Oct. 9	G. H. Russell.....	1.66	84.5

Daily gage height, in feet, of Laramie River at Woods Landing, Wyo., for 1911.

[Bessie Summers, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		2.80	1.55	1.58	1.05	1.82	1.35
2.....		2.82	1.62	1.50	1.02	1.92	1.22
3.....		2.80	1.90	1.42	1.10	1.82	1.20
4.....		2.78	1.90	1.40	1.20	1.68	1.18
5.....		2.92	1.85	1.40	1.25	1.58	1.62
6.....		2.85	1.90	1.48	1.15	1.58	1.75
7.....	2.30	2.95	1.90	1.40	1.10	1.78	1.62
8.....	2.50	3.05	1.85	1.35	1.10	1.62	1.52
9.....	2.70	3.12	1.75	1.30	1.00	1.75	1.42
10.....	2.65	2.75	1.68	1.20	1.00	1.68	1.26
11.....	2.28	2.75	1.42	1.32	1.00	1.42	1.34
12.....	2.18	2.58	1.38	1.38	1.00	1.45	.....
13.....	2.35	2.58	1.55	1.32	1.00	1.40	.....
14.....	2.52	2.60	1.72	1.28	1.00	1.40	.....
15.....	2.72	2.58	1.58	1.20	1.10	1.40	.....
16.....	2.75	2.75	1.58	1.30	1.10	1.35	.....
17.....	2.80	3.20	1.70	1.40	1.10	1.45	.....
18.....	2.75	2.65	1.78	1.35	1.10	1.45	.....
19.....	2.75	2.42	1.72	1.30	1.00	1.58	.....
20.....	2.50	2.52	1.62	1.20	1.00	1.45	.....

Daily gage height, in feet, of Laramie River at Woods Landing, Wyo., for 1911—Contd.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
21.....	2.40	2.92	1.50	1.30	1.00	1.30	.....
22.....	2.30	2.68	1.42	1.38	1.00	1.65	.....
23.....	2.32	2.48	1.32	1.70	1.00	1.85	.....
24.....	2.52	2.15	1.38	1.52	1.68	1.45	.....
25.....	2.65	2.35	1.32	1.32	1.55	1.40	.....
26.....	2.78	2.00	1.32	1.35	1.25	1.42	.....
27.....	2.60	1.90	1.65	1.35	1.10	1.42	.....
28.....	2.58	1.85	1.65	1.30	1.30	1.45	.....
29.....	2.68	1.80	1.65	1.22	1.24	1.48	.....
30.....	2.65	1.75	1.65	1.12	1.32	1.42	.....
31.....	2.75	.....	1.55	1.10	.....	1.40	.....

Daily discharge, in second-feet, of Laramie River at Woods Landing, Wyo., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	.....	1,080	200	165	30	170	36
2.....	.....	1,090	236	140	28	220	26
3.....	.....	1,080	410	110	32	170	25
4.....	.....	1,060	410	100	40	115	24
5.....	.....	1,180	375	100	45	80	70
6.....	.....	1,170	410	135	35	80	110
7.....	410	1,260	410	100	23	200	70
8.....	550	1,340	375	70	23	70	53
9.....	710	1,410	310	60	18	110	42
10.....	670	1,090	269	45	18	85	29
11.....	335	1,090	139	65	18	42	35
12.....	385	943	175	80	18	45	.....
13.....	495	943	200	65	18	40	.....
14.....	620	960	292	55	18	40	.....
15.....	780	943	215	45	23	40	.....
16.....	810	1,090	215	60	23	36	.....
17.....	905	1,480	280	80	23	45	.....
18.....	865	1,000	328	70	23	45	.....
19.....	865	811	292	60	18	62	.....
20.....	660	892	236	45	18	45	.....
21.....	580	1,230	175	60	18	32	.....
22.....	555	1,030	139	80	18	78	.....
23.....	570	859	98	180	17	152	.....
24.....	730	595	95	100	110	45	.....
25.....	835	755	75	55	70	40	M.....
26.....	945	480	75	60	34	42	.....
27.....	890	410	215	60	29	42	.....
28.....	835	375	215	50	37	45	.....
29.....	920	340	215	40	33	48	.....
30.....	890	310	215	35	31	42	.....
31.....	975	.....	195	32	.....	40	.....

NOTE.—Daily discharge determined as follows: May 7 to June 5 and July 16 to Oct. 7, by indirect method for shifting channels; June 6 to July 15 and Oct. 8 to Nov. 11, from fairly well-defined rating curves.

Monthly discharge of Laramie River at Woods Landing, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May 7-31.....	975	335	711	36,400	C.
June.....	1,480	310	943	56,100	C.
July.....	410	75	242	14,900	C.
August.....	180	32	77.5	4,770	C.
September.....	110	17	29.6	1,760	C.
October.....	220	32	75.7	4,650	C.
November 1-11.....	110	24	47.3	1,030	C.
The period.....	.....	.....	.....	120,000	.....

LARAMIE RIVER AT TWO RIVERS, WYO.

Location.—At highway bridge at Two Rivers post office, in sec. 5, T. 17 N., R. 74 W.

The nearest tributary is Little Laramie River which enters one-fourth mile below the station.

Records available.—May 6 to November 4, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Slightly shifting.

Discharge measurements.—Made from the bridge.

Winter flow.—Ice causes backwater during the winter months and the records are discontinued.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions from Laramie River of 460 second-feet between Woods Landing and Two Rivers.

Accuracy.—Results are only fair.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of Laramie River at Two Rivers, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 6	Fletcher and Kingdon	2.10	95.0	June 25	R. H. Fletcher.....	3.50	439
June 5	R. H. Fletcher.....	3.60	488	Oct. 11	G. H. Russell.....	1.85	31.6
14	.....do.....	3.40	451				

Daily gage height, in feet of Laramie River at Two Rivers, Wyo., for 1911.

[A. R. Peters, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	3.3	2.4	1.65	1.6	1.55	2.2
2	3.65	2.4	1.6	1.6	1.6	2.25
3	3.65	2.4	1.6	1.6	1.6	2.3
4	3.5	2.4	1.55	1.6	1.6	2.4
5	3.5	2.4	1.5	1.6	1.6	.....
6	2.1	3.6	2.3	1.5	1.6	.....
7	3.55	2.35	1.45	1.6	1.65
8	3.65	2.4	1.4	1.6	1.7
9	3.75	2.35	1.4	1.6	1.7
10	4.0	2.3	1.3	1.6	1.75
11	3.85	2.15	1.25	1.6	1.8
12	2.25	3.6	2.1	1.3	1.6	1.8
13	2.65	3.45	1.9	1.4	1.5	1.8
14	3.05	3.3	1.8	1.4	1.5	1.8
15	3.05	3.4	1.8	1.4	1.5	1.85
16	3.25	3.5	1.8	1.4	1.5	1.8
17	3.6	3.95	1.55	1.4	1.5	1.85
18	3.8	4.4	1.9	1.3	1.4	1.8
19	3.75	4.3	1.9	1.3	1.35	1.8
20	3.85	3.7	1.75	1.5	1.3	1.8
21	3.75	3.5	1.6	1.5	1.3	1.8
22	3.5	3.75	1.6	1.55	1.2	1.8
23	3.4	4.1	1.6	1.6	1.2	2.0
24	3.2	3.75	1.5	1.6	1.2	2.05
25	3.15	3.5	1.4	1.6	1.2	2.1
26	3.0	3.25	1.7	1.6	1.25	2.1
27	3.15	3.0	1.7	1.6	1.3	2.2
28	3.2	2.85	1.7	1.6	1.4	2.1
29	3.0	2.5	1.7	1.55	1.5	2.0
30	3.1	2.4	1.7	1.55	1.5	2.0
31	3.2	.....	1.7	1.6	.....	2.0

NOTE.—Ice present Oct. 23 to Nov. 24.

Daily discharge, in second-feet, of Laramie River at Two Rivers, Wyo., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1.....	90	410	141	16	13	10	16.....	395	470	27	4	8	27
2.....	90	515	141	13	13	13	17.....	500	605	10	4	8	33
3.....	90	515	141	13	13	13	18.....	560	740	39	2	4	27
4.....	90	470	141	10	13	13	19.....	545	710	39	2	3	27
5.....	90	470	141	8	13	13	20.....	575	498	23	8	2	27
6.....	95	500	117	8	13	13	21.....	545	440	13	8	2	27
7.....	101	485	129	6	13	16	22.....	470	512	13	10	0	27
8.....	107	515	141	4	13	19	23.....	440	615	13	13	0	25
9.....	113	545	129	4	13	19	24.....	380	512	8	13	0	25
10.....	119	620	117	2	13	23	25.....	365	440	4	13	0	25
11.....	125	575	85	1	13	27	26.....	320	370	19	13	1	25
12.....	132	500	75	2	13	27	27.....	365	300	19	13	2	25
13.....	232	455	39	4	8	27	28.....	380	258	19	13	4	25
14.....	335	410	27	4	8	27	29.....	320	165	19	10	8	25
15.....	335	440	27	4	8	33	30.....	350	141	19	10	8	25
							31.....	380		19	13		25

NOTE.—Daily discharge determined as follows: May 6 to June 19 and June 20 to Oct. 22 from rating curves not well defined; discharge estimated May 1 to 5, May 7 to 11, and Oct. 23 to 31.

Monthly discharge of Laramie River at Two Rivers, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	575	90	291	17,900	C.
June.....	740	141	473	28,100	C.
July.....	141	4	61.1	3,760	C.
August.....	16	1	8.0	402	C.
September.....	13	0	7.7	458	C.
October.....	33	10	23.0	1,410	C.
The period.....				52,100	

LITTLE LARAMIE RIVER NEAR FILMORE, WYO.

Location.—At May's ranch, in sec. 9, T. 15 N., R. 77 W., $1\frac{1}{2}$ miles south of Filmore post office; 4 miles below the junction of the North, Middle, and South Forks; 8 miles above the mouth of Mill Creek, the nearest tributary below.

Records available.—May 14 to October 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Slightly shifting.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions of 450 second-feet from the Little Laramie, both above and below the station.

Accuracy.—The shifting channel makes the estimates of discharge only fair.

Cooperation.—Station maintained in cooperation with State engineer.

Discharge measurements of Little Laramie River near Filmore, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
June 6	R. H. Fletcher.....	<i>Feet.</i> 3.10	<i>Sec.-ft.</i> 620
15	do.....	2.80	424
25	do.....	2.30	285
Oct. 10	G. H. Russell.....	1.00	31.8

Daily gage height, in feet, and discharge, in second-feet, of Little Laramie River near Filmore, Wyo., for 1911.

[Ralph May, observer.]

Day.	May.		June.		July.		August.		September.		October.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....			3.25	638	2.05	212	1.3	68	.08	12	1.2	55
2.....			3.3	660	2.05	212	1.25	62	.85	17	1.15	49
3.....			3.25	638	2.1	225	1.25	62	.85	17	1.1	43
4.....			3.4	705	2.05	205	1.2	55	.95	27	1.15	49
5.....			3.35	682	2.0	200	1.2	55	.9	22	1.35	75
6.....			3.45	728	2.0	200	1.15	49	.9	22	1.35	75
7.....			3.35	682	1.95	188	1.1	43	.9	22	1.2	55
8.....			3.9	930	1.95	188	1.05	38	.9	22	1.1	43
9.....			3.85	908	1.85	166	1.0	32	.9	22	1.1	43
10.....			3.7	840	1.75	144	1.05	38	.9	22	1.1	43
11.....			3.5	750	1.6	114	1.15	49	.85	17	1.0	32
12.....			3.45	728	1.6	114	1.15	49	.85	17	1.0	32
13.....			3.2	615	1.6	114	1.15	49	.8	12	1.0	32
14.....	1.9	177	2.0	200	1.6	114	1.15	49	.8	12	1.0	32
15.....	2.15	240	2.05	212	1.6	114	1.05	38	.8	12	1.0	32
16.....	2.15	240	a 3.5	750	1.6	114	1.05	38	.8	12	1.0	32
17.....	2.2	255	3.4	705	1.55	106	1.05	38	.8	12	1.1	43
18.....	2.3	285	3.0	535	1.5	97	1.0	32	.8	12	1.1	43
19.....	2.2	255	2.75	438	1.65	124	1.0	32	.8	12	1.0	32
20.....	2.1	225	2.75	438	1.6	114	1.0	32	.85	17	1.0	32
21.....	2.0	200	2.7	420	1.55	106	1.0	32	.9	22	1.0	32
22.....	2.0	200	2.65	402	1.5	97	1.0	32	.9	22	1.0	32
23.....	2.0	200	2.55	368	1.5	97	1.0	32	.9	22	1.0	32
24.....	2.15	240	2.55	368	1.4	82	1.0	32	.9	22	1.0	32
25.....	2.2	255	2.45	333	1.4	82	1.0	32	.9	22	1.0	32
26.....	2.5	350	2.4	315	1.4	82	1.0	32	.9	22	1.0	32
27.....	2.45	332	2.25	270	1.35	75	1.0	32	.9	22	1.0	32
28.....	2.5	350	2.05	212	1.35	75	.95	27	.9	22	.9	22
29.....	2.6	385	2.05	212	1.35	75	.95	27	.9	22	.9	22
30.....	2.7	420	2.05	212	1.3	68	.9	22	.95	27	.85	17
31.....	3.05	555			1.3	68	.8	12			.85	17

a The maximum gage height on June 16 was 4.2 feet.

NOTE.—Daily discharge determined from a fairly well defined rating curve.

Monthly discharge of Little Laramie River near Filmore, Wyo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May 14-31.....	555	177	287	10,200	C.
June.....	930	212	530	31,500	C.
July.....	225	68	128	7,870	C.
August.....	68	12	39.4	2,420	C.
September.....	27	12	18.8	1,120	C.
October.....	75	17	37.9	2,330	C.
The period.....				55,400	

LITTLE LARAMIE RIVER AT TWO RIVERS, WYO.

Location.—At highway bridge on section line between secs. 5 and 6, T. 17 N., R. 74 W., half a mile south of Two Rivers post office; nearest tributary, Mill Creek, enters about 12 miles above; no tributary between the station and the mouth, one-half mile below.

Records available.—May 6 to November 4, 1911.

Drainage area.—421 square miles (measured from Hayden's Atlas).

Gage.—Vertical staff.

Channel.—Somewhat shifting.

Discharge measurements.—Made from bridge during high water, and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months and the records are discontinued.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions from Little Laramie River of 450 second-feet, and from the tributaries, 326 second-feet. These diversions are all above the station.

Accuracy.—As the station has not been completely rated no estimates of discharge have been made.

Cooperation.—Station maintained in cooperation with State engineer.

Discharge measurements of Little Laramie River at Two Rivers, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 6	Fletcher and Kingdon.....	1.90	5.5
June 5	R. H. Fletcher.....	3.05	188
14	.....do.....	2.80	101
25	.....do.....	2.80	128
Oct. 11	G. H. Russell.....	1.25	a 0

a Water standing in pools.

Daily gage height, in feet, of Little Laramie River at Two Rivers, Wyo., for 1911.

[A. R. Peters, observer.]

Day.	May.	June.	July.	Oct.	Nov.	Day.	May.	June.	July.	Oct.	Nov.
1.....		2.25	2.2		2.15	16.....	1.0	2.8	1.8	1.4	.....
2.....		2.55	2.3		2.2	17.....	1.7	3.7	1.75	1.55	.....
3.....		2.7	2.3		2.2	18.....	1.7	4.15	1.7	1.65	.....
4.....		2.7	2.3		2.2	19.....	1.7	3.25	1.8	1.8	.....
5.....		3.0	2.2			20.....	1.9	2.75	1.75	1.85	.....
6.....	1.9	3.15	2.1			21.....	1.65	2.7	1.6	1.8	.....
7.....		3.2	2.1			22.....		3.35	1.6	1.8	.....
8.....		3.15	2.0			23.....		3.5	1.7	1.85	.....
9.....		3.6	2.0			24.....		3.0	1.7	1.9	.....
10.....		3.7	2.0			25.....		2.75	1.6	1.95	.....
11.....		3.4	2.0			26.....		2.7	1.6	2.05	.....
12.....	1.9	3.05	1.9			27.....		2.55		2.1	.....
13.....	1.05	2.9	1.8			28.....		2.5		2.1	.....
14.....	1.5	2.8	1.8			29.....		2.3		2.0	.....
15.....	1.45	2.7	1.8			30.....	1.9	2.2		2.05	.....
						31.....	1.9			2.1	.....

NOTE.—On days for which gage heights are omitted from May 1 to Nov. 4 the water stood in pools.

NORTH LARAMIE RIVER AT UVA, WYO.

Location.—At highway bridge in sec. 20, T. 25 N., R. 67 W., one-fourth mile west of Uva; 800 feet above the mouth.

Records available.—May 21 to November 10, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—It is probable that the station is within the influence of backwater from Laramie River during high water. This is the only section on the lower river where an observer can be obtained.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months and the records are discontinued.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions from North Laramie of 59 second-feet, and from the tributaries, 70 second-feet. These diversions are all above the station.

Accuracy.—The station has not been completely rated, and no estimates of flow have been made.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of North Laramie River at Uva, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 22	R. H. Fletcher.....	0.55	6.2
June 22	E. O. Christiansen.....	.69	6.0
July 2	R. H. Fletcher.....	.52	1.4
	do.....	.44	.8
Oct. 19	G. H. Russell.....	.62	a 2.0

a Discharge estimated.

Daily gage height, in feet, of North Laramie River at Uva, Wyo., for 1911.

[W. H. Ralston, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		0.50	0.50	0.40	0.48	0.50	0.65	16.....		a3.40	0.55	0.50	0.45	0.45	
2.....		.50	.50	.40	.50	.50	.65	17.....		1.10	.58	.50	.45	.45	
3.....		.48	.50	.40	.50	.50	.65	18.....		1.15	.55	.45	.45	.45	
4.....		.45	.50	.40	.50	.50	.70	19.....		.95	.55	.40	.50	c.65	
5.....		.45	.50	.40	.50	.48	.70	20.....		.82	.55	.40	.48	.65	
6.....		.38	.52	.40	.50	.45	.70	21.....	0.60	.72	.48	.40	.40	.65	
7.....		.28	.55	.40	.45	.45	.70	22.....	.58	.70	.48	.40	.40	.65	
8.....		.25	.55	.40	.45	.45	.70	23.....	.52	.68	.48	.40	.40	.65	
9.....		.20	.55	.40	.45	.45	.70	24.....	.50	.68	.50	.40	.40	.65	
10.....		.20	.52	.40	.45	.45	.70	25.....	.50	.60	.45	.40	.40	.65	
11.....		.20	.48	.40	.45	.45		26.....	.50	.60	.40	.40	.40	.65	
12.....		.20	.45	.48	.45	.45		27.....	.50	.60	.40	.40	.45	.65	
13.....		.20	.45	.50	.45	.45		28.....	.50	.58	.40	.45	.48	.65	
14.....		.20	(b)	.48	.45	.45		29.....	.50	.57	.40	.48	.45	.65	
15.....		.20		.50	.45	.45		30.....	.50	.52	.40	.45	.48	.65	
								31.....	.50		.40	.45		.65	

a Maximum, 6.0 feet.

b Backwater from Laramie River; flow above this influence practically unchanged.

c Increase due to closing of canal above.

CHUGWATER CREEK AT CHUGWATER, WYO.

Location.—At highway bridge in sec. 31, T. 21 N., R. 66 W., one-half mile from Chugwater. No important tributaries within several miles of the station.

Records available.—May 22 to December 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Reasonably permanent control for the station is formed by a low diversion dam about 300 feet below the gage.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions from Chugwater Creek of 178 second-feet and from the tributaries 72 second-feet.

Accuracy.—As the station has not been completely rated, no estimates of discharge have been made.

Cooperation.—Station maintained in cooperation with the State engineer and with the Swan Land & Cattle Co.

Discharge measurements of Chugwater Creek at Chugwater, Wyo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
May 23	Fletcher and Johnston	<i>Feet.</i> 0.62	<i>Sec.-ft.</i> 3.8
Do.	do.	.63	3.4
July 3	R. H. Fletcher	.55	^a 1.5
22	Fletcher and Johnston	.80	9.7
Oct. 12	G. H. Russell	.62	2.9

^a Estimated.

Daily gage height, in feet, of Chugwater Creek at Chugwater, Wyo., for 1911.

[A. A. Woolwer, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		0.60	0.54	0.60	0.62	0.68	0.72	0.68
2		.59	.55	.60	.62	.68	.75	.68
3		.58	.55	.60	.62	.68	.75	.69
4		.58	.54	.60	.62	.62	.75	.70
5		.58	.54	.60	.62	.66	.74	.70
6		.58	.54	.60	.62	.66	.78	.70
7		.57	.54	.60	.64	.65	.79	.70
8		.57	.54	.60	.64	.60	.90	.70
9		.57	.54	.60	.65	.60	.85	.70
10		.57	.54	.60	.61	.60	.78	.70
11		.57	.55	.60	.60	.60	.75	.70
12		.58	.55	.60	.60	.62	.72	.70
13		.58	.56	.60	.60	.62	.70	.69
14		.58	^a 2.00	.61	.60	.62	.66	.68
15		.57	.84	.60	.60	.69	.82	.67
16		1.15	.68	.60	.60	.70	.90	.66
17		.60	.66	.60	.60	(^c)		.64
18		.58	.64	.60	.60			.66
19		.58	.62	1.50	.60			.65
20		.56	.61	.78	.60			.64
21		.58	.60	.71	.60		.85	.66
22		0.65	^b 1.45	.70	.60	.70	.86	.65
23		.64	.56	.69	.70	.60	.72	.65
24		.64	.56	.62	.72	.60	.70	.64
25		.63	.56	.60	.70	.60	.74	.64
26		.62	.56	.60	.70	.60	.71	.64
27		.66	.55	.60	.68	.60	.70	.63
28		.62	.54	.60	.66	.60	.72	.64
29		.60	.54	.60	.64	.60	.72	.69
30		.60	.54	.60	.62	.60	.72	.64
31		.60		.60	.62		.72	.65

^a Maximum 2.4.

^b Maximum 2.8.

^c Temporary backwater.

HORSE CREEK NEAR LITTLE HORSE CREEK, WYO.

Location.—At upper Coad ranch, in sec. 10, T. 18 N., R. 62 W., 1 mile from Little Horse creek post office; 1 mile above mouth of Little Horse Creek, the nearest tributary.

Records available.—December 1 to 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Data too meager to determine.

Discharge measurements.—Made by wading.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions from Horse Creek of 1,216 second-feet, nearly all below the station.

Accuracy.—No estimates of discharge have been made, as base data are insufficient.

Cooperation.—Station maintained in cooperation with State engineer and Mr. J. A. Whiting.

The following discharge measurement was made by Watson and Whiting:
December 1, 1911: Gage height, 1.60 feet; discharge, 12 second-feet.

Daily gage height, in feet, of Horse Creek near Little Horse Creek, Wyo., for 1911.

Day.	Dec.	Day.	Dec.	Day.	Dec.
1.....	1.60	6.....	1.75	11.....	1.60
2.....		7.....	1.60	12.....	1.60
3.....	1.62	8.....	1.60	13.....	1.70
4.....	1.60	9.....	1.60	14.....	1.60
5.....	1.60	10.....	1.60	15.....	1.80
				16.....	1.80

HORSE CREEK NEAR LAGRANGE, WYO.

Location.—At Wye Cross ranch, about sec. 28, T. 20 N., R. 61 W., 3 miles above Laramie, Wyo., 1 mile below mouth of Bear Creek.

Records available.—December 1 to 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Data too meager to determine.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—Prior to July 1, 1912, there were adjudicated diversions from Horse Creek of 1,216 second-feet and of 224 second-feet from tributaries entering above the station.

Accuracy.—Data insufficient for estimates of daily and monthly discharge.

Cooperation.—Station maintained in cooperation with State engineer.

The following discharge measurement was made by Watson and Whiting:
December 1, 1911: Gage height, .40 feet; discharge, 2.2 second-feet.

Daily gage height, in feet, of Horse Creek near Laramie, Wyo., for 1911.

Day.	Dec.	Day.	Dec.	Day.	Dec.
1.....	.04	11.....	0.8	21.....	3.1
2.....	.4	12.....	.8	22.....	2.2
3.....	.5	13.....	.8	23.....	3.1
4.....	.6	14.....	.8	24.....	3.1
5.....	.5	15.....	.8	25.....	3.1
6.....	.6	16.....	.8	26.....	3.1
7.....	.6	17.....	.8	27.....	3.1
8.....	.8	18.....	.8	28.....	3.3
9.....	.8	19.....	1.2	29.....	3.7
10.....	.8	20.....	1.1	30.....	3.7
				31.....	3.7

NOTE.—Ice present during the greater part of December.

MIDDLE FORK¹ OF SOUTH PLATTE RIVER AT FAIRPLAY, COLO.

Location.—At the highway bridge at Fairplay, in sec. 33, T. 9 S., R. 77 W., 1 mile above the mouth of Beaver Creek and about 3 miles below the mouth of Sacramento Creek.

Records available.—October 17, 1910, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Somewhat shifting.

Discharge measurements.—Made by wading.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—There are no court decrees for diversions from Middle Fork above the station, but decrees for diversions of 1,092 second-feet below. There are also decrees for diversions of 147 second-feet from tributaries entering above.

Accuracy.—As the station has not been completely rated no estimates of discharge have been made.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of Middle Fork of South Platte River at Fairplay, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
Mar. 1	O. M. Wimmer.....	<i>Feet.</i> .75	<i>Sec.-ft.</i> 8.8
Apr. 24	.....do.....	1.03	20.5
Sept. 16	.....do.....	1.30	28.2

Daily gage height, in feet, of Middle Fork of South Platte River at Fairplay, Colo., for 1911.

[E. N. Brown, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.50	0.70	0.75	0.79	1.00	1.85	1.75	1.5	1.25	1.2	1.3	1.1
2.....	.50	^a 1.60	.75	.82	1.02	1.9	2.2	1.45	1.3	1.25	1.15	1.15
3.....	.50	.70	.62	1.00	1.05	1.9	2.3		1.35	1.2	1.35	1.1
4.....	.40	^a 1.60	.67	.92	1.25	1.95			1.3		1.2	1.1
5.....	.40			.83		2.05	2.6	1.5			1.2	1.2
6.....	.40	1.80	.68	.79	1.4	2.05	2.65	1.45	1.25			1.1
7.....	.40	1.70	.70	.72	1.4	2.1	2.6	1.45	1.2	1.15		
8.....	.40	1.90	.64	.73	1.5	2.2	2.25	1.4	1.2	1.2	1.1	1.0
9.....	.50	1.90	.68	.83	1.5		2.2	1.5	1.2	1.15	1.2	1.05
10.....	.60	^a 1.90		.75	1.45	2.0	2.3	1.5	1.25			1.0
11.....	.70		.72	.73	1.4	2.25		1.4				1.0
12.....	.70				1.35	2.4		1.4		1.25	1.2	1.05
13.....	.70		.70	.71	1.4	2.15		1.5	1.2	1.25	1.25	1.0
14.....	.70	.70	.73	.70	1.4	2.1		1.4		1.3		
15.....		.70	.78	.72	1.5	2.2			1.25	1.25		
16.....	.70	.70	.75	.73	1.5	2.1			1.25	1.2	1.1	1.0
17.....		.70	.75	.73	1.6	2.2	1.8		1.2	1.3		
18.....	.60		.70	1.00		2.0	1.7	1.55		1.35	1.25	1.0
19.....		.70		1.02	1.5	2.2	1.75	1.55	1.25	1.2		1.05
20.....	.70	.70	.73	1.02	1.45	2.2		1.5	1.15	1.3	1.3	1.05
21.....	.70	.60	.70	1.03	1.4	2.3	1.7	1.5	1.3	1.25	1.2	1.0
22.....		.60	.75	1.30	1.35	2.3	1.65	1.6		1.3		
23.....	^a 1.60	.50	.76		1.35	2.4	1.6		1.25	1.25	1.15	1.0
24.....	.70	.50	.75	1.03		2.3				1.3		
25.....	.70	.60	.80	1.08		2.1		1.3	1.15	1.4		
26.....				1.08		1.8		1.3	1.2	1.3		
27.....	.70	.70	.78	1.25	1.5	1.75	1.5	1.25	1.2	1.2		
28.....	.70	.70	.65	1.13	1.55	1.8	1.5			1.4	1.2	
29.....			.71	1.30	1.6	1.75	1.5			1.15	1.15	
30.....	.70		.70	1.05	1.75	1.6	1.55		1.35	1.3	1.25	.95
31.....			.72		1.85					1.35		.95

^a Ice gorge.

NOTE.—Ice caused backwater Nov. 20 to Dec. 31, and it is probable that gage heights were affected by ice during January, February, and March; approximate thickness of ice during December, 0.3 foot.

¹ Erroneously called the South Fork in 1910 report.

SOUTH FORK OF SOUTH PLATTE RIVER AT LAKE GEORGE, COLO.

Location.—At highway bridge in sec. 19, T. 12 S., R. 71 W., one-fourth mile below Lake George, in the Pike National Forest, about 2 miles above the mouth of Caylor Gulch; no tributary between the outlet of the lake and the station.

Records available.—October 22, 1910, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Automatic recording gage installed in 1911, reading to the same datum as the original staff gage.

Channel.—Conditions in the channel will remain unchanged as long as the control for the station—a 2-foot timber-crib dam 50 feet below the gage—remains permanent.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months and measurements are made to determine the flow.

Artificial control.—The discharge at the station is controlled naturally to some extent by the regulating effect of Lake George, which has an area of one-half square mile.

Diversions.—There are court decrees for diversions of 1,076 second-feet from the South Fork above this station and for diversions of 1,816 second-feet from tributaries entering above.

Accuracy.—As the station has not been completely rated, no estimates of discharge have been made.

Cooperation.—Station maintained in cooperation with United States Forest Service and the State engineer of Colorado.

Discharge measurements of South Fork of South Platte River at Lake George, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 11 ^a	Russell and Wimmer.....	0.74	1.6
Apr. 26	O. M. Wimmer.....	1.20	12.9
July 8	E. O. Christiansen.....	3.32	729
Sept. 25	H. B. Waha.....	1.78	41.9

^a Ice conditions.

Daily gage height, in feet, of South Fork of South Platte River at Lake George, Colo., for 1911.

[F. C. Parrett, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.70	.....	0.85	2.0	0.95	1.05	2.2	2.3	2.0	1.7	1.55	1.3
2.....	.....	.....	1.0	2.0	1.05	1.05	2.45	2.3	2.0	1.7	1.55	1.25
3.....	.....	.....	1.0	1.9	1.05	1.05	3.5	2.2	2.0	1.5	1.6	1.05
4.....	.....	.....	.9	2.0	1.05	1.0	3.4	2.2	1.95	1.3	1.65	1.05
5.....	.....	.....	1.1	1.85	1.15	.95	3.5	2.15	1.9	1.45	1.65	1.15
6.....	.6	.....	1.0	1.7	1.15	1.0	3.3	2.1	1.90	1.8	1.65	1.15
7.....	.....	.....	1.1	1.55	1.05	1.5	3.25	2.05	1.85	2.0	1.6	1.15
8.....	.7	.....	1.2	1.35	1.2	1.75	3.35	2.0	1.85	1.95	1.6	1.1
9.....	.68	.....	1.35	1.35	1.2	1.95	3.1	2.0	1.85	1.65	1.6	1.15
10.....	.72	.....	1.7	1.25	1.1	1.9	2.8	2.0	1.8	1.6	1.6	1.05
11.....	.74	.....	1.75	1.4	1.05	1.85	2.1	2.05	1.8	1.7	1.35	.95
12.....	.....	.....	1.25	1.4	1.05	1.8	2.2	2.15	1.8	1.45	1.45	.95
13.....	.....	.....	1.35	1.15	1.05	1.85	2.1	2.1	1.75	1.15	1.45	1.0
14.....	.....	.....	1.55	1.05	1.0	2.15	2.35	2.05	1.75	1.6	1.4	.....
15.....	.....	.....	1.6	1.1	1.15	2.3	2.3	2.05	1.85	1.6	1.5	1.0

Daily gage height, in feet, of South Fork of South Platte River at Lake George, Colo., for 1911—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....			1.65	1.05	1.3	2.4	2.4	2.0	1.9	1.55	1.5	.90
17.....		1.05	1.6	1.2	1.4	2.45	2.15	2.05	1.9	1.55	1.4	.....
18.....	.8	1.0	1.65	1.2	1.45	2.45	2.05	2.1	1.8	1.5	1.4	.90
19.....		1.05	1.5	1.2	1.45	2.7	2.15	2.05	1.7	1.5	1.3	.....
20.....		.95	1.6	1.1	1.35	2.75	2.2	2.0	1.7	1.45	1.3	1.00
21.....		.8	1.7	1.2	1.45	2.75	2.45	2.05	1.75	1.4	1.4	.....
22.....		.8	1.6	1.2	1.50	2.75	2.5	2.1	1.8	1.4	1.5	.....
23.....		.8	1.65	1.1	1.5	2.85	2.55	2.25	1.8	1.6	1.6	.....
24.....		1.0	1.8	1.2	1.4	2.7	2.6	2.35	2.0	1.9	1.55	.....
25.....		1.0	1.95	1.25	1.4	2.4	2.65	2.3	2.15	1.9	1.55	.....
26.....		.85	1.6	1.3	1.4	2.3	2.7	2.05	1.7	1.65	1.6	.....
27.....		.75	1.6	1.25	1.35	2.2	2.6	2.05	1.7	1.65	1.45	.....
28.....		.8	1.65	1.2	1.2	2.25	2.45	2.05	1.7	1.65	1.35	.....
29.....			1.95	1.15	1.2	2.25	2.3	2.05	1.7	1.4	1.4	.....
30.....			1.7	1.05	1.05	2.2	2.35	2.0	1.7	1.25	1.3	.....
31.....			1.45	.....	1.1	.....	2.3	2.0	.....	1.5	.....	.....

NOTE.—Ice present Jan. 1 to Feb. 16 and Dec. 3 to 31.

SOUTH FORK OF SOUTH PLATTE RIVER AT SOUTH PLATTE, COLO.

Location.—In sec. 25, T. 7 S., R. 70 W., in the Pike National Forest, half a mile east of South Platte, 600 feet above junction with the North Fork.

Records available.—May 8, 1905, to December 31, 1911.

Drainage area.—2,160 square miles.

Gage.—Inclined staff; datum unchanged.

Channel.—Somewhat shifting.

Discharge measurements.—Made from car and cable during highwater and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months and measurements are made to determine the flow.

Artificial control.—The flow is controlled to a certain extent by the Cheeseman reservoir, 20 miles upstream, which has a capacity of 79,000 acre-feet. No very important tributaries enter between the reservoir and this station.

Diversions.—There are no court decrees for diversions from the South Fork between this station and the one at Lake George; but decrees for diversion of 1,400 second-feet from intervening tributaries.

Accuracy.—Although the channel is somewhat shifting, sufficient discharge measurements have been made to enable reliable estimates of discharge to be made.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of South Fork of South Platte River at South Platte, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 10 ^a	R. H. Fletcher.....	1.98	75.6	July 11	G. H. Russell.....	3.95	944
Feb. 22 ^a	do.....	1.90	77.3	Aug. 18	R. H. Fletcher.....	2.35	200
Mar. 16	do.....	1.50	46.7	29	do.....	2.55	237
May 10	Miles and Turner.....	1.87	71.9	Sept. 8	Waha and Fletcher.....	2.40	196
23	R. C. Miles.....	2.80	344	Nov. 4	G. H. Russell.....	1.92	71.6
June 12	J. B. Stewart.....	2.00	93.9	Dec. 16 ^b	R. H. Fletcher.....	1.80	73.4

^a Ice conditions.

^b Slight ice effect.

Daily gage height, in feet, of South Fork of South Platte River at South Platte, Colo., for 1910-11.

[Miss A. Vermillion, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1.....	2.25	2.2	2.0	2.6	3.1	2.7	2.45	2.25	2.05	2.0	1.9	1.7
2.....	2.3	2.15	2.1	2.6	3.1	2.7	2.7	3.15	2.05	2.0	1.85	1.7
3.....	2.2	2.1	2.2	2.65	3.1	2.7	2.9	3.4	2.0	2.0	1.8	1.7
4.....	2.2	2.0	2.2	2.6	3.2	2.7	2.8	3.3	2.0	1.95	1.85	1.7
5.....	2.2	2.0	2.5	2.6	3.25	2.7	2.8	3.1	2.0	1.9	1.95	1.6
6.....	2.4	2.0	2.7	2.6	3.05	2.7	2.8	3.05	1.9	1.9	2.0	1.65
7.....	2.5	1.9	2.7	2.0	3.0	2.95	2.8	3.0	1.85	1.9	2.0	1.7
8.....	2.5	1.7	2.7	2.0	2.9	2.85	2.8	2.9	1.85	1.9	2.0	1.7
9.....	2.6	1.7	2.75	2.0	2.8	2.8	2.35	2.85	1.95	1.95	2.05	1.75
10.....	2.6	1.7	3.6	2.6	2.8	2.75	1.9	3.3	1.85	1.95	2.1	1.7
11.....	2.3	1.75	3.55	2.65	2.8	2.8	1.9	3.3	1.9	1.95	2.1	1.7
12.....	2.3	1.65	3.4	2.65	2.9	2.7	1.9	3.3	1.9	1.95	2.05	1.7
13.....	2.3	1.7	3.3	2.7	2.9	2.75	1.9	3.4	1.9	1.9	2.0	1.65
14.....	2.25	1.75	3.2	2.85	2.8	2.65	1.9	3.25	1.9	1.95	2.05	1.65
15.....	2.3	1.9	3.2	2.8	3.0	2.75	1.9	2.35	1.9	1.95	2.05	1.65
16.....	2.3	1.9	3.1	2.6	2.95	2.8	1.9	2.0	1.9	1.95	2.05	1.65
17.....	2.4	1.95	3.15	2.65	3.05	2.8	2.0	2.55	2.0	2.0	2.0	1.65
18.....	2.4	1.95	3.2	2.65	3.25	2.9	2.05	2.55	1.95	2.0	2.0	1.8
19.....	2.5	2.0	3.2	2.65	3.15	2.9	2.0	2.55	1.9	2.0	1.95	1.8
20.....	2.45	2.1	3.2	2.7	2.95	2.7	2.1	2.3	1.9	2.0	1.9	1.7
21.....	2.5	2.25	3.2	2.8	2.95	2.5	2.1	2.5	2.05	2.0	1.9	1.8
22.....	2.5	2.2	3.2	2.85	3.0	2.6	2.15	2.55	2.1	2.15	1.8	1.9
23.....	2.45	2.2	2.9	2.85	3.1	2.6	2.1	2.55	2.25	2.15	1.85	1.85
24.....	2.3	2.1	2.9	2.85	3.2	2.6	2.1	2.55	2.15	2.15	1.8	1.85
25.....	2.25	2.0	2.9	2.9	3.2	2.2	2.75	2.0	2.15	2.15	1.75	1.9
26.....	2.15	2.0	2.8	2.9	3.1	2.2	2.75	2.05	2.15	2.15	1.85	1.9
27.....	2.2	2.0	2.8	2.9	2.9	2.1	2.75	2.1	2.15	2.1	1.85	1.9
28.....	2.2	2.0	2.7	2.9	3.0	2.15	2.8	2.05	2.15	2.1	1.7	2.1
29.....	2.15	.....	2.7	3.0	2.85	2.2	3.6	2.05	2.15	2.1	1.8	2.0
30.....	2.2	.....	2.6	3.0	2.7	2.2	2.8	2.0	2.15	2.1	1.8	2.0
31.....	2.2	.....	2.6	.....	2.7	.....	2.75	2.1	.....	2.1	.....	2.05
1911.												
1.....	2.0	1.7	1.85	1.5	2.2	2.05	3.0	2.5	2.6	2.1	1.8	2.0
2.....	1.85	1.6	1.65	2.0	2.1	2.05	3.0	2.25	2.7	2.1	1.9	2.0
3.....	1.6	1.75	1.75	2.5	2.05	2.25	3.1	2.25	2.7	2.1	1.9	2.0
4.....	1.9	1.7	1.8	2.7	2.0	2.25	3.0	2.25	2.6	2.4	1.9	2.1
5.....	2.0	1.8	1.75	2.75	1.95	2.1	3.0	3.0	2.6	2.4	1.9	2.0
6.....	1.9	1.65	1.75	2.75	1.9	2.0	2.75	3.1	2.5	2.4	1.85	2.0
7.....	1.9	1.8	1.7	2.65	1.9	1.95	3.25	3.05	2.5	2.1	1.85	2.0
8.....	2.0	1.7	1.75	2.5	1.9	1.95	4.1	2.3	2.4	2.0	1.85	2.0
9.....	1.8	1.75	1.7	2.3	1.9	1.95	4.1	2.3	2.4	2.0	1.9	1.7
10.....	2.1	1.7	1.75	2.15	1.85	1.95	4.1	3.0	2.4	1.8	1.9	1.6
11.....	2.05	1.7	1.7	2.1	1.85	1.95	4.05	2.6	2.3	1.8	1.9	1.5
12.....	2.0	1.75	1.65	2.1	1.9	1.95	4.0	2.4	2.3	1.75	2.0	2.0
13.....	1.9	1.75	1.5	2.05	1.8	1.95	4.0	2.4	2.25	1.7	1.8	2.1
14.....	1.8	1.75	1.45	2.05	1.85	1.95	4.0	2.4	2.2	1.7	1.8	1.8
15.....	1.9	1.75	1.5	2.0	1.85	2.1	4.0	2.35	2.1	1.7	1.8	1.8
16.....	2.0	1.8	1.55	2.0	1.9	2.3	4.0	2.3	2.1	1.7	1.8	1.8
17.....	1.85	1.8	1.5	2.0	1.85	2.3	4.0	2.3	2.15	1.7	1.8	1.8
18.....	1.65	1.8	1.45	1.95	1.9	2.3	2.4	2.4	2.1	1.7	1.8	1.85
19.....	1.7	1.65	1.5	1.95	1.9	2.3	2.25	2.4	2.1	1.7	1.8	1.95
20.....	1.75	1.35	1.5	1.9	2.1	2.3	3.3	2.4	2.1	1.7	1.8	1.85
21.....	2.0	1.65	1.55	1.8	2.7	2.7	3.3	2.3	2.1	1.7	1.8	1.75
22.....	1.8	2.1	1.6	1.95	2.75	2.7	3.3	2.3	2.1	1.7	1.8	1.8
23.....	1.8	2.05	1.5	2.0	2.75	2.5	3.6	3.2	2.1	1.7	1.75	2.1
24.....	2.05	2.1	1.55	1.85	2.75	2.5	3.6	3.2	2.1	1.7	1.75	2.0
25.....	2.0	2.1	1.5	1.9	2.75	2.7	3.6	3.2	2.1	1.7	2.0	1.9
26.....	1.95	2.0	1.5	1.85	2.75	2.7	3.5	3.2	2.1	1.7	2.0	1.8
27.....	1.9	1.85	1.4	1.7	2.75	2.8	3.2	2.6	2.1	1.7	1.8	1.7
28.....	1.9	1.9	1.55	1.75	2.45	2.8	3.0	2.6	2.1	1.7	1.6	3.7
29.....	1.85	.....	1.5	1.9	2.15	2.9	3.0	2.6	2.1	1.7	1.8	4.0
30.....	1.85	.....	1.5	2.4	2.1	3.0	2.8	2.6	2.1	1.7	2.0	2.7
31.....	1.7	.....	1.45	.....	2.1	.....	2.75	2.6	.....	1.8	.....	2.6

NOTE.—Ice present Jan. 1 to 10 and Dec. 18 to 31, 1910; gage heights for 1910, published in Water Supply Paper No. 286, were partly in error as necessary corrections were not applied; corrected gage heights given in above table. Ice present Jan. 1 to Feb. 26, and Nov. 26 to Dec. 31, 1911.

Daily discharge, in second-feet, of South Fork of South Platte River at South Platte, Colo., for 1910-11.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1.....	110	122	94	242	425	317	200	170	125	114	95	54
2.....	110	113	114	242	430	318	274	455	425	114	88	54
3.....	110	104	136	258	434	319	342	580	114	114	80	54
4.....	115	88	136	242	476	320	308	530	114	114	86	54
5.....	115	88	214	242	503	318	308	435	114	96	110	46
6.....	120	88	274	242	420	315	308	410	96	96	109	50
7.....	120	75	242	94	405	408	308	382	88	96	108	54
8.....	125	53	274	94	370	362	308	340	88	96	106	54
9.....	130	53	291	94	335	335	173	315	105	105	117	59
10.....	135	53	644	242	337	317	78	564	88	105	127	54
11.....	142	58	620	258	339	330	78	564	96	105	125	54
12.....	142	49	550	258	380	295	78	564	96	105	115	54
13.....	142	53	506	274	380	305	78	610	96	105	103	50
14.....	132	58	462	325	340	270	78	541	96	105	112	50
15.....	142	78	462	308	425	300	78	173	96	105	110	50
16.....	142	78	420	242	403	315	78	114	96	105	110	50
17.....	162	86	441	258	445	312	94	246	114	114	100	50
18.....	162	86	462	258	540	343	104	246	105	114	98	45
19.....	184	94	462	258	490	340	94	246	96	114	90	45
20.....	173	114	462	274	408	274	114	182	96	114	82	45
21.....	184	148	462	308	410	214	114	240	125	114	80	45
22.....	184	136	462	325	430	242	125	256	136	147	70	45
23.....	173	136	342	325	476	242	114	256	170	147	70	45
24.....	142	114	342	325	520	242	114	256	147	147	64	45
25.....	132	94	342	342	522	136	292	136	147	147	59	45
26.....	113	94	308	342	480	136	308	125	147	147	70	55
27.....	122	94	308	342	395	114	322	136	147	136	70	55
28.....	122	94	274	338	435	125	362	125	147	136	54	55
29.....	113	.....	274	378	375	136	550	125	147	136	64	55
30.....	122	.....	242	380	314	136	350	114	147	136	64	55
31.....	122	.....	242	.....	316	.....	322	136	.....	136	.....	55
1911.												
1.....	65	55	72	46	142	105	432	242	254	106	58	85
2.....	65	50	53	94	116	105	432	165	290	106	70	85
3.....	65	50	61	233	105	156	480	165	290	106	70	85
4.....	65	55	66	302	94	156	432	165	254	188	70	85
5.....	70	65	61	323	86	116	432	448	254	188	70	85
6.....	70	55	61	323	78	94	323	500	220	188	64	85
7.....	70	65	56	284	78	86	555	472	220	106	64	85
8.....	70	55	61	233	78	86	1,040	170	188	86	64	85
9.....	75	60	56	170	78	86	1,040	170	188	86	70	75
10.....	75	55	61	129	72	86	1,040	442	188	58	70	75
11.....	75	55	56	116	72	86	1,010	283	158	58	70	75
12.....	75	60	53	116	78	86	975	215	158	53	86	75
13.....	70	60	46	105	66	86	975	215	144	48	58	75
14.....	70	60	44	105	72	86	975	215	130	48	58	75
15.....	70	60	46	94	72	116	975	200	106	48	58	75
16.....	75	65	48	94	78	170	975	182	106	48	58	75
17.....	70	65	46	94	72	170	975	182	118	48	58	75
18.....	55	65	44	86	78	170	200	200	106	48	58	75
19.....	55	55	46	86	78	170	130	198	106	48	58	80
20.....	60	60	46	78	116	170	585	198	106	48	58	80
21.....	65	70	48	66	302	302	585	175	106	48	58	80
22.....	65	77	50	86	323	302	585	175	106	48	58	80
23.....	65	77	46	94	323	233	750	540	106	48	53	80
24.....	65	85	48	72	323	233	750	540	106	48	53	90
25.....	75	90	46	78	323	302	755	540	106	48	53	90
26.....	85	94	46	72	323	302	700	540	106	48	58	90
27.....	75	72	42	56	323	344	545	260	106	48	58	90
28.....	75	78	48	61	216	344	445	260	106	48	42	100
29.....	70	.....	46	78	129	386	445	260	106	48	58	100
30.....	70	.....	46	200	116	432	355	254	106	48	86	100
31.....	55	.....	44	.....	116	.....	335	254	.....	58	.....	100

NOTE.—Daily discharge for 1910, published in Water Supply Paper No. 286, erroneous because of noncorrection of gage heights and method of computing; revised determination presented here. Discharge estimated Jan. 1 to 10 and Dec. 18 to 31, 1910, on account of presence of ice. Daily discharge determined Jan. 11 to 31, Feb. 15 to Apr. 27, May 10 to June 4, June 21 to July 24, Aug. 12 to Oct. 31, and Nov. 23 to Dec. 17, 1910, from fairly well-defined curves; indirect method for shifting channels used for the remaining periods of 1910. Daily discharge Jan. 1 to Feb. 26 and Nov. 26 to 31, 1911, estimated because of ice; daily discharge Feb. 27 to July 11 and Aug. 30 to Nov. 25, 1911, determined from two curves well-defined between 50 and 450 second-feet; indirect method for shifting channels used from July 12 to Aug. 29, 1911.

Monthly discharge of South Fork of South Platte River at South Platte, Colo., for 1910-11.

[Drainage area, 2,160 square miles.]

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
1910.					
January.....	184	110	137	8,410	B.
February.....	148	49	89.3	4,960	B.
March.....	644	94	350	21,500	B.
April.....	380	94	270	16,100	B.
May.....	540	314	418	25,700	B.
June.....	408	114	271	16,100	B.
July.....	550	78	208	12,800	B.
August.....	610	114	310	19,000	B.
September.....	170	88	117	6,950	B.
October.....	147	96	118	7,270	B.
November.....	127	54	91.2	5,430	B.
December.....	59	45	50	3,080	B.
The year.....	644	45	204	147,000	
1911.					
January.....	85	55	70.6	4,340	B.
February.....	94	50	64.8	3,600	B.
March.....	72	42	51.4	3,160	B.
April.....	323	46	132	7,880	A.
May.....	323	66	146	8,980	A.
June.....	432	86	186	11,000	A.
July.....	1,040	130	653	40,100	A.
August.....	540	165	285	17,500	A.
September.....	290	106	155	9,210	A.
October.....	188	48	72.6	4,460	A.
November.....	86	42	62.2	3,700	B.
December.....	100	75	83.6	5,140	B.
The year.....	1,040	42	165	119,000	

NOTE.—Monthly estimates for this station for 1910, as published in Water Supply Paper 286, are in error, and the revised values are published herewith.

SOUTH PLATTE RIVER AT SOUTH PLATTE, COLO.

Location.—In sec. 25, T. 7 S., R. 70 W., in the Pike National Forest, three-fourths of a mile east of South Platte; about 300 feet below junction of the North and South forks; no tributary between the forks and the station, and none for several miles below.

Records available.—March 28, 1902, to December 31, 1911. Records at Platte Canyon and at Deansbury, a few miles below, extend back to 1887 with the exception of the years 1893 and 1894. The earlier records, 1887-1892, were taken by the State engineer, and the records from 1895 to 1898 were taken under the direction of the Denver Power & Irrigation Co.

Drainage area.—2,610 square miles.

Gage.—An automatic recording gage, installed by the State engineer March 14, 1910. From March 28, 1902, to May 7, 1905, the gage was at the highway bridge. On the latter date it was moved to its present site, 150 feet below. It is probable that the new gage read to a somewhat different datum. The recording gage is referred to the datum of the gage established in 1905.

Channel.—Shifting.

Discharge measurements.—Made from car and cable during high water, and by wading at low stages.

Winter flow.—Ice causes backwater during a portion of the winter months and measurements are made to determine the flow.

Artificial control.—The flow is controlled to a certain extent by the Cheesman reservoir which is on the South Fork about 20 miles above the forks.

Diversions.—No water is diverted between this station and that on the South Fork at South Platte nor between this station and that on the North Fork at Cassells.

Accuracy.—Although the channel is shifting, sufficient discharge measurements have been obtained to enable fair estimates of discharge to be made.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of South Platte River at South Platte, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
Jan. 10 ^a	R. H. Fletcher.....	<i>Feet.</i> 2.08	<i>Sec.-ft.</i> 111	July 11	G. H. Russell.....	<i>Feet.</i> 4.28	<i>Sec.-ft.</i> 1,190
Feb. 22 ^a	.....do.....	1.88	106	Aug. 18	R. H. Fletcher.....	2.37	308
Mar. 15	.....do.....	1.48	72.2	29	.....do.....	2.00	324
16	.....do.....	1.60	98.0	Sept. 8	Fletcher and Waha.....	2.04	284
May 10	Turner and Miles.....	2.58	361	Nov. 3	G. H. Russell.....	1.65	94.1
June 12	J. B. Stewart.....	2.75	445	Dec. 16 ^a	R. H. Fletcher.....	1.80	116

^a Ice conditions.

Daily gage height, in feet, of South Platte River at South Platte, Colo., for 1910-11.

[Miss A. Vermillion, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1.....	2.6	2.0	1.9	2.6	3.3	3.4	2.8	2.65	2.0	1.9	1.9	1.5
2.....	2.4	2.1	2.0	2.65	3.3	3.4	2.8	3.25	2.05	1.9	1.85	1.5
3.....	2.5	2.0	2.2	2.65	3.3	3.4	2.9	3.4	2.0	1.9	1.85	1.6
4.....	2.3	1.9	2.2	2.5	3.4	3.4	2.85	3.3	2.05	1.9	1.85	1.6
5.....	2.3	1.9	2.5	2.5	3.4	3.25	2.85	3.15	2.0	1.85	1.95	1.4
6.....	2.5	1.9	2.6	2.45	3.25	3.25	2.8	3.2	1.9	1.9	1.9	1.4
7.....	2.6	1.7	2.55	2.5	3.2	3.35	2.75	3.1	1.85	1.9	1.9	1.45
8.....	2.7	1.7	2.65	2.5	3.15	3.3	2.65	2.9	1.85	1.95	2.0	1.6
9.....	2.7	1.7	2.7	2.5	3.15	3.25	2.55	2.75	1.95	1.9	2.0	1.6
10.....	2.5	1.65	3.55	2.5	3.2	3.2	2.1	3.35	1.95	1.9	2.0	1.65
11.....	2.5	1.7	3.55	2.55	3.2	3.15	2.05	3.35	1.85	1.95	2.05	1.6
12.....	2.6	1.7	3.4	2.6	3.25	3.2	2.0	3.45	1.85	1.9	2.05	1.6
13.....	2.6	1.75	3.3	2.7	3.35	3.1	2.0	3.4	1.9	1.8	2.0	1.7
14.....	2.45	1.8	3.3	2.85	3.45	3.2	2.0	3.25	1.9	1.85	1.95	1.55
15.....	2.5	1.9	3.3	2.8	3.45	3.1	2.05	2.35	1.9	1.95	2.0	1.65
16.....	2.3	2.0	3.3	2.65	3.4	3.15	2.05	2.25	1.9	2.05	2.0	1.65
17.....	2.4	1.9	3.25	2.7	3.35	3.2	2.05	2.4	1.9	2.1	1.9	1.7
18.....	2.5	1.95	3.3	2.7	3.55	3.15	2.05	2.5	1.9	2.05	1.95	1.8
19.....	2.5	2.0	3.25	2.75	3.5	3.1	1.9	2.45	1.9	2.05	1.95	1.9
20.....	2.6	2.1	3.3	2.8	3.3	2.9	1.95	2.45	1.9	2.1	1.85	1.8
21.....	2.6	2.2	3.25	2.95	3.25	2.7	2.0	2.65	1.95	2.1	1.85	1.9
22.....	2.55	2.25	3.2	2.9	3.35	2.75	2.0	2.7	2.05	2.15	1.8	1.9
23.....	2.6	2.2	3.25	2.95	3.55	2.7	2.0	2.7	2.05	2.15	1.75	1.8
24.....	2.2	2.2	3.2	3.0	3.6	2.65	2.2	2.7	2.05	2.1	1.85	1.95
25.....	2.2	2.0	3.05	3.05	3.55	2.65	2.6	2.25	2.0	2.1	1.85	2.0
26.....	2.2	2.1	3.0	3.05	3.4	2.5	2.55	2.05	2.0	2.05	1.75	1.95
27.....	2.0	2.1	2.85	3.1	3.4	2.45	2.55	2.05	2.0	2.0	1.7	1.9
28.....	2.1	2.0	2.75	3.15	3.45	2.4	2.6	2.05	2.0	2.0	1.55	1.9
29.....	2.2	.....	2.75	3.25	3.45	2.4	3.3	2.1	2.0	2.05	1.6	1.9
30.....	2.1	.....	2.6	3.3	3.4	2.75	3.25	2.0	2.0	2.0	1.55	1.9
31.....	2.15	.....	2.55	.....	3.4	.....	3.4	2.0	.....	1.95	.....	1.9
1911.												
1.....	.....	1.6	1.65	1.6	2.15	2.75	3.15	2.35	2.1	2.0	1.65	.....
2.....	.....	1.55	1.6	1.9	2.1	2.85	3.4	2.3	2.25	1.95	1.6	.....
3.....	2.05	1.55	1.55	2.2	2.0	2.85	3.75	2.35	2.2	1.85	1.65	.....
4.....	2.0	1.55	1.6	2.35	2.0	2.85	3.4	2.45	2.15	2.05	1.75	.....
5.....	2.05	1.6	1.6	2.4	2.1	2.9	3.55	2.95	2.15	2.1	1.75	1.25
6.....	1.9	1.55	1.6	2.4	2.2	2.8	3.9	2.9	2.1	2.3	1.65	1.7
7.....	1.7	1.6	1.55	2.25	2.3	2.8	3.95	2.75	2.05	2.0	1.65	1.75
8.....	1.65	1.55	1.6	2.1	2.4	2.75	4.3	2.35	2.0	1.9	1.7	1.3
9.....	1.75	1.55	1.6	2.05	2.45	2.85	4.25	2.8	2.0	1.8	1.7	1.1
10.....	2.0	1.55	1.6	1.9	2.55	2.75	4.2	2.85	1.95	1.7	1.75	1.1

Daily gage height, in feet, of South Platte River at South Platte, Colo., for 1910-11—Con.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.												
11.....	2.0	1.6	1.65	1.85	2.2	2.7	4.2	2.9	1.9	1.65	1.75	.....
12.....	1.95	1.6	1.5	1.85	2.05	2.7	4.15	2.45	1.8	1.6	1.6	.....
13.....	1.85	1.6	1.45	1.8	2.35	2.7	4.2	2.35	1.8	1.6	1.55	.....
14.....	1.7	1.55	1.45	1.8	2.35	2.65	4.2	2.3	1.8	1.6	1.75	.....
15.....	1.65	1.55	1.45	1.7	2.55	2.7	4.15	2.3	1.8	1.6	1.65	.....
16.....	1.65	1.6	1.55	1.75	2.6	2.85	4.15	2.3	1.8	1.6	1.65	.....
17.....	1.65	1.6	1.55	1.8	2.6	2.9	4.2	2.3	1.8	1.6	1.6	.....
18.....	1.55	1.6	1.5	1.75	2.65	2.8	3.2	2.35	1.85	1.6	1.6	.....
19.....	1.6	1.55	1.55	1.8	2.75	2.8	2.85	2.25	1.85	1.6	1.65	.....
20.....	1.6	1.45	1.45	1.8	2.7	2.8	3.5	2.2	1.85	1.55	1.6	.....
21.....	1.65	1.45	1.5	1.8	2.9	3.0	3.5	2.2	1.85	1.55	1.6	.....
22.....	1.7	1.8	1.55	1.9	3.0	2.9	3.55	2.45	1.85	1.55	1.65	.....
23.....	1.55	2.0	1.5	1.95	3.0	3.0	3.6	2.75	1.85	1.6	1.5	.....
24.....	1.65	2.05	1.5	2.1	3.0	3.0	3.55	2.7	1.8	1.65	1.5	.....
25.....	1.7	2.0	1.55	2.2	3.0	3.0	3.55	2.7	1.8	1.65	1.6	.....
26.....	1.7	1.7	1.5	2.2	3.05	3.0	3.6	2.6	1.85	1.65	1.7	.....
27.....	1.6	1.6	1.4	2.15	2.95	3.0	3.35	2.1	1.85	1.65	1.65	.....
28.....	1.6	1.65	1.5	2.1	2.8	3.05	3.15	2.1	1.85	1.65	.....	.....
29.....	1.6	.....	1.45	2.2	2.75	3.05	3.1	2.0	1.85	1.7	.....	.....
30.....	1.65	.....	1.5	2.3	2.65	3.15	2.85	2.0	1.95	1.65	.....	.....
31.....	1.6	.....	1.55	.....	2.6	.....	2.45	2.05	.....	1.65	.....	.....

NOTE.—Ice present Jan. 1 to 23 and Dec. 16 to 31, 1910. Gage heights for 1910, published in Water-Supply Paper 286, are in error as necessary corrections were not applied; corrected gage heights presented in above table.

Ice present Jan. 1 to Feb. 26 and Nov. 26 to Dec. 31, 1911.

Daily discharge, in second-feet, of South Platte River at South Platte, Colo., for 1910-11.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1.....	200	182	160	354	605	600	388	400	182	162	136	68
2.....	200	206	182	370	600	600	388	610	194	162	126	68
3.....	200	182	234	370	600	598	480	690	182	160	126	83
4.....	200	160	234	322	635	598	404	610	194	160	126	83
5.....	200	160	322	322	630	540	404	545	182	150	146	68
6.....	225	160	354	306	570	540	388	560	160	155	136	68
7.....	225	120	338	322	550	576	373	510	150	155	136	68
8.....	225	120	370	322	530	558	343	430	150	160	156	83
9.....	225	120	386	322	530	540	313	365	171	155	156	83
10.....	225	111	710	322	548	522	197	630	171	153	156	90
11.....	215	120	710	338	548	505	186	630	150	158	167	83
12.....	215	120	650	354	560	522	175	670	150	152	167	83
13.....	215	130	610	386	600	488	175	650	160	130	156	98
14.....	215	140	610	440	630	522	175	590	160	140	146	76
15.....	215	160	610	422	625	488	186	276	160	160	156	70
16.....	210	182	610	370	615	505	186	248	160	180	156	70
17.....	210	160	590	386	590	522	186	290	160	195	136	70
18.....	210	171	610	386	665	505	186	322	160	178	146	70
19.....	210	182	590	404	650	488	153	306	160	176	146	70
20.....	210	206	610	422	572	420	164	306	160	190	126	70
21.....	205	234	590	476	555	358	175	370	171	190	126	75
22.....	205	248	570	458	590	373	175	386	194	200	116	75
23.....	205	234	590	476	660	358	175	386	194	200	107	75
24.....	205	234	570	494	680	343	220	386	194	186	126	75
25.....	208	182	513	513	660	343	375	248	180	186	126	80
26.....	212	206	494	513	605	298	365	194	180	175	107	80
27.....	170	206	440	532	605	284	380	194	180	160	98	80
28.....	190	182	404	552	620	270	410	194	178	160	76	80
29.....	218	.....	404	590	620	270	670	206	178	170	83	85
30.....	195	.....	354	605	602	373	640	182	178	160	76	85
31.....	205	.....	338	.....	602	.....	690	182	.....	145	.....	85
1911.												
1.....	100	95	105	95	226	438	617	303	340	237	100	100
2.....	100	85	95	160	212	480	732	286	390	220	90	100
3.....	100	85	86	240	185	480	908	303	360	190	95	105
4.....	105	85	95	283	185	480	732	337	335	245	115	105
5.....	105	95	95	298	212	500	807	529	330	260	115	105

Daily discharge, in second-feet, of South Platte River at South Platte, Colo., for 1910-11—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907-8.												
6.....	110	85	95	298	240	460	986	508	310	320	95	105
7.....	115	95	86	254	268	460	1,010	446	290	225	95	115
8.....	105	85	95	212	298	440	1,200	303	270	195	105	115
9.....	105	85	95	198	314	485	1,180	466	270	170	105	115
10.....	110	85	95	160	347	445	1,150	487	250	140	115	115
11.....	110	95	105	148	238	428	1,150	508	235	130	115	115
12.....	110	95	77	148	195	428	1,120	337	210	115	85	115
13.....	110	95	70	137	283	426	1,150	303	205	115	77	115
14.....	115	86	70	137	283	408	1,150	286	205	110	115	115
15.....	105	86	70	115	355	426	1,120	286	200	110	95	115
16.....	105	95	86	126	370	487	1,120	286	200	108	95	115
17.....	105	95	86	137	370	508	1,150	286	200	108	85	110
18.....	85	95	77	126	392	466	640	303	210	105	85	110
19.....	95	100	86	137	430	466	487	280	210	103	95	110
20.....	95	100	70	137	412	466	782	280	210	95	85	110
21.....	105	105	77	137	490	550	782	290	210	92	85	110
22.....	115	105	86	160	535	508	807	390	205	92	95	110
23.....	85	105	77	172	535	550	832	525	205	100	70	110
24.....	105	110	77	212	535	550	807	515	190	110	70	105
25.....	115	110	86	240	535	550	807	535	190	110	85	105
26.....	115	115	77	240	560	550	832	510	200	110	85	105
27.....	95	95	63	226	515	550	709	335	200	108	90	105
28.....	95	105	77	212	455	572	617	345	200	105	95	105
29.....	95	.....	70	240	435	572	594	325	195	115	95	105
30.....	95	.....	77	268	400	617	487	325	220	105	100	105
31.....	95	.....	86	.....	380	.....	337	332	.....	105	.....	105

NOTE.—Daily discharge for this station for 1910, as published in Water-Supply Paper 286, in error because of noncorrection of gage heights and method of computing; corrected determination presented herewith: Daily discharge Jan. 1 to 23 and Dec. 16 to 31, 1910, estimated because of ice; discharge Feb. 16 to Apr. 27, June 6 to July 19, Aug. 12 to Sept. 24, and Nov. 1 to 22, 1910, determined from fairly well-defined curves; indirect method for shifting channels used for the remaining periods of 1910.

Daily discharge Jan. 1 to Feb. 26 and Nov. 26 to Dec. 31, 1911, estimated because of ice; discharge Feb. 27 to Aug. 18, 1911, determined from a curve fairly well defined between 50 and 1,200 second-feet; indirect method for shifting channels used from Aug. 19 to Nov. 25, 1911.

Monthly discharge of South Platte River at South Platte, Colo., for 1910-11.

[Drainage area, 2,610 square miles.]

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
1910.					
January.....	225	170	209	12,800	C.
February.....	248	111	172	9,560	B.
March.....	710	160	437	26,900	B.
April.....	605	306	415	24,700	B.
May.....	680	530	602	37,000	B.
June.....	600	270	464	27,600	B.
July.....	690	153	312	19,200	B.
August.....	670	182	404	24,900	B.
September.....	194	150	171	10,200	B.
October.....	200	130	167	10,200	B.
November.....	167	76	131	7,800	B.
December.....	98	68	77.3	4,750	B.
The year.....	710	68	298	216,000	
1911.					
January.....	115	85	103	6,360	B.
February.....	115	85	95.4	5,300	B.
March.....	105	63	83.6	5,140	B.
April.....	298	95	188	11,200	A.
May.....	560	185	361	22,200	A.
June.....	617	408	492	29,200	A.
July.....	1,200	337	865	53,100	A.
August.....	535	280	373	22,900	A.
September.....	390	190	242	14,400	A.
October.....	320	92	144	8,830	A.
November.....	115	70	94.4	5,620	B.
December.....	115	100	109	6,700	C.
The year.....	1,200	63	264	191,000	

NOTE.—Monthly estimates for this station, for 1910, as published in Water Supply Paper 286, are in error, and therefore the revised estimates are published herewith.

SOUTH PLATTE RIVER AT DENVER, COLO.

Location.—At the Sixteenth Street viaduct in Denver; 500 feet below mouth of Cherry Creek.

Records available.—May 7, 1895, to December 31, 1911.

Drainage area.—3,840 square miles.

Gage.—Automatic recording gage installed August 12, 1909. The original gage was located at the Twenty-third Street viaduct. In July, 1895, a new gage was installed at the Fifteenth Street bridge. In August, 1898, an inclined staff gage was placed on the opposite side of the river, but referred to the same datum. This gage was destroyed by high water in June, 1900, and for the remainder of the year the gage installed in July, 1895, was used. This gage was stolen, and a new one was placed between the Fifteenth Avenue and Sixteenth Avenue bridges May 15, 1901, reading to the same datum. This gage also was stolen and was replaced on June 10, 1903, by a vertical staff near the same place and having the same datum. The automatic gage is referred to practically the same datum as the preceding vertical staff.

Channel.—Shifting.

Discharge measurements.—Made from the Fifteenth Street bridge during high water and by wading at low-water stages.

Winter flow.—The flow at this point is seldom affected by ice.

Diversions.—Between this station and the one at South Platte there are court decrees for diversion from South Platte River of 2,226 second-feet and from intervening tributaries of 1,466 second-feet.

Cooperation.—Since 1907 station has been maintained by the State engineer, by whom the records are furnished.

Discharge measurements of South Platte River at Denver, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 17	Turner and Clayton...	1.18	179	July 31	Bundy and Bunger...	1.46	341
Feb. 24	Thos. Grieve.....	1.08	110	Aug. 7	do.....	1.15	216
Mar. 11	F. Cogswell.....	1.10	110	14	Grieve and Bundy....	1.28	216
Apr. 4	Turner and Clayton...	1.33	177	21	Bundy and Bunger....	1.35	230
May 1	Thos. Grieve.....	1.52	254	28	Hezmalhalch and Bunge- ger.....	1.40	242
June 19	C. C. Hezmalhalch....	1.69	331	Sept. 11	do.....	1.21	160
24	F. Cogswell.....	1.72	396	16	F. Cogswell.....	1.00	114
July 5	Bunger and Hezmalhalch	1.78	463	Oct. 2	Hezmalhalch and Bunge- ger.....	1.03	111
11	Bundy and Bunger....	1.93	591	30	do.....	.89	89.0
24	Bunger and Hezmalhalch	2.16	750	Dec. 4	Grieve and Bunger....	.74	71.0

Daily gage height, in feet, of South Platte River at Denver, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.85	0.95	1.1	0.9	1.4	1.55	1.65	1.25	1.2	1.1	0.95	0.95
2.....	.8	.9	1.15	.8	1.35	1.7	1.9	1.2	1.2	.95	.9	1.1
3.....	.8	.9	1.2	1.0	1.3	1.65	2.4	1.15	1.45	1.0	.9	.95
4.....	.85	.8	1.05	1.3	1.2	1.6	2.35	1.15	1.45	.9	.85	.8
5.....	1.0	.95	1.0	1.35	1.25	1.55	1.75	1.25	1.3	1.1	.85	.95
6.....	1.1	1.0	1.0	1.4	1.25	1.6	1.8	1.25	1.3	1.25	.85	.9
7.....	1.1	.9	1.1	1.5	1.3	1.45	2.3	1.15	1.3	1.2	.90	1.05
8.....	1.15	.9	1.05	1.5	1.35	1.55	2.1	.95	1.2	1.05	.9	1.15
9.....	1.1	.9	1.0	1.25	1.4	1.6	2.15	1.05	1.2	1.0	.9	1.1
10.....	1.15	.95	1.05	1.15	1.45	1.6	2.0	1.05	1.15	.95	.85	.95

Daily gage height, in feet, of South Platte River, at Denver, Colo., for 1911—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11.....	1.1	.95	1.1	1.15	1.45	1.5	1.95	2.25	1.05	1.0	.8	.95
12.....	1.05	1.0	1.0	1.05	1.4	1.5	1.85	2.0	1.05	.95	.8	.9
13.....	1.05	1.0	.9	1.0	1.35	1.45	1.9	1.95	1.05	.85	1.0	.8
14.....	1.1	1.0	.95	1.05	1.4	1.5	1.95	1.3	1.0	.85	1.05	.8
15.....	1.05	1.0	.85	1.05	1.4	1.5	1.95	1.35	1.05	.9	1.05	.9
16.....	1.0	.95	.9	1.0	1.5	1.75	2.2	1.3	1.1	.95	1.05	.9
17.....	1.05	1.0	.9	1.0	1.5	2.05	2.35	1.25	.95	.95	1.1	.95
18.....	1.05	1.0	.9	.95	1.5	2.2	2.25	1.25	.9	.95	.95	1.0
19.....	1.0	1.05	.8	.95	1.4	1.7	1.55	1.3	.95	.95	.9	1.0
20.....	1.0	1.0	.9	.9	1.6	1.7	1.55	1.3	.95	1.0	.85	.95
21.....	1.0	.85	.85	.95	1.5	1.7	1.7	1.3	.95	.9	.85	.9
22.....	1.0	.75	.85	.95	1.5	1.9	1.65	1.3	.9	.85	.75	.9
23.....	.9	.75	.85	1.0	1.35	1.85	1.65	1.5	.9	.95	.75	.95
24.....	1.0	1.1	.9	1.05	1.4	1.8	2.15	1.85	.85	.9	.8	.95
25.....	1.05	1.3	.9	1.15	1.35	1.7	2.2	1.9	.9	.9	.9	.9
26.....	1.1	1.25	.8	1.1	1.4	1.65	2.2	1.95	.85	.95	.85	.85
27.....	1.1	1.2	.9	1.1	1.45	1.7	2.1	1.7	.9	.95	.85	.7
28.....	1.0	1.1	.85	1.15	1.35	1.7	1.95	1.4	.95	.9	.75	.75
29.....	1.0		.85	1.2	1.4	1.7	1.8	1.3	.95	.9	.75	.9
30.....	1.0		.8	1.45	1.5	1.6	1.65	1.3	1.0	.95	.85	.9
31.....	1.0		.9		1.45		1.45	1.2		.9		.9

Daily discharge, in second-feet, of South Platte River at Denver, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	78	102	115	70	205	268	390	250	165	135	100	100
2.....	65	85	128	55	188	335	510	230	165	100	90	135
3.....	65	85	140	90	170	312	815	215	250	110	90	100
4.....	78	60	102	170	140	290	780	215	250	90	82	75
5.....	115	95	90	188	155	268	450	250	195	135	82	100
6.....	150	110	90	205	155	290	475	250	195	180	82	90
7.....	150	80	115	245	170	225	760	215	195	165	90	122
8.....	168	80	102	245	188	268	640	145	165	122	90	150
9.....	150	80	90	155	205	290	680	165	165	110	90	135
10.....	168	90	102	132	225	290	630	160	150	100	82	100
11.....	150	90	115	132	225	245	602	650	122	110	75	100
12.....	132	105	90	102	205	245	540	570	122	100	75	90
13.....	132	105	70	90	188	225	570	520	122	82	110	75
14.....	150	105	80	102	205	245	602	195	110	82	122	75
15.....	132	100	62	102	205	245	602	212	122	90	122	90
16.....	115	85	70	90	245	360	770	195	135	100	122	90
17.....	132	95	70	90	245	532	890	180	100	100	135	100
18.....	132	95	70	80	245	630	810	180	90	100	100	110
19.....	115	110	55	80	205	335	378	195	100	100	90	110
20.....	115	90	70	70	290	345	378	195	100	110	82	100
21.....	115	55	62	80	245	350	455	195	100	90	82	90
22.....	115	50	62	80	245	470	428	195	90	82	68	90
23.....	90	50	62	90	188	455	428	270	90	100	68	100
24.....	115	115	70	102	205	435	735	432	82	90	75	100
25.....	132	170	70	128	188	390	770	460	90	90	90	90
26.....	150	155	55	115	205	370	770	490	82	82	82	82
27.....	150	140	70	115	225	400	700	355	90	100	82	62
28.....	115	115	62	128	188	400	602	230	100	90	68	68
29.....	115		62	140	205	400	510	195	100	90	68	90
30.....	115		55	225	245	365	428	195	110	100	82	90
31.....	115		70		225		332	165		90		90

Monthly discharge of South Platte River at Denver, Colo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	168	65	123	7,580
February.....	170	50	96	5,350
March.....	140	55	81	5,010
April.....	245	55	123	7,330
May.....	290	140	207	12,700
June.....	630	225	343	20,400
July.....	890	332	595	36,600
August.....	650	145	270	16,600
September.....	650	145	132	7,840
October.....	180	82	104	6,400
November.....	135	68	89	5,310
December.....	150	62	98	5,950
The year.....	890	50	189	137,000

SOUTH PLATTE RIVER NEAR KERSEY, COLO.

Location.—At highway bridge in sec. 9, T. 5 N., R. 64 W., $1\frac{1}{4}$ miles north of Kersey, 2 miles below the entrance of Lone Tree Creek, an intermittent stream, and 3 miles below the mouth of Cache la Poudre River.

Records available.—April 27, 1901, to October 31, 1903; March 1, 1905, to December 31, 1911.

Drainage area.—9,500 square miles.

Gage.—A chain gage, placed in the fall of 1906 in each of the two channels in which the river flows. These gages were referred to a datum slightly different from that of the original gage, but have remained permanent since. The original gage, a vertical staff, was used until June 14, 1906, when the observer moved it 20 feet south. This gage was placed 0.30 foot too high, and all readings were corrected by that amount until the chain gages were placed in position.

Channel.—Shifting.

Discharge measurements.—Made from the bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes slight backwater for a few days during the winter.

Diversions.—Between this station and Denver there are court decrees for diversions of 3,764 second-feet from the South Platte, and 17,000 second-feet from intervening tributaries, besides numerous flood-water decrees.

Accuracy.—Although the channel is shifting, sufficient discharge measurements have been obtained to enable estimates of flow to be made which may be regarded as reliable.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of South Platte River near Kersey, Colo., in 1911.

Date.	Hydrographer.	Gage No. 2.		Date.	Hydrographer.	Gage No. 1.	
		Gage height.	Discharge.			Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 30	R. H. Fletcher.....	2.74	263	Jan. 30	R. H. Fletcher.....	2.78	160
Feb. 25	E. O. Christiansen.....	2.65	277	Feb. 25	E. O. Christiansen.....	2.58	125
Mar. 4	R. H. Fletcher.....	3.04	338	Mar. 4	R. H. Fletcher.....	2.98	188
27	do.....	2.30	149	27	do.....	2.38	81.3
Apr. 20	do.....	1.36	26.9	Apr. 20	do.....	1.98	37.0
May 27	R. C. Miles.....	1.40	32.4	May 27	R. C. Miles.....	1.96	43.3
June 27	E. O. Christiansen.....	1.74	55.2	June 27	E. O. Christiansen.....	2.11	47.2
July 13	G. H. Russell.....	1.90	78.5	July 13	G. H. Russell.....	2.15	58.8
Aug. 14	R. H. Fletcher.....	2.25	96.0	Aug. 14	R. H. Fletcher.....	2.27	67.5
Sept. 14	G. H. Russell.....	1.63	37.7	Sept. 14	G. H. Russell.....	2.13	53.6
Oct. 31	do.....	2.90	234	Oct. 31	do.....	2.80	140
Dec. 13	R. H. Fletcher.....	2.82	197	Dec. 13	R. H. Fletcher.....	2.80	154

Daily gage height, in feet, of South Platte River at gages Nos. 1 and 2 near Kersey, Colo., for 1911.

[Mrs. J. C. Maisner, observer.]

Gage No. 1.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.75	2.8	2.85	2.25	2.02	2.4	2.18	2.0	2.0	2.1	2.78	2.9
2.....	2.85	2.8	2.9	2.3	2.05	2.4	2.2	2.5	2.5	2.1	2.68	2.9
3.....	3.25	2.75	2.95	2.3	2.02	2.4	2.22	2.5	2.5	2.1	2.6	2.9
4.....	3.42	2.72	2.95	2.3	2.0	2.0	2.25	2.5	2.5	2.1	2.6	2.9
5.....	3.52	2.7	2.95	2.3	2.1	2.0	2.6	2.5	2.5	2.1	2.65	2.9
6.....	3.35	2.7	2.9	2.18	2.1	2.0	3.2	2.5	2.5	2.1	2.65	2.88
7.....	2.95	2.7	2.7	2.2	2.12	2.0	2.88	2.5	2.5	2.1	2.65	2.82
8.....	3.0	2.7	2.62	2.2	2.3	2.25	2.82	2.5	2.3	2.1	2.7	2.85
9.....	2.9	2.7	2.55	2.18	2.3	2.25	2.8	2.0	2.1	2.1	2.8	2.85
10.....	3.3	2.65	2.5	2.1	2.3	2.02	2.72	2.5	2.1	2.1	2.9	2.8
11.....	3.2	2.6	2.5	2.08	2.2	2.4	2.56	2.3	2.1	2.35	2.9	2.8
12.....	3.12	2.52	2.5	2.15	1.9	2.2	2.28	2.3	2.3	2.55	2.98	2.78
13.....	3.5	2.5	2.45	2.1	2.4	2.4	2.14	2.28	2.1	2.82	3.25	2.8
14.....	3.25	2.5	2.4	2.1	2.2	2.5	2.1	2.22	2.1	2.92	3.1	2.8
15.....	2.9	2.5	2.4	2.1	2.3	2.62	2.1	2.3	2.12	2.95	3.15	2.9
16.....	2.9	2.45	2.4	2.2	2.25	2.6	2.1	2.25	2.1	3.0	3.15	2.8
17.....	2.85	2.4	2.4	2.5	2.0	2.45	2.1	2.25	2.12	3.0	3.1	2.8
18.....	2.85	2.4	2.4	2.5	2.0	2.58	2.1	2.25	2.1	3.0	3.5	2.8
19.....	2.85	2.42	2.35	2.0	2.0	2.35	2.22	2.25	2.1	3.0	3.25	2.8
20.....	2.8	2.5	2.35	2.0	2.0	2.15	2.55	2.25	2.1	3.0	3.0	2.8
21.....	2.8	2.5	2.35	1.9	1.9	2.18	2.18	2.3	2.1	3.0	3.5	2.82
22.....	2.8	2.5	2.3	2.0	1.9	2.3	2.15	2.3	2.1	3.0	3.5	2.92
23.....	2.8	2.5	2.3	2.0	2.4	2.3	2.12	2.5	2.1	3.0	2.98	2.9
24.....	2.8	2.5	2.3	2.0	2.4	2.25	2.1	2.5	2.1	2.9	2.88	2.85
25.....	2.8	2.55	2.3	2.0	2.5	2.2	2.1	2.5	2.3	2.7	2.85	2.85
26.....	2.8	2.65	2.35	1.9	2.0	2.2	2.1	2.3	2.55	2.7	2.8	2.82
27.....	2.8	2.7	2.4	2.0	2.0	2.15	2.1	2.2	2.5	2.8	2.82	2.8
28.....	2.8	2.8	2.4	2.5	2.0	2.15	2.1	2.3	2.5	2.8	2.88	3.75
29.....	2.75	.....	2.4	2.1	2.0	2.18	2.25	2.22	2.1	2.8	2.85	3.58
30.....	2.75	.....	2.4	2.1	2.0	2.21	2.5	2.1	2.1	2.8	2.85	3.3
31.....	2.8	.....	2.35	.....	2.15	.....	2.25	2.3	.....	2.82	.....	3.22

Gage No. 2.

1.....	.....	2.9	3.0	2.3	1.58	1.5	1.85	1.65	1.7	1.8	2.85	2.9
2.....	.....	2.9	3.0	2.22	1.6	1.52	1.85	1.68	1.7	1.8	2.75	2.92
3.....	.....	2.85	3.32	2.2	1.52	1.5	1.92	1.68	1.75	1.8	2.7	2.9
4.....	.....	2.85	3.32	2.2	1.5	1.5	1.98	1.7	1.75	1.8	2.65	2.85
5.....	.....	2.8	3.0	2.2	1.5	1.5	2.4	1.7	1.7	1.9	2.65	2.85
6.....	.....	3.4	2.8	2.95	2.18	1.5	3.32	1.7	1.7	1.95	2.65	2.85
7.....	.....	3.3	2.8	2.7	2.1	1.42	2.85	1.7	1.7	1.92	2.7	2.8
8.....	.....	3.18	2.8	2.68	2.1	1.38	2.75	1.7	1.7	1.9	2.78	2.8
9.....	.....	3.22	2.8	2.5	2.5	1.3	2.75	1.65	1.7	1.92	2.92	2.8
10.....	.....	3.22	2.75	2.45	2.0	1.32	2.68	1.62	1.7	1.92	3.0	2.8
11.....	.....	3.3	2.7	2.45	1.92	1.3	2.45	1.7	1.68	2.45	3.0	2.8
12.....	.....	3.25	2.62	2.4	1.8	1.3	2.32	1.75	1.65	2.8	3.5	2.78
13.....	.....	3.2	2.6	2.35	1.62	1.3	1.95	2.22	1.62	3.0	3.1	2.8
14.....	.....	3.15	2.58	2.35	1.65	1.3	1.88	2.15	1.6	3.0	3.2	2.75
15.....	.....	3.1	2.52	2.3	1.62	1.32	2.2	1.85	1.78	3.0	3.25	2.68
16.....	.....	3.3	2.5	2.3	1.6	1.35	2.68	1.8	1.7	3.0	3.25	2.78
17.....	.....	2.95	2.5	2.28	1.55	1.3	2.48	1.8	1.72	3.0	3.18	2.8
18.....	.....	2.9	2.5	2.25	1.5	1.28	2.62	1.8	1.72	3.0	3.1	2.8
19.....	.....	3.0	2.5	2.28	1.45	1.35	2.25	2.05	1.7	3.0	3.1	2.85
20.....	.....	2.92	2.55	2.25	1.42	1.35	2.0	2.28	1.7	3.0	3.1	2.85
21.....	.....	2.9	2.5	2.25	1.3	1.45	2.15	2.02	1.7	3.0	3.1	2.85
22.....	.....	2.9	.....	2.2	1.3	1.4	2.28	1.98	1.7	3.0	3.3	2.98
23.....	.....	2.9	.....	2.2	1.3	1.52	2.3	1.85	1.7	3.0	2.95	2.92
24.....	.....	2.9	.....	2.2	1.3	1.55	2.22	1.8	1.7	2.88	2.9	2.9
25.....	.....	2.9	2.02	2.2	1.3	1.55	1.88	1.8	1.7	2.68	2.8	2.85
26.....	.....	2.9	2.75	2.25	1.3	1.4	1.85	1.82	1.72	2.65	2.8	2.9
27.....	.....	2.9	.....	2.3	1.3	1.4	1.7	1.78	2.02	2.75	2.8	2.9
28.....	.....	2.9	2.95	2.32	1.3	1.45	1.68	1.78	2.28	2.72	2.85	3.95
29.....	.....	2.85	.....	2.35	1.4	1.5	1.65	1.72	2.22	2.75	2.85	3.95
30.....	.....	2.85	.....	2.35	1.5	1.5	1.82	1.72	2.25	2.75	2.9	3.85
31.....	.....	2.88	.....	2.3	.....	1.5	.....	1.68	1.85	.....	2.9	3.72

NOTE.—Gage No. 1: Ice present Jan. 1 to 14 and Dec. 28 to 31. Gage No. 2: Ice present Jan. 1 to 16 and Dec. 28 to 31.

Daily discharge, in second-feet, of South Platte River at gages No. 1 and No. 2 near Kersey, Colo., for 1911.

Gage No. 1.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	154	167	167	67	40	77	56	46	46	50	139	170
2.....	178	167	177	72	42	77	57	90	90	50	119	170
3.....	180	156	187	72	41	77	59	90	90	50	103	170
4.....	180	144	183	73	40	46	62	90	90	50	103	170
5.....	180	144	183	73	45	46	103	90	90	50	113	170
6.....	180	144	170	60	45	46	257	90	90	50	113	165
7.....	180	144	128	61	45	46	165	90	90	50	113	148
8.....	180	144	112	61	62	62	148	90	67	50	123	156
9.....	185	144	104	59	62	62	143	46	50	50	143	156
10.....	185	134	92	53	62	47	127	90	50	50	170	143
11.....	185	125	92	51	54	77	98	67	50	72	170	143
12.....	185	108	92	55	40	57	65	67	67	96	192	139
13.....	185	108	87	51	74	77	53	65	50	148	272	143
14.....	185	108	80	50	53	90	50	59	50	175	226	143
15.....	190	108	80	48	62	107	50	67	51	184	242	170
16.....	190	102	81	53	67	103	50	62	50	197	242	143
17.....	178	95	82	85	42	84	50	62	51	197	226	143
18.....	178	95	82	85	42	100	50	62	50	197	356	143
19.....	178	98	75	40	43	72	59	62	50	197	272	143
20.....	167	108	75	38	43	54	96	62	50	197	197	143
21.....	167	108	76	36	42	56	56	67	50	197	356	148
22.....	167	108	71	38	42	67	54	67	50	197	356	175
23.....	167	108	71	38	73	67	51	90	50	197	192	170
24.....	167	108	72	38	73	62	50	90	50	170	165	156
25.....	167	116	72	38	85	57	50	90	67	123	156	156
26.....	167	130	77	36	45	57	50	67	96	123	143	148
27.....	167	140	85	38	46	54	50	57	90	143	148	143
28.....	167	158	85	84	46	54	50	67	90	143	165	143
29.....	156	-----	85	45	46	56	62	59	50	143	156	143
30.....	156	-----	85	45	46	58	90	50	50	143	156	143
31.....	167	-----	78	-----	54	-----	62	67	-----	148	-----	143

Gage No. 2.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	250	302	335	146	42	36	72	42	40	47	211	223
2.....	250	302	335	131	44	38	72	45	40	47	188	228
3.....	250	286	465	127	38	36	81	45	44	47	177	223
4.....	250	286	465	127	36	36	90	45	44	47	167	211
5.....	250	271	335	127	36	36	167	45	40	55	167	211
6.....	250	271	318	123	36	36	465	43	40	60	167	211
7.....	250	271	242	109	31	36	286	43	40	57	177	199
8.....	250	271	237	109	29	38	256	43	40	55	195	199
9.....	250	271	190	190	26	38	256	41	40	57	228	199
10.....	275	256	178	93	27	56	237	35	40	57	250	199
11.....	275	242	178	81	26	42	178	42	39	130	250	199
12.....	275	220	167	66	26	44	150	45	36	199	430	195
13.....	275	215	156	46	26	40	86	93	34	250	280	199
14.....	275	210	156	49	26	40	75	84	33	250	315	188
15.....	275	195	146	46	27	127	72	46	34	250	332	173
16.....	275	190	146	44	28	237	65	40	33	250	332	195
17.....	318	190	142	40	26	190	65	41	34	250	308	199
18.....	302	190	136	36	25	220	65	41	33	430	280	199
19.....	335	190	142	33	28	137	96	40	33	430	280	211
20.....	309	202	136	31	28	93	133	40	36	430	280	211
21.....	302	190	136	26	33	118	80	40	36	430	280	211
22.....	302	203	127	26	30	142	80	40	36	430	362	245
23.....	302	225	127	26	38	146	65	40	40	250	236	228
24.....	302	250	127	26	40	131	60	40	40	218	223	223
25.....	302	267	127	26	40	76	58	40	40	173	199	211
26.....	302	290	136	26	30	72	60	41	40	167	199	223
27.....	302	305	146	26	30	54	55	67	44	199	195	223
28.....	302	315	150	26	33	52	55	102	41	199	211	223
29.....	286	-----	156	30	36	49	50	94	44	211	199	223
30.....	286	-----	156	36	36	68	50	98	44	223	204	223
31.....	296	-----	146	-----	36	-----	45	51	-----	223	-----	223

NOTE.—Gage No. 1: Daily discharge Jan. 1 to 14 and Dec. 28 to 31 estimated because of ice; discharge Jan. 15 to Feb. 25 and May 27 to Dec. 27 determined from a curve fairly well defined between 45 and 250 second-feet; discharge Feb. 26 to May 26 computed by indirect method for shifting channels.

Gage No. 2: Daily discharge Jan. 1 to 16 and Dec. 28 to 31 estimated because of ice; discharge Jan. 17 to Feb. 21, Mar. 1 to July 13, and Aug. 15 to Dec. 27 determined from a rating curve fairly well defined between 20 and 400 second-feet; discharge Feb. 22 to Feb. 28 and July 14 to Aug. 14 computed by indirect method for shifting channels.

Daily discharge, in second-feet, of South Platte River near Kersey, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	404	469	502	213	82	113	128	88	86	97	350	393
2.....	428	469	512	203	86	115	129	135	130	97	307	398
3.....	430	442	652	199	79	113	140	135	134	97	280	393
4.....	430	430	648	200	76	82	152	135	134	97	270	381
5.....	430	415	518	200	81	82	270	135	130	105	280	381
6.....	430	415	488	183	81	82	722	133	130	110	280	376
7.....	430	415	370	170	76	82	451	133	130	107	290	347
8.....	430	415	349	170	91	100	404	133	107	105	318	355
9.....	435	415	294	249	88	100	399	87	90	107	371	355
10.....	460	390	270	146	89	103	364	125	90	107	420	342
11.....	460	367	270	132	80	119	276	109	89	202	420	342
12.....	460	328	259	121	66	101	215	112	103	295	622	334
13.....	460	323	243	97	100	117	139	158	84	398	552	342
14.....	460	318	236	99	79	130	125	143	83	425	541	331
15.....	465	303	226	94	89	234	122	113	85	434	574	343
16.....	465	292	227	97	95	340	115	102	83	447	574	338
17.....	496	285	224	125	68	274	115	103	85	447	534	342
18.....	480	285	218	121	67	320	115	103	83	427	636	342
19.....	513	288	217	73	71	209	155	102	83	427	552	354
20.....	476	310	211	69	71	147	229	102	86	427	477	354
21.....	469	298	212	62	75	174	136	107	86	427	636	359
22.....	469	311	198	64	72	209	134	107	86	427	718	420
23.....	469	333	198	64	111	213	116	130	90	447	428	398
24.....	469	358	199	64	113	193	110	130	90	388	388	379
25.....	469	383	199	64	125	133	108	130	107	296	355	367
26.....	469	420	213	62	75	129	110	108	136	290	342	371
27.....	469	445	231	64	76	108	105	124	134	342	343	366
28.....	469	473	235	110	79	106	105	169	131	342	376	366
29.....	442	.....	241	75	82	105	112	153	94	354	355	366
30.....	442	.....	241	81	82	126	140	148	94	366	360	366
31.....	463	.....	224	.....	90	.....	107	118	.....	371	.....	366

NOTE.—Determinations of daily discharge presented in above table represent the combined flow in the two channels.

Monthly discharge of South Platte River near Kersey, Colo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	513	404	456	28,000
February.....	473	285	371	20,600
March.....	652	198	301	18,500
April.....	249	62	122	7,280
May.....	125	66	83.7	5,150
June.....	340	82	149	8,840
July.....	722	105	195	12,000
August.....	169	88	123	7,560
September.....	136	83	102	6,100
October.....	447	97	291	17,900
November.....	718	270	432	25,700
December.....	420	331	363	22,300
The year.....	722	62	249	180,000

NOTE.—These estimates represent the combined flow of both channels.

SOUTH PLATTE RIVER AT JULESBURG, COLO.

Location.—At highway bridge 1 mile south of Julesburg, about sec. 33, T. 12 N., R. 44 W. No important tributaries between the station and the Colorado-Nebraska State line, 1 mile distant. All the tributaries for 100 miles or more above the station are intermittent.

Records available.—April 2, 1902, to November 16, 1906; May 12, 1908, to December 31, 1911.

Drainage area.—20,600 square miles.

Gage.—When the station was reestablished in 1908 a gage was placed in each of the two main channels; both gages read practically the same as the original gage on the lower bridge 2,000 feet below the present site. The datum of the gages has remained unchanged.

Channel.—Shifting.

Discharge measurements.—Made from the pile bridge during high water, and by wading at low-water stages.

Winter flow.—Ice causes backwater during the winter months and measurements are made to determine the flow.

Diversions.—Between Kersey and Julesburg there are court decrees for diversions of 5,316 second-feet from the South Platte, and diversions of 1,240 second-feet from intervening tributaries including Lodgepole Creek in Wyoming and Nebraska and Crow Creek in Wyoming, besides numerous flood decrees. Between the State line and the mouth diversions of 206 second-feet from the South Platte have been granted in Nebraska.

Accuracy.—Although the channel is shifting, sufficient measurements have been made to give fairly reliable discharge estimates.

Cooperation.—During 1911 this station was maintained in cooperation with the State engineer.

Discharge measurements of South Platte River at Julesburg, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 31 ^a	R. H. Fletcher.....	2.46	683	July 14	G. H. Russell.....	0.85	4.6
Mar. 28	.....do.....	1.10	39.0	Aug. 15	R. H. Fletcher.....	0.85	7.2
Apr. 21	.....do.....	.96	16.5	Sept. 15	G. H. Russell.....	.82	12.7
May 26	R. C. Miles.....	.90	17.9	Oct. 31	.....do.....	1.07	29.6
June 28	E. O. Christiansen.....	.90	7.5	Dec. 14 ^a	R. H. Fletcher.....	1.04	17.1

^a Ice present.

^b Gage height to ground-water level caused by seepage. Gage 40 feet from edge of first channel.

Daily gage height, in feet, of South Platte River at Julesburg, Colo., for 1911.

[Elva McSpurian, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.2	2.3	2.0	1.1	1.3	1.0	0.8	0.8	1.0	0.8	1.1	1.0
2.....	2.2	2.2	2.3	1.1	1.2	1.0	.8	.8	1.0	.8	1.1	1.0
3.....	2.2	2.2	2.2	1.1	1.2	.9	.8	.8	1.0	.8	1.1	.....
4.....	2.3	2.0	2.0	1.1	1.2	.9	.8	.8	1.0	.9	1.1	.....
5.....	2.4	2.0	1.5	1.1	1.2	.9	.8	.8	1.0	.9	1.1	.....
6.....	2.4	2.0	1.6	1.1	1.1	.9	.8	.8	1.0	.9	1.1	.....
7.....	2.4	2.0	1.6	1.1	1.1	.9	.8	.8	.9	.9	1.1	.....
8.....	2.8	2.0	1.6	1.0	1.1	.9	.8	.8	.9	.9	1.1	.....
9.....	2.8	1.9	1.5	1.0	1.1	.9	.8	.8	.9	1.0	1.1	.....
10.....	2.8	2.0	1.4	1.0	1.0	.9	.8	.8	.9	1.0	1.1	.....
11.....	2.8	1.9	1.4	1.0	1.0	.9	.8	.8	.9	1.0	1.1	.....
12.....	2.8	1.9	1.3	1.0	1.0	.9	.8	.8	.9	1.0	1.1	.....
13.....	2.8	1.9	1.3	1.0	1.0	.9	.8	.8	.9	1.0	1.1	.....
14.....	2.8	1.8	1.2	1.0	.9	.9	.8	.8	.9	1.0	1.0	.....
15.....	2.8	1.8	1.2	1.0	.9	1.0	.8	.8	.8	1.0	1.0	.....
16.....	2.8	1.7	1.2	1.0	.9	1.3	.8	.8	.8	1.0	1.0	.....
17.....	2.8	1.7	1.1	1.0	.9	1.2	.8	.8	.8	1.0	1.0	1.0
18.....	2.8	1.6	1.1	1.0	.9	1.1	.8	.....	.8	1.0	1.0	1.0
19.....	2.8	1.6	1.1	1.0	.9	1.0	.8	1.7	.8	1.0	1.0	1.0
20.....	2.8	1.6	1.1	1.0	.9	1.0	.9	1.7	.8	1.0	1.0	1.0
21.....	2.8	1.6	1.1	.9	.9	.9	.....	1.6	.8	1.0	1.0	1.0
22.....	2.8	1.5	1.1	1.0	.9	.9	1.0	1.5	.8	1.0	1.0	1.0
23.....	2.8	1.5	1.1	1.0	.9	.9	1.0	1.4	.8	1.0	1.0	1.0
24.....	2.8	1.5	1.1	1.0	.9	.8	1.0	1.4	.8	1.0	1.0	1.0
25.....	2.8	1.8	1.0	1.0	.9	.8	.....	1.4	.8	1.0	1.0	1.0
26.....	2.8	2.0	1.1	1.0	.9	.8	.....	1.4	.8	1.0	1.0	1.0
27.....	2.7	2.0	1.0	1.0	.9	.8	.....	1.3	.8	1.1	1.0	1.0
28.....	2.7	2.0	1.2	.9	.9	.....	.....	1.2	.8	1.1	1.0	1.0
29.....	2.7	.....	1.2	.....	1.0	.8	.8	1.2	.8	1.1	1.0	1.0
30.....	2.7	.....	1.2	1.3	1.0	.....	.75	1.1	.8	1.1	1.0	1.0
31.....	2.5	.....	1.1	.....	1.0	.....	.8	1.0	.....	1.1	.....	.....

NOTE.—Ice present Jan. 4 to Feb. 1, Feb. 19 to Mar. 3, and Dec. 17 to 31.

Daily discharge, in second-feet, of South Platte River at Julesburg, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	230	680	670	34	75	21	8	8	21	8	34	21
2.....	230	675	670	34	52	21	8	8	21	8	34	21
3.....	230	670	670	34	52	12	8	8	21	8	34	21
4.....	300	670	670	34	52	12	8	8	21	12	34	21
5.....	350	670	153	34	52	12	8	8	21	12	34	21
6.....	350	670	210	34	34	12	8	8	21	12	34	21
7.....	350	670	210	34	34	12	8	8	12	12	34	19
8.....	700	670	210	21	34	12	8	8	12	12	34	19
9.....	700	510	153	21	34	12	8	8	12	21	34	19
10.....	700	670	112	21	21	12	8	8	12	21	34	19
11.....	700	510	112	21	21	12	8	8	12	21	34	19
12.....	700	510	81	21	21	12	8	8	12	21	34	19
13.....	700	510	81	21	21	12	8	8	12	21	34	19
14.....	700	375	57	21	12	12	8	8	12	21	21	18
15.....	700	375	57	21	12	21	8	8	8	21	21	18
16.....	700	270	57	21	12	75	8	8	8	21	21	18
17.....	700	270	38	21	12	52	8	8	8	21	21	18
18.....	700	195	38	21	12	34	8	25	8	21	21	18
19.....	700	195	38	21	12	21	270	8	8	21	21	18
20.....	700	195	38	21	12	21	12	270	8	21	21	18
21.....	700	195	38	12	12	12	21	195	8	21	21	18
22.....	700	142	38	21	12	12	21	142	8	21	21	18
23.....	700	142	38	21	12	12	21	105	8	21	21	18
24.....	700	142	38	21	12	8	21	105	8	21	21	18
25.....	700	375	24	21	12	8	21	105	8	21	21	18
26.....	700	670	38	21	12	8	21	105	8	21	21	18
27.....	685	670	24	21	12	8	12	75	8	34	21	18
28.....	685	670	52	12	12	8	12	52	8	34	21	18
29.....	685	.....	52	40	21	8	8	52	8	34	21	18
30.....	685	.....	52	75	21	8	7	34	8	34	21	18
31.....	685	.....	34	.....	21	.....	8	21	.....	34	.....	18

NOTE.—Daily discharge Jan. 4 to Feb. 1, Feb. 19 to Mar. 3, and Dec. 17 to 31, estimated from a mean curve with a very small range; discharge interpolated for days for which gage readings are missing.

Monthly discharge of South Platte River at Julesburg, Colo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	700	230	605	37,200	C.
February.....	680	142	463	25,700	C.
March.....	670	24	153	9,430	C.
April.....	75	12	25.9	1,540	C.
May.....	75	12	24.1	1,480	C.
June.....	75	8	16.7	996	C.
July.....	21	7	10.9	668	C.
August.....	270	8	54.6	3,360	C.
September.....	21	8	11.7	694	C.
October.....	34	8	20.4	1,250	C.
November.....	34	21	26.6	1,580	C.
December.....	21	18	18.2	1,120	C.
The year.....	700	7	118	85,000	

TARRYALL CREEK NEAR COMO, COLO.

Location.—At highway bridge in sec. 26, T. 8 S., R. 76 W., $1\frac{1}{2}$ miles northeast of Como. No tributary within several miles of the station.

Records available.—July 21 to November 21, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Data too meager to determine.

Discharge measurements.—Made from bridge during high water and by wading during low water.

Winter flow.—Ice causes backwater during the winter months and the records are discontinued.

Diversions.—There are court decrees for diversions of 255 second-feet from Tarryall Creek above the station.

Accuracy.—Data insufficient for estimates of discharge.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of Tarryall Creek near Como, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
July 28	O. M. Wimmer.....	1.22	12.0
Sept. 5	Fletcher and Waha.....	.86	9.4
5	H. B. Waha.....	.86	5.8

Daily gage height, in feet, of Tarryall Creek near Como, Colo., for 1911.

[Roy Truman, observer.]

Day.	July.	Aug.	Sept.	Oct.	Nov.	Day.	July.	Aug.	Sept.	Oct.	Nov.
1						16				1.0	
2						17					
3				.85		18					
4					1.1	19					
5			.9			20					
6			.86			21	2.1				.7
7						22		1.0	.9		
8		.9				23				1.2	
9						24					
10				.9		25					
11						26			.8		
12						27	1.85				
13					2.3	28					
14						29		.9			
15		.9	.9			30					
						31	1.0				

NOTE.—Ice caused backwater Nov. 13 to Dec. 31.

TARRYALL CREEK NEAR JEFFERSON, COLO.

Location.—At Robbins's ranch, in sec. 6, T. 9 S., R. 74 W., 10 miles southeast of Jefferson, a short distance above the mouth of Rock Creek.

Records available.—October 23, 1910, to June 30, 1911. At the latter date the station was discontinued and a new one established near Como.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Shifting.

Discharge measurements.—Made by wading.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—There are court decrees for diversions of 309 second-feet from Tarryall Creek above the station, and for 898 second-feet from tributaries entering above.

Accuracy.—Data insufficient for estimates of discharge.

Cooperation.—Station was maintained in cooperation with the United States Forest Service.

Discharge measurements of Tarryall Creek near Jefferson, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
Jan. 7	Fletcher and Truman.....	<i>Fect.</i> a 1.30	<i>Sec.-ft.</i> 0
Apr. 23	O. M. Wimmer.....	1.30	46.0

a Gage height to top of ice. River frozen to bottom.

Daily gage height, in feet, of Tarryall Creek near Jefferson, Colo., for 1911.

[Roy Truman, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.
1.....		2.1	2.6		.75		16.....						
2.....						.65	17.....						1.6
3.....							18.....					.65	
4.....							19.....				1.0		
5.....						1.45	20.....						
6.....							21.....	1.7					
7.....	1.3						22.....						
8.....					.75		23.....				1.3		
9.....							24.....				1.1		
10.....							25.....				1.1		
11.....				1.05			26.....					.9	1.0
12.....							27.....						
13.....							28.....			2.5			.9
14.....							29.....						
15.....			2.7				30.....						
							31.....						

NOTE.—Creek frozen solid Jan. 7; water running over ice Jan. 21, Feb 1, and Mar. 1, 15, and 23.

TARRYALL CREEK NEAR HAYMAN, COLO.

Location.—At McLaughlin's ranch, in sec. 23, T. 11 S., R. 72 W., 6 miles northeast of Hayman post office, in the Pike National Forest. Nearest tributary a small stream entering from the north just below.

Records available.—October 23, 1910, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff. The datum was raised 0.28 foot in April, 1911, and all previous gage heights referred to the new datum.

Channel.—Apparently permanent.

Discharge measurements.—Made from the bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—There are court decrees for diversions of 205 second-feet from Tarryall Creek between this station and the one near Jefferson.

Accuracy.—As the station has not been completely rated, no estimates of discharge have been made.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of Tarryall Creek near Hayman, Colo., in 1910-11.

Date.	Hydrographer.	Gage height.	Dis-charge.
1910.		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 23	S. T. Harding	0.52	9.3
Nov. 18	G. H. Russell	.62	13.3
1911.			
Jan. 11 ^a	O. M. Wimmer	.32	1.6
Apr. 26	do.	.92	33.3
July 9	E. O. Christiansen	1.95	133
Sept. 26	H. B. Waha	.55	12.4

^a Ice conditions.*Daily gage height, in feet, of Tarryall Creek near Hayman, Colo., for 1910-11.*

[F. C. Parrett, observer.]

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1910.				1910.				1910.			
1.				11.				21.			
2.				12.		0.62		22.		0.57	0.42
3.				13.		.62		23.		.52	
4.				14.				24.			
5.		0.72		15.			0.52	25.			
6.			0.82	16.				26.			
7.			.72	17.				27.	0.52		
8.				18.		.62		28.			
9.				19.				29.		.72	.32
10.				20.				30.	.47		
								31.			

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.												
1.		0.5			0.94				0.7			
2.								1.2				
3.												
4.			1.5				3.2			0.7		
5.	0.4											
6.		.7										
7.									.7			
8.				0.8								
9.							1.95					
10.											0.75	
11.	.3	1.3			.3			.85				
12.								.9		.8		
13.												
14.		1.5					1.3		.55	.75		
15.											.7	
16.			1.7									
17.							1.2					
18.								.8		.7		0.6
19.	.2								.55			
20.		1.0				0.90						
21.			.4									
22.											.65	
23.		.8									.7	
24.	.25							.9				
25.							1.2				.85	
26.				.9				.85	.55	.95		
27.												
28.										.9		
29.			.9				1.3				.8	
30.	.4											
31.								.75				

JEFFERSON CREEK AT JEFFERSON, COLO.

Location.—At highway bridge at Jefferson, in sec. 8, T. 8 S., R. 75 W. Nearest tributary enters $1\frac{1}{2}$ miles below.

Records available.—October 17, 1910, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff, which was lowered 0.66 foot. All readings have been referred to the latter datum.

Channel.—Shifting.

Discharge measurements.—Made from the bridge at high water, and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—There are court decrees for diversions from Jefferson Creek of 167 second-feet above the station and 21 second-feet below. There is a decree of 546 second-foot diversion from Jefferson Lake.

Accuracy.—Data insufficient for estimates of discharge.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of Jefferson Creek at Jefferson, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-feet.</i>
Jan. 6	R. H. Fletcher.....	<i>a</i> 2.10	0
Apr. 22	O. M. Wimmer.....	<i>b</i> .97	9.9
Sept. 7	R. H. Fletcher.....	.90	4.2
7	H. B. Waha.....	.90	3.8

a Gage height to top of ice. River frozen to bottom.

b Gage height reduced to new datum.

Daily gage height, in feet, of Jefferson Creek at Jefferson, Colo., for 1911.

[R. M. Truman, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.				0.96					0.86	0.90		
2.		3.21	3.21		0.68	0.56	0.96		.96	.90	0.90	
3.					.71	1.36	.86	(<i>a</i>)	.91	.85		
4.					.74	1.41		(<i>a</i>)	.96	.80	.90	
5.					.68	1.16	.76	(<i>a</i>)	.91	1.00	.85	
6.	2.76				.66		.81	0.76	.96	.95	.85	
7.					.66	.56	.66	.76		.90	1.10	
8.					.66		.66	1.06		.90	1.00	1.60
9.					.67		.66	.76	.90	.90	.90	
10.					.54		(<i>a</i>)	.56	.90	.85		
11.					.51		.51	.61	.80	.85	1.20	
12.			3.26		.51		.51	.61	.80	.85		
13.					.48	.51	.66	1.06	.80	.85	1.05	
14.					.51	.96	.86	1.06		.80		
15.					.56	.96	.76	.96	.80	.85	1.00	
16.		3.26			.54	.68	.76	.96	.80	.95		
17.	3.06			1.16	.51	.76	.56		.80		.90	
18.					.54	.68	.51	.96	.80	.80	1.20	
19.						.68	.51	.96	.90	.90		
20.			3.26					.96	.85	.90	1.10	
21.					.56		.56			.90	1.00	
22.				.97	.51	.66	.61	1.06	.80	.95	1.10	
23.				.96	1.06	.76	.61	1.06		1.00	1.10	
24.				.76	.86	.66	.61	.96	.80	.90	1.10	
25.					.91	.66	.76	.96		1.00	1.20	
26.				.81	.51		.76		.80	.95		
27.				.87	.51		.56			1.00	1.20	
28.				.86	.53	.54	.54	.96	.85	.92		
29.				.54	.56	.56	.91			.90	1.30	
30.					.64	.61			.90	.85		
31.					.56	.64	.56			.80		

a Creek dry, as water was used above station for irrigation.

NOTE.—Creek frozen over Jan. 1 to Apr. 16 and Nov. 7 to Dec. 31; frozen solid Jan. 6. A very small flow Jan. 17.

MICHIGAN CREEK NEAR JEFFERSON, COLO.

Location.—At the highway bridge at Michigan Siding, in sec. 13, T. 8 S., R. 76 W., 2½ miles southwest of Jefferson. No tributary between the station and the mouth, 3½ miles below, and no important tributary for several miles above.

Records available.—October 17, 1910, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Somewhat shifting.

Discharge measurements.—Made from the bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—There are court decrees for diversions of 104 second-feet from Michigan Creek above the station and 40 second-feet below.

Accuracy.—Data insufficient for estimates of discharge.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of Michigan Creek near Jefferson, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 6	R. H. Fletcher.....	a 2.00	0
Apr. 22	O. M. Wimmer.....	1.06	25.3
July 28	do.....	.85	2.7
Sept. 6	Fletcher and Waha.....	.95	8.8
6	H. B. Waha.....	.95	8.0

a Ice.

Daily gage height, in feet, of Michigan Creek near Jefferson, Colo., for 1911.

[R. M. Truman, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.				2.7	0.8		0.85					
2.		2.8							1.0			
3.			2.8			.9				.95		
4.											1.1	
5.						1.1	1.7	.9	1.0			
6.	2.0				.72				.95			
7.												
8.				.8			1.3	1.0				
9.												.65
10.										1.0		
11.							.95					
12.									.85			
13.			2.9								.8	
14.							1.0		.95			
15.						1.12		1.05	1.0			
16.		2.8								1.1		
17.	2.7			.8								
18.												
19.						1.0	1.0	1.0				
20.			3.0									
21.											.8	
22.				1.08			1.1	1.2	.9			
23.						1.0		1.1		1.2		
24.												
25.												
26.				.9			.9		.9	1.1		
27.					.8						.7	
28.					.85		.7					
29.								1.0				
30.												
31.							.7			1.1		

NOTE.—Creek frozen over Jan. 1 to Mar. 31 and Nov. 13 to Dec. 31; frozen solid Jan. 6, 17, and 28.

NORTH FORK OF SOUTH PLATTE RIVER AT GRANT, COLO.

Location.—At Grant post office, in sec. 9, T. 7 S., R. 74 W., in the Pike National Forest, 250 feet above the mouth of Geneva Creek.

Records available.—July 18, 1910, to December 31, 1911.

Drainage area.—51 square miles (measured from Forest Atlas).

Gage.—Vertical staff.

Channel.—Shifting.

Discharge measurements.—Made from footbridge and by wading.

Winter flow.—Ice causes backwater during the winter months and measurements are made to determine the flow.

Diversions.—There are no court decrees for diversions from the North Fork above the station, but there is a decree for a diversion of 8 second-feet from a tributary.

Accuracy.—Though the channel is somewhat shifting, sufficient measurements were obtained to make the estimates reliable. The diurnal fluctuations at this station are so great that the mean of two daily readings does not represent the mean discharge, especially in the spring, when the creek is melting during day and freezing during night.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of North Fork of South Platte River at Grant, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Mar 14 ^a	R. H. Fletcher.....	1.50	8.1	Aug. 29	R. H. Fletcher.....	1.45	14.2
Apr 14 ^a	W. B. Freeman.....	1.46	13.0	Sept. 8	do.....	1.44	15.2
21	O. M. Wimmer.....	1.65	22.7	8	Waha and Fletcher.....	1.52	20.3
June 11	J. B. Stewart.....	2.15	82.8	Nov. 3 ^a	G. H. Russell.....	1.43	3.5
July 13	W. B. Freeman.....	1.95	52.1				

^a Ice conditions.

Daily gage height, in feet, of North Fork of South Platte River at Grant, Colo., for 1911.

[Edmund Couch, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.							1.80					1.70
2.					1.65	2.20			1.52			1.87
3.											1.52	
4.								1.60				1.85
5.				1.35	2.05			1.60				
6.						2.20						
7.			1.55						1.40	1.50		
8.							1.80		1.44			1.87
9.	1.65							1.50			1.45	
10.		1.55				2.20		1.50	1.40			
11.	1.65				2.05	2.15						1.90
12.						2.15				1.40		
13.							1.94					2.00
14.			1.50	1.46	2.05							2.00
15.				1.37					1.40			1.90
16.						2.15		1.55				1.85
17.								1.52		1.40	1.75	
18.						2.15						
19.					2.20							
20.				1.45	2.20					1.35		1.30
21.				1.65					1.40			1.30
22.									1.40			1.35
23.						2.00					1.70	
24.			1.35					1.52			1.70	
25.							1.82				1.90	
26.				1.65	2.10		1.82					
27.						1.85						
28.	1.65			1.70						1.35	1.67	
29.					2.05		1.65	1.45	1.40			
30.					2.05	1.80						
31.												

Daily discharge, in second-feet, of North Fork of South Platte River at Grant, Colo., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1....	5	23	80	35	22	14	15	16....	10	76	80	47	18	14	14
2....	5	22	88	35	21	14	16	17....	10	80	80	45	17	14	14
3....	5	22	88	35	21	14	16	18....	10	84	80	44	17	14	13
4....	5	24	88	35	21	14	17	19....	10	88	76	43	17	14	13
5....	5	66	88	35	21	14	17	20....	12	88	72	42	17	14	12
6....	5	66	88	35	19	15	18	21....	22	85	68	41	17	14	12
7....	5	66	88	35	18	15	18	22....	22	83	64	40	17	14	12
8....	5	66	88	35	17	15	17	23....	22	80	59	39	17	14	12
9....	5	66	88	38	16	15	16	24....	22	78	55	38	17	14	12
10....	5	66	88	41	16	14	15	25....	22	75	50	37	17	14	12
11....	8	66	80	44	16	14	14	26....	22	73	45	37	16	14	12
12....	8	66	80	47	16	14	14	27....	24	70	40	32	16	14	12
13....	10	66	80	51	17	14	14	28....	26	68	38	27	15	14	12
14....	13	66	80	50	17	14	14	29....	24	66	37	22	14	14	12
15....	9	72	80	48	17	14	14	30....	24	66	35	22	14	15	12
								31....	.....	73	.....	22	14	.....	12

NOTE.—Daily discharge determined as follows: Apr. 1 to 14, estimated; Apr. 15 to July 31, from a well-defined curve; Aug. 1 to 31, from a curve based on one measurement and shape of previous curves; Sept. 1 to 8, the indirect method for shifting channels; Sept. 9 to Oct. 31, from a poorly defined curve.

Monthly discharge of North Fork of South Platte River at Grant, Colo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	.....	.....	a 7.0	430	D.
February.....	.....	.....	a 7.0	389	D.
March.....	.....	.....	a 6.0	389	D.
April.....	26	5	12.7	756	B.
May.....	88	22	66.3	4,080	B.
June.....	88	35	71.7	4,270	B.
July.....	51	22	38.0	2,340	B.
August.....	22	14	17.3	1,060	B.
September.....	15	14	14.2	845	C.
October.....	18	12	14.0	861	C.
November.....	.....	.....	a 4.0	238	D.
The period.....	.....	.....	.....	15,600	

a Discharge estimated.

NORTH FORK OF SOUTH PLATTE RIVER AT CASSELLS, COLO.

Location.—At Cassells, in sec. 11, T. 7 S., R. 74 W., in the Pike National Forest.

The nearest tributary is a small stream entering from the south, a short distance below.

Records available.—July 4, 1908, to December 31, 1911.

Drainage area.—128 square miles (measured from topographic sheets and Forest atlas).

Gage.—Chain gage which replaced a vertical staff reading to the same datum.

Channel.—Shifting.

Discharge measurements.—Made from bridge.

Winter flow.—Ice causes backwater during the winter months and measurements are made to determine the flow.

Diversions.—There are no court decrees for diversions between this station and that at Grant.

Accuracy.—Although the channel is shifting, sufficient measurements have been obtained to make the estimates of discharge reliable. The diurnal fluctuations due to melting during the day and freezing at night are so great at this station during the spring and, to a less extent, in the fall, that the mean of two daily gage readings does not properly represent the mean stage.

Cooperation.—Station maintained in cooperation with the United States Forest Service and the State engineer.

Discharge measurements of North Fork of South Platte River at Cassells, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 8 ^a	R. H. Fletcher.....	2.08	21.4	June 10	J. B. Stewart.....	2.19	250
9 ^a	.....do.....	1.84	23.2	July 12	W. B. Freeman.....	1.82	178
Feb. 20 ^a	.....do.....	1.34	25.2	Aug. 28	R. H. Fletcher.....	1.33	66.7
Mar. 13 ^a	.....do.....	1.16	22.1	Sept. 8	.....do.....	1.22	60.3
14 ^a	.....do.....	1.16	23.5	Nov. 1	Waha & Fletcher.....	1.22	52.6
Apr. 13	W. B. Freeman.....	1.20	26.1		G. H. Russell.....	1.25	39.6
22	O. M. Wimmer.....	1.34	44.1				

^aIce conditions.

Daily gage height, in feet, of North Fork of South Platte River at Cassells, Colo., for 1911.

[Lulu Cassell, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.5	1.15	1.22	1.15	1.48	2.25	1.7	.....	1.19	1.45	1.15	2.0
2.....	1.6	.95	1.18	1.12	1.51	2.28	2.18	.....	1.21	1.32	1.15	2.0
3.....	1.5	.90	1.15	1.15	1.52	2.38	2.62	.....	1.2	1.21	1.17	1.95
4.....	1.9	1.1	1.2	1.15	1.55	2.1	2.45	1.43	1.19	1.2	1.12	1.8
5.....	1.6	1.05	1.15	1.08	1.6	2.2	2.73	1.45	1.18	1.54	1.24	1.75
6.....	1.8	.95	1.15	1.18	1.77	2.22	2.3	1.45	1.2	1.35	1.2	1.55
7.....	1.8	1.05	1.05	1.08	1.75	2.35	2.12	.....	1.2	1.25	1.45	1.6
8.....	1.95	1.1	1.06	1.1	1.82	2.32	2.05	.....	1.2	1.3	1.5	1.5
9.....	1.8	1.05	1.2	1.15	1.9	2.3	1.92	1.7	1.2	1.2	1.4	1.7
10.....	1.65	.95	1.1	1.1	1.9	2.2	1.88	1.7	1.2	1.19	1.25	1.65
11.....	2.0	.95	1.05	1.2	1.8	2.25	1.9	1.82	1.2	1.15	1.3	1.7
12.....	1.55	1.02	1.08	1.08	2.1	2.15	1.85	1.82	1.2	1.16	1.5	1.75
13.....	1.55	1.05	1.11	1.05	2.12	2.15	1.83	1.42	1.2	1.18	1.55	1.95
14.....	1.5	1.2	1.23	.96	2.1	2.08	1.83	1.43	1.22	1.15	1.5	1.98
15.....	1.6	1.1	1.06	.95	2.1	2.1	1.82	1.34	1.28	1.08	1.05	2.02
16.....	1.75	1.1	1.14	1.05	2.2	2.08	1.8	1.35	1.2	1.18	1.15	1.98
17.....	1.5	1.05	1.05	1.02	2.35	2.08	1.85	1.34	1.2	1.12	1.4	1.95
18.....	1.45	1.0	1.0	1.05	2.45	2.05	1.78	1.38	1.18	1.1	1.4	2.0
19.....	1.5	1.1	1.02	1.12	2.1	2.08	1.78	1.37	1.18	1.2	1.45	1.95
20.....	1.55	.90	1.08	1.35	1.8	2.11	1.69	1.38	1.19	1.15	1.5	2.08
21.....	1.35	.80	1.0	1.38	1.88	2.2	1.66	1.39	1.18	1.11	1.4	2.2
22.....	1.25	.90	1.0	1.36	1.86	2.25	1.72	1.41	1.19	1.1	1.3	1.9
23.....	1.28	1.1	1.04	1.45	1.9	2.1	1.65	1.4	1.2	1.2	1.7	1.7
24.....	1.18	.90	1.02	1.4	1.82	2.0	.....	1.37	1.18	1.18	1.8	1.2
25.....	1.28	1.02	1.0	1.35	1.78	1.9	.....	1.35	1.18	1.15	1.8	1.2
26.....	1.28	1.08	.95	1.43	1.94	1.98	.....	1.28	1.17	1.18	1.8	1.2
27.....	1.22	1.1	1.12	1.49	1.88	1.94	.....	.....	1.17	1.04	2.05	1.2
28.....	1.25	1.65	1.0	1.5	1.88	1.8	.....	1.32	1.16	1.1	2.0	1.15
29.....	1.3	.....	1.0	1.5	2.0	1.75	.....	1.27	1.28	1.15	2.05	1.15
30.....	1.22	.....	1.02	1.35	1.89	1.68	.....	1.24	1.35	1.18	2.0	1.2
31.....	1.15	.....	1.05	.....	2.05	.....	.....	1.22	.....	1.2	.....	1.1

NOTE.—Ice present Jan. 1 to Mar. 16 and Nov. 5 to Dec. 31.

Daily discharge, in second-feet, of North Fork of South Platte River at Cassells, Colo., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1.....	20	22	65	271	106	97	51	89
2.....	20	20	70	282	255	93	53	68
3.....	20	22	72	324	470	89	52	53
4.....	20	22	77	217	380	85	51	52
5.....	20	17	86	252	555	89	50	107
6.....	20	25	122	260	325	89	52	72
7.....	20	17	118	311	260	107	52	58
8.....	20	18	134	298	230	126	52	65
9.....	20	22	155	290	200	145	52	52
10.....	20	18	155	252	190	145	52	51
11.....	15	27	129	271	195	178	52	40
12.....	17	17	217	234	180	102	52	40
13.....	19	15	224	234	181	84	52	40
14.....	30	10	217	211	181	85	55	35
15.....	16	10	217	217	178	71	62	30
16.....	22	15	252	211	172	72	52	33
17.....	15	13	311	211	187	71	52	27
18.....	12	15	356	201	167	77	50	25
19.....	13	20	217	211	167	76	50	35
20.....	17	45	129	220	142	77	51	30
21.....	12	49	150	252	135	78	50	26
22.....	12	46	145	271	150	82	51	25
23.....	14	60	155	217	132	80	52	35
24.....	13	52	134	185	129	76	50	33
25.....	12	45	124	155	125	72	50	30
26.....	10	57	167	179	121	62	48	33
27.....	20	66	150	167	117	65	48	20
28.....	12	68	150	129	113	68	47	25
29.....	12	68	185	118	109	61	62	30
30.....	13	45	152	102	105	57	72	33
31.....	15	.....	201	.....	101	55	.....	35

NOTE.—Daily discharge determined as follows: Mar. 1 to 10, estimated; Mar. 11 to July 1, from a fairly well defined curve; July 2 to 12, by the indirect method for shifting channels; July 13 to Oct. 10, from a fairly well defined curve; Oct. 11 to 31, by the indirect method for shifting channels.

Monthly discharge of North Fork of South Platte River at Cassells, Colo., for 1911.

[Drainage area, 128 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy ¹
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....	.....	.....	α 24	0.188	0.22	1,480	D.
February.....	.....	.....	α 25	.195	.20	1,390	D.
March.....	30	10	16.8	.131	.15	1,030	C.
April.....	68	10	31.5	.246	.27	1,870	B.
May.....	356	65	162	1.27	1.46	9,960	C.
June.....	324	102	225	1.76	1.96	13,400	B.
July.....	555	101	195	1.52	1.75	12,000	C.
August.....	178	55	87.5	.684	.79	5,380	B.
September.....	72	47	52.5	.410	.46	3,120	B.
October.....	107	20	42.8	.334	.39	2,630	C.
November.....	.....	.....	α 25	.195	.22	1,490	D.
The period.....	.....	.....	.....	.....	.....	53,800	.....

¹ Estimated from discharge measurements.

GENEVA CREEK ABOVE JACKWHACKER CREEK, NEAR GRANT, COLO.

Location.—In Pike National Forest, 100 feet above Jackwhacker Creek and 12 miles above Grant.

Records available.—Fragmentary records August 17, 1909, to November 9, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff; datum unchanged.

Channel.—Character not determined.

Discharge measurements.—Made by wading.

Winter flow.—No data.

Diversions.—No water is diverted above the station.

Accuracy.—Data too meager for estimates of discharge.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Daily gage height, in feet, of Geneva Creek above Jackwhacker Creek, near Grant, Colo., for 1911.

[Edmund Couch, observer.]

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	June.	July.	Aug.	Sept.	Oct.	Nov.
1							16						
2				0.54			17			0.55		0.50	
3						0.45	18						
4							19						
5			0.55				20						
6							21						
7					0.50		22				0.48		
8							23						
9			.54			.43	24			.55			
10							25						
11							26						
12					.50		27	0.85					
13		0.80					28						
14							29		0.07				
15				.50			30						

GENEVA CREEK AT OLD GENEVA SMELTER, NEAR GRANT, COLO.

Location.—One-fourth mile below Old Geneva smelter, in T. 6 S., R. 75 W., 10 miles above Grant.

Records available.—Fragmentary records from August 17, 1909, to September 2, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff; datum unchanged.

Channel.—Unstable, as the flow is frequently affected by backwater from beaver dams.

Discharge measurements.—Made by wading.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—No water is diverted above the station, and therefore the records represent the natural run-off.

Accuracy.—Data insufficient for estimates of discharge.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

The following discharge measurement was made by W. B. Freeman:

July 13, 1911; Gage height, 1.55 feet; discharge, 36 second-feet.

Daily gage height, in feet, of Geneva Creek at Old Geneva smelter, near Grant, Colo., for 1911.

[Edmund Couch, observer.]

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1					16				
2	2.2			1.2	17			1.2	
3					18				
4					19				
5			1.2		20				
6					21				
7					22				
8					23				
9			1.2		24			1.2	
10					25				
11					26				
12					27	1.8			
13		1.55			28				
14					29		1.2		
15					30				

GENEVA CREEK AT SULLIVAN'S RANCH, NEAR GRANT, COLO.

Location.—In Pike National Forest in sec. 29, T. 6 S., R. 74 W., 4 miles above Grant, at Sullivan's ranch; 40 feet below the mouth of Threemile Creek.

Records available.—July 5, 1908, to November 3, 1911.

Drainage area.—66 square miles (measured from Forest atlas).

Gage.—Vertical staff; datum unchanged.

Channel.—Fairly permanent except during high water.

Discharge measurements.—Made by wading.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—There are no court decrees for diversion of water above this station, and therefore the records probably represent the natural run-off.

Accuracy.—Conditions are favorable for good results, and the estimates of discharge should be reliable. The stream is, however, subject to sharp diurnal fluctuations, especially in the spring and, to a less extent, in the fall, caused by melting during the day and freezing at night, so that the mean gage height derived from two daily readings may not represent the true stage.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of Geneva Creek at Sullivan's ranch, near Grant, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 9 ^a	Fletcher and Couch	0.50	14.6	June 11	J. B. Stewart	1.50	182
Feb. 21 ^a	R. H. Fletcher	.40	15.3	July 13	W. B. Freeman	1.40	143
Mar. 14 ^a	do	.48	13.7	Aug. 29	R. H. Fletcher	.80	40.6
Apr. 14	W. B. Freeman	.47	14.3	Nov. 2	G. H. Russell	.72	26.3

^a Ice conditions.

Daily gage height, in feet, of Geneva Creek at Sullivan's ranch, near Grant, Colo., for 1911.

Mrs. M. A. Sullivan, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....				0.50	0.70	1.70	1.25	1.00	0.75	1.00	
2.....				.50	.68	1.60	1.80	1.00	.78	.90	0.72
3.....				.50	.65	1.55	1.90	1.00	.80	.75	.80
4.....					.70	1.65	1.75	1.00	.85	.70	
5.....				.45	.95	1.65	1.95	.90	.80	.90	
6.....					.95	1.60	1.90	.90	.80	.80	
7.....				.45	1.10	1.70	1.85	.90	.75	.75	
8.....				.45	1.20	1.70	1.70	.90	.75	.75	
9.....	0.50			.45	1.35	1.68	1.55	.90	.75	.80	
10.....				.50	1.10	1.68	1.45	.90	.75	.70	
11.....				.50	.95	1.62	1.45	1.00	.75	.70	
12.....					1.08	1.65	1.40	1.00	.72	.70	
13.....				.50	1.20	1.55	1.35	.90	.70	.70	
14.....			0.48	.50	1.25	1.60	1.30	.88	.75	.70	
15.....				.65	1.25	1.55	1.30	.85	.80	.70	
16.....				.58	1.35	1.55	1.30	.90	.70	.70	
17.....				.50	1.40	1.55	1.40	.88	.70	.70	
18.....				.50	1.55	1.58	1.30	.90	.70	.70	
19.....				.62	1.45	1.55	1.30	.90	.70		
20.....				.64	1.30	1.55	1.30	.88	.75		
21.....		0.40		.70	1.28	1.65	1.20	.90	.75		
22.....			.40	.68	1.25	1.78	1.28	.95	.72		
23.....			.40	.70	1.28	1.72	1.20	1.00	.70		
24.....				.60	1.35	1.60	1.20	.90	.70		
25.....			.40	.65	1.35	1.50	1.15	.90	.70		
26.....			.40	.68	1.38	1.45	1.15	.80	.70		
27.....				.80	1.45	1.45	1.10	.80	.70		
28.....				.80	1.40	1.40	1.15	.80	.70		
29.....			.40	.82	1.50	1.30	1.10	.80	.80	.75	
30.....				.75	1.45	1.30	1.05	.78	.85	.75	
31.....			.45		1.50		1.00	.75		.75	

NOTE.—Ice present Jan. 1 to about Mar. 21.

Daily discharge, in second-feet, of Geneva Creek at Sullivan's ranch, near Grant, Colo., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		15	33	226	117	66	32	66	30
2.....		15	31	202	239	66	36	51	29
3.....		15	28	190	263	66	38	32	38
4.....		14	33	214	227	66	44	27	
5.....		12	67	214	276	51	38	51	
6.....		12	67	202	263	51	38	38	
7.....		12	94	226	251	51	32	32	
8.....		12	114	226	216	51	32	32	
9.....		12	145	221	182	51	32	38	
10.....		15	94	221	159	51	32	27	
11.....		15	67	207	159	66	32	27	
12.....		15	90	214	148	66	29	27	
13.....		15	114	190	137	51	27	27	
14.....	14	15	124	202	122	48	32	27	
15.....		28	124	190	122	44	38	27	
16.....		21	145	190	122	51	27	27	
17.....		15	156	187	143	48	27	27	
18.....		15	190	193	122	51	27	27	
19.....		25	167	187	122	51	27	28	
20.....		27	134	187	122	48	32	28	
21.....			33	130	210	51	32	28	
22.....		8.0	31	124	232	58	29	29	
23.....		8.0	33	130	226	102	66	27	29
24.....		8.0	23	145	198	102	51	27	29
25.....		8.0	28	145	176	92	51	27	30
26.....		8.0	31	152	164	92	38	27	30
27.....		8.0	45	167	164	83	38	27	31
28.....		8.0	45	156	153	92	38	27	31
29.....		8.0	48	178	126	83	38	38	32
30.....		10	39	167	126	74	36	44	32
31.....		12		178		66	32		32

NOTE.—Daily discharge determined as follows: Mar. 22 to June 11 and July 14 to Nov. 3, from two fairly well-defined curves; June 12 to July 13, by indirect method for shifting channels; discharge interpolated Oct. 19 to 28.

Monthly discharge of Geneva Creek at Sullivan's ranch, near Grant, Colo., for 1911.

[Drainage area, 66 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
January.....			^a 15	0.227	0.26	922
February.....			^a 15	.227	.24	833
March.....			11.7	.177	.20	719
April.....	48	12	22.7	.344	.38	1,350
May.....	190	28	119	1.80	2.08	7,320
June.....	232	126	195	2.95	3.29	11,600
July.....	276	66	146	2.21	2.55	8,980
August.....	66	32	51.3	.777	.90	3,150
September.....	44	27	31.9	.483	.54	1,900
October.....	66	27	32.2	.488	.56	1,980
November.....			^a 20	.303	.34	1,190
December.....						
The period.....						39,900

^a Estimated.

NOTE.—Discharge estimated at 14 second-feet Mar. 1-13 and 11 second-feet Mar. 15-21.

GENEVA CREEK AT GRANT, COLO.

Location.—In the Pike National Forest, at highway bridge in sec. 9, T. 7 S., R. 74 W., at Grant post office; 300 feet above mouth of creek.

Records available.—November 3 to December 31, 1911.

Drainage area.—74 square miles (measured from Forest Atlas).

Gage.—Vertical staff.

Channel.—Somewhat shifting during high water.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—There are no court decrees for diversions above this station.

Accuracy.—Data insufficient for estimates of discharge.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

The following discharge measurement was made by G. H. Russell:

November 3, 1911: Gage height, 0.96 foot; discharge, 12 second-feet.

Daily gage height, in feet, of Geneva Creek at Grant, Colo., for 1911.

[Edmund Couch, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....			11.....		1.60	21.....		1.70
2.....			12.....		1.75	22.....		1.70
3.....	0.96		13.....		1.70	23.....		
4.....		1.45	14.....		1.65	24.....		
5.....			15.....		1.65	25.....		
6.....			16.....		1.65	26.....		
7.....			17.....	1.25		27.....		
8.....		1.45	18.....			28.....		
9.....			19.....			29.....		
10.....			20.....		1.70	30.....		
						31.....		

NOTE.—Ice present Nov. 16 to Dec. 31; ice 10 inches thick Dec. 11 and 14 inches thick Dec. 20, 21, and 22.

SMELTER CREEK NEAR GRANT, COLO.

Location.—In Pike National Forest, at Old Geneva smelter, in T. 6 S., R. 75 W., 10 miles above Grant; one-fourth mile above the mouth of creek.

Records available.—Fragmentary records August 17, 1909, to November 9, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff whose datum has remained unchanged.

Channel.—Data too meager to determine.

Discharge measurements.—Made by wading.

Winter flow.—Ice causes backwater during the winter months, and the records are discontinued.

Diversions.—There are no court decrees for diversions above this station and therefore the records probably represent the natural run-off.

Accuracy.—Data insufficient for estimates of discharge.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of Smelter Creek near Grant, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
July 13	W. B. Freeman	<i>Feet.</i> 0.90	<i>Sec.-ft.</i> 12.7
Nov. 2	G. H. Russell	.52	1.4

Daily gage height, in feet, of Smelter Creek near Grant, Colo., for 1911.

[Edmund Couch, observer.]

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	June.	July.	Aug.	Sept.	Oct.	Nov.
1							16						
2	1.05			0.62			17			0.60		1.54	
3						0.50	18						
4							19						
5			0.65				20						
6							21						
7					1.54		22				0.50		
8							23						
9			.63			.45	24			.60			
10							25						
11							26						
12					1.55		27	0.95					
13		0.90					28						
14							29						
15				.55			30		0.07				
							31						

DUCK LAKE CREEK NEAR GRANT, COLO.

Location.—At Gordon's ranch, in sec. 12, T. 6 S., R. 75 W., 50 yards above the mouth, 7 miles above Grant, in Pike National Forest.

Records available.—Fragmentary records August 17, 1909, to November 9, 1911.

Drainage area.—8 square miles (measured from topographic sheet).

Gage.—Vertical staff; datum unchanged.

Channel.—Data too meager to determine.

Discharge measurements.—Made from footbridge or by wading.

Winter flow.—Ice causes backwater during the winter months and the records are discontinued.

Diversions.—There are no court decrees for diversions above this station and therefore the records probably represent the natural run-off.

Accuracy.—Data insufficient for estimates of discharge.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

The following discharge measurement was made by G. H. Russell:

November 2, 1911: Gage height, 0.88 foot; discharge, 1.3 second-feet.

Daily gage height, in feet, of Duck Lake Creek near Grant, Colo., for 1911.

[Edmund Couch, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1								16							
2								17				0.95		0.87	
3		1.55			0.95			18							
4							0.95	19	1.40						
5				1.00				20							
6								21							
7						0.82		22					0.80		
8								23		1.45					
9				.95			.87	24				.95			
10		1.55		.95				25							
11	0.95							26							
12						.90		27		1.30					
13			1.30					28							
14								29			1.05				
15					.80			30							
								31							

SCOTT GOMER CREEK¹ NEAR GRANT, COLO.

Location.—Near Sullivan's ranch, in sec. 19, T. 6 S., R. 74 W., in the Pike National Forest, about 5 miles above Grant, one-fourth mile above mouth of creek. No tributary enters between mouth and station.

Records available.—Fragmentary records August 16, 1909, to December 31, 1911.

Drainage area.—21 square miles (measured from topographic sheet).

Gage.—Vertical staff, moved to its present location, 2½ miles below original site, September 4, 1909. Datum unchanged in new location, but has no determined relation to datum of original gage.

Channel.—Slightly shifting.

Discharge measurements.—Made by wading.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—There are no court decrees for diversions above this station, and therefore the records probably represent the natural run-off.

Accuracy.—Conditions are favorable for fairly accurate results and the estimates of flow should be reliable.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of Scott Gomer Creek near Grant, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 9 ^a	Fletcher and Couch	1.10	4.7	June 11	J. B. Stewart	2.45	31.4
Feb. 21 ^a	R. H. Fletcher	.90	4.8	July 13	W. B. Freeman	2.53	40.7
Mar. 14 ^a	do	1.10	5.9	Aug. 29	R. H. Fletcher	1.68	12.9
Apr. 14 ^a	W. B. Freeman	1.26	3.2	Nov. 2	G. H. Russell	1.60	9.6
21	O. M. Wimmer	1.20	7.3				

^a Ice conditions.

¹ Also called East Geneva Creek.

Daily gage height, in feet, of Scott Gomer Creek near Grant, Colo., for 1911.

[Edmund Couch, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.												
2.					1.30	3.15			1.65		1.60	1.30
3.											1.65	
4.				0.95								1.30
5.								1.80				
6.												
7.		0.70							1.65	1.65		
8.							2.80					
9.	0.70							1.67			1.55	
10.		.70				3.55		1.67				
11.					2.60	2.45						1.30
12.										1.65		
13.							2.54					
14.	.75		1.10	1.26								
15.				1.00					1.65			
16.						2.55		1.70				
17.								1.70		1.60	1.40	
18.												
19.					3.00							
20.				1.10								1.35
21.		.90		1.20								
22.									1.60			
23.						2.95						
24.			1.00					1.77				
25.											1.35	
26.					3.00							
27.						2.85						
28.				1.30								
29.							1.95	1.68				
30.												
31.												

NOTE.—Ice caused backwater Jan. 1 to Apr. 14 and Nov. 17 to Dec. 31.

Daily discharge, in second-feet, of Scott Gomer Creek near Grant, Colo., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		7.5	70	53	16	11	11	10
2.		7.5	72	53	16	11	11	11
3.		11	75	52	15	11	11	11
4.		14	78	52	14	11	11	11
5.		17	81	52	14	11	11	11
6.		21	84	51	13	11	11	10
7.		25	88	51	12	11	11	10
8.		29	92	51	11	11	11	10
9.		33	96	48	11	11	11	10
10.		37	100	45	11	11	11	
11.		41	34	42	11	11	11	
12.		43	35	40	11	11	11	
13.		46	36	38	12	11	11	
14.		49	37	36	12	11	11	
15.	5	52	38	34	12	11	10	
16.	5	55	38	32	12	11	10	
17.	5	58	41	30	12	11	10	
18.	5.5	61	44	29	12	11	10	
19.	5.5	63	47	28	12	10	10	
20.	5.5	63	50	27	12	10	10	
21.	6.5	63	53	26	13	10	10	
22.	6.5	63	56	25	13	10	10	
23.	6.5	63	60	24	13	10	10	
24.	7.0	63	58	23	13	10	10	
25.	7.0	63	56	22	12	10	10	
26.	7.5	63	55	21	12	10	10	
27.	7.5	64	54	20	11	10	10	
28.	7.5	65	54	19	11	10	10	
29.	7.5	66	54	18	11	10	10	
30.	7.5	67	53	18	11	11	10	
31.		68		17	11		10	

NOTE.—Daily discharge determined from a rating curve that is fairly well defined between 5 and 36 second-feet. Discharge interpolated for days for which gage heights are missing.

Monthly discharge of Scott Gomer Creek near Grant, Colo., for 1911.

[Drainage area, 21 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....			a 5.0	0.238	0.27	307	
February.....			a 5.0	.238	.25	278	
March.....			a 5.0	.238	.27	307	
April.....	7.5		5.75	.274	.31	342	C.
May.....	68	7.5	46.5	2.21	2.55	2,960	C.
June.....	100	34	59.6	2.84	3.17	3,550	C.
July.....	53	17	34.7	1.65	1.90	2,130	C.
August.....	16	11	12.3	.586	.68	756	C.
September.....	11	10	10.6	.505	.56	631	C.
October.....	11	10	10.5	.500	.58	646	C.
November.....	11		8.0	.381	.43	476	C.
December.....			a 5.0	.238	.27	307	
The year.....	100		17.4	.829	11.24	12,600	

a Estimated.

NOTE.—Discharge Apr. 1 to 14 estimated at 5 second-feet per day. Nov. 10 to 30 at 7 second-feet.

CLEAR CREEK AT IDAHO SPRINGS, COLO.

Location.—At Idaho Springs, in sec. 36, T. 3 S., R. 73 W., half a mile below mouth of Chicago Creek and a quarter of a mile above entrance of Soda Creek and Virginia Canyon.

Records available.—October 8, 1910, to December 31, 1911.

Drainage area.—239 square miles (measured from Forest Atlas).

Gage.—A staff gage placed March 23, 1911, a short distance upstream from the original staff gage, which was used until that date. The new gage was referred to a datum 0.2 foot lower than the original. All readings have been referred to the latter gage.

Channel.—Slightly shifting.

Discharge measurements.—Made by wading.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—There are no court decrees for diversions above the station, but the records do not represent the natural flow at all times, as water is diverted from Fraser River, in the Grand Basin, into Clear Creek by means of a tunnel and canal entering the West Fork. This diversion has a court decree for 53 second-feet.

Accuracy.—Conditions are favorable for fairly accurate results.

Artificial control.—The operation of two power plants some 12 miles above the station causes a daily fluctuation of 0.10 foot or more at the gage during the low-water period.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of Clear Creek at Idaho Springs, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 23	Fletcher and Miles.....	0.50	34.5	Sept. 22	G. A. Gray.....	0.98	119
Apr. 27	O. M. Wimmer.....	.82	74.8	Nov. 8a	G. H. Russell.....	.80	63.4
June 29	E. O. Christiansen.....	2.70	508	Dec. 21b	R. H. Fletcher.....	.80	49.6
Aug. 12	R. H. Fletcher.....	1.60	241				

a Slight ice effect.

b Ice conditions.

Daily gage height, in feet, of Clear Creek at Idaho Springs, Colo., for 1911.

[W. B. Kelso, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		0.55			0.7	2.15	2.15					0.8
2.						2.3		1.35		0.7	0.75	
3.						2.3		1.3				
4.							2.65				.7	.6
5.				0.6		2.5	3.3	1.2	0.95	.9	.65	
6.					1.1	2.5	3.35			.9		
7.						2.7	3.15			1.0		
8.			0.8		1.3	2.8	3.0	1.1			.8	.6
9.					1.3	3.0		1.1				
10.					1.4	2.75	2.5			.8	.6	
11.									.75	.85	.7	
12.		.55			1.7	2.9						
13.		.55			1.3	2.95		1.1	.8		.7	
14.							2.3	1.1		.7		
15.				.7	1.3	2.8	2.2	1.05				
16.					1.4				.7	.6		.6
17.					1.45	2.6		1.1	.55	.6	1.1	
18.					1.6						1.1	.55
19.	0.55					2.6	2.15	1.0	.8			.75
20.			.55	.6	1.5							
21.		.7					1.9	1.2				.8
22.					1.4				1.0		.6	
23.	.55		.5			2.8			.6	.65	.5	
24.			.6		1.5	2.7	1.75	1.1				
25.							1.7		.6	.65		
26.				.75								
27.				.8		2.3						
28.						2.2		1.0	.55			
29.					1.8	2.3	1.5					
30.	.6		.55		1.9			.95	.65			1.0
31.					2.0			.95				

NOTE.—Gage heights during January, February, and to Mar. 8 distorted by ice; ice from Nov. 17 to Dec. 31.

Daily discharge, in second-feet, of Clear Creek at Idaho Springs, Colo., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.			61	372	372				
2.				410		182		61	69
3.				410		171			
4.					498				61
5.		46		460	665	151	703	94	54
6.			131	460	680			94	
7.				510	622			112	
8.			171	535	585	131			77
9.			171	585		131			
10.			192	522	460			77	46
11.							69	86	61
12.			260	560					
13.			171	572		131	77		61
14.					410	131		61	
15.		61	171	535	385	122			
16.			192			131	61	46	
17.			202	485		131	40	46	
18.			235						
19.				485	372	112	77		
20.	40	46	213						
21.					310	151			
22.			192				112		
23.	33			535			46	54	
24.	46		213	510	272	131			
25.					260		46	54	
26.		69							
27.		77		410					
28.				385		112	40		
29.			285	410	213				
30.	40		310			103	54		
31.			335			103			

CLEAR CREEK AT FORKSCREEK, COLO.

Location.—At Forkscreek, a few hundred feet below the mouth of North Clear Creek, Records available.—May 29, 1899, to December 31, 1911.

Drainage area.—345 square miles.

Gage.—A chain gage was installed June 3, 1907, 50 feet upstream from first site. The original gage had been moved 30 feet upstream on July 19, 1905, but set to read the same as before. The chain gage was also referred to the same datum.

Channel.—Very shifting.

Discharge measurements.—Made from footbridge and by wading.

Winter flow.—Ice causes backwater during the winter months and measurements are made to determine the flow.

Diversions.—There are no court decrees for diversions between Idaho Springs and Forkscreek. Below there are decrees for diversions of 1,668 second-feet from Clear Creek.

Artificial control.—The natural flow is regulated to some extent by storage in various ponds and reservoirs above.

Accuracy.—Estimates have been made by the indirect method for shifting channels and can be considered in general only fair although the 1911 estimates have been rated as good.

Cooperation.—Station maintained in cooperation with the State engineer.

Discharge measurements of Clear Creek at Forkscreek, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 3 ^a	Miles and Fletcher.....	7.37	22.6	June 29	E. O. Christiansen.....	7.00	537
Mar. 1 ^a	R. H. Fletcher.....	6.73	24.4	Aug. 12	R. H. Fletcher.....	6.10	274
1 ^a	.....do.....	7.33	28.4	Sept. 23	G. A. Gray.....	5.62	86.2
24	.....do.....	5.98	41.2	Nov. 8	G. H. Russell.....	5.80	81.3
24	Miles and Fletcher.....	5.94	32.1	Dec. 22	R. H. Fletcher.....	^b 7.40	40.7
May 13	J. B. Stewart.....	6.70	286				

^a Ice conditions.

^b Gage height distorted by ice. Reading to top of ice.

Daily gage height, in feet, of Clear Creek at Forkscreek, Colo., for 1911.

[C. W. Haisington, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	6.2	7.8	6.15	6.25	7.3	6.8	6.2	5.7	5.75	5.7	5.65	5.65
2.....	6.15	7.75	6.1	6.2	7.4	7.45	6.1	5.7	5.6	5.7	5.7	5.65
3.....	6.1	7.75	6.05	6.2	7.55	7.65	6.1	5.95	5.6	5.7	5.3	5.3
4.....	7.85	6.15	7.6	6.05	6.3	7.65	7.65	6.0	5.85	5.6	5.7	5.3
5.....	7.8	6.15	7.5	6.15	6.3	7.55	7.6	6.0	5.7	5.6	5.65	5.4
6.....	7.55	6.2	7.45	6.1	6.45	7.55	7.7	5.9	5.7	5.6	5.7	5.55
7.....	7.55	6.2	7.3	6.05	6.7	7.45	7.45	5.9	5.65	5.6	5.7	5.7
8.....	7.65	6.05	7.3	6.0	6.7	7.45	7.25	5.85	5.65	5.65	5.8	5.75
9.....	7.6	6.0	6.9	6.1	6.8	7.4	7.15	5.85	5.65	5.65	5.8	5.95
10.....	7.4	6.3	6.9	6.05	6.9	7.4	7.0	6.0	5.6	5.6	5.8	5.95
11.....	7.5	6.35	6.3	6.1	6.75	7.3	6.9	6.1	5.6	5.65	5.6	5.95
12.....	7.3	6.45	6.25	6.1	6.6	7.45	6.9	6.1	5.6	5.65	5.5	6.4
13.....	7.55	6.35	6.25	6.1	6.7	7.5	6.85	6.1	5.6	5.7	5.65	6.5
14.....	6.95	6.35	5.9	6.0	6.7	7.5	6.7	6.1	5.6	5.7	5.65	6.6
15.....	6.45	6.25	5.8	5.9	6.8	7.45	6.7	6.0	5.6	5.7	5.7	6.7
16.....	6.35	6.25	5.8	6.0	6.8	7.35	6.6	6.0	5.6	5.5	5.6	6.7
17.....	6.4	6.25	5.8	6.0	6.9	7.2	6.55	6.0	5.6	5.6	5.7	6.85
18.....	6.35	6.45	5.85	6.05	6.9	7.1	6.55	6.0	5.6	5.6	5.6	6.9
19.....	6.35	6.4	5.95	6.1	7.0	7.15	6.55	6.95	5.6	5.65	5.6	6.9
20.....	6.25	6.8	6.0	6.1	6.85	7.3	6.55	6.9	5.6	5.7	5.7	7.0
21.....	6.35	6.85	5.85	6.1	6.8	7.55	6.5	5.9	5.6	5.7	5.7	7.1
22.....	6.55	6.85	6.15	6.2	6.7	7.6	6.5	5.9	5.6	5.65	5.7	7.1
23.....	6.85	7.1	6.05	6.2	6.6	7.4	6.5	5.9	5.6	5.65	5.7	7.1
24.....	6.6	7.1	6.0	6.2	6.7	7.3	6.5	5.85	5.6	5.65	5.65	7.0
25.....	6.4	7.25	6.05	6.2	6.8	7.2	6.45	5.85	5.6	5.65	5.55	7.0
26.....	6.25	7.7	5.9	6.3	6.9	7.1	6.4	5.8	5.6	5.7	5.65	7.1
27.....	6.2	7.85	5.8	6.35	6.9	7.0	6.4	5.8	5.6	5.7	5.7	7.2
28.....	6.15	7.85	6.05	6.4	7.0	7.0	6.4	5.8	5.6	5.7	5.7	7.2
29.....	6.1	.....	6.1	6.5	7.05	6.9	6.3	5.75	5.6	5.7	5.65	7.1
30.....	6.05	.....	6.15	6.3	7.1	6.85	6.3	5.75	5.6	5.6	5.65	7.1
31.....	6.15	.....	6.15	.....	7.1	.....	6.2	5.7	.....	5.7	.....	.....

NOTE.—Ice present Jan. 1 to Mar. 13 and Dec. 7 to 31.

Daily discharge, in second-feet, of Clear Creek at Forkscreek, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	23	24	26	83	110	670	432	255	128	103	67	55
2.....	23	24	26	70	96	738	833	216	128	76	67	55
3.....	23	24	26	58	96	825	965	220	215	76	67	27
4.....	23	24	26	58	125	882	970	185	177	76	67	27
5.....	23	24	26	83	125	835	945	181	160	73	57	33
6.....	23	24	26	70	179	837	1,010	155	160	73	65	45
7.....	23	24	26	58	286	780	860	158	112	73	65	45
8.....	23	24	26	47	286	782	740	143	112	80	81	45
9.....	23	24	28	70	332	750	680	146	112	80	81	45
10.....	23	24	28	58	386	752	595	202	97	68	81	45
11.....	23	24	28	70	309	690	540	242	97	78	50	45
12.....	23	24	28	70	240	784	545	245	96	78	40	45
13.....	23	24	28	70	286	814	515	248	95	84	55	45
14.....	23	24	30	47	286	820	435	252	94	84	55	41
15.....	23	25	18	30	338	790	442	217	93	84	63	41
16.....	23	25	18	47	340	730	390	219	92	58	50	41
17.....	23	25	18	47	397	640	365	221	91	64	63	41
18.....	23	25	24	58	400	580	373	223	90	64	50	41
19.....	23	25	38	70	460	610	375	205	88	69	50	41
20.....	23	25	47	70	375	708	378	188	87	80	63	41
21.....	23	25	24	70	355	865	357	191	85	80	63	41
22.....	23	25	83	96	305	900	363	193	83	79	63	41
23.....	23	25	58	96	260	770	367	195	80	67	63	41
24.....	23	25	47	96	305	712	370	175	80	67	55	41
25.....	23	25	58	96	360	652	350	175	79	67	45	41
26.....	23	25	30	125	420	590	327	160	78	70	55	41
27.....	23	25	18	138	422	533	330	160	78	70	63	35
28.....	23	25	58	160	480	535	333	160	78	69	63	35
29.....	23	.....	70	198	510	480	290	143	77	69	55	35
30.....	23	.....	83	125	545	455	292	143	77	52	55	35
31.....	23	.....	83	.....	545	.....	252	127	.....	67	.....	35

NOTE.—Daily discharge estimated, because of ice, Jan. 1 to Mar. 13 and Dec. 7 to 31; discharge Mar. 14 to May 13 determined from a rating curve fairly well defined between 30 and 450 second-feet; discharge May 14 to Dec. 6 computed by indirect method for shifting channels.

Monthly discharge of Clear Creek at Forkscreek, Colo., for 1911.

[Drainage area, 345 square miles.]

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	23	23	23	1,410	B.
February.....	25	24	24.4	1,360	B.
March.....	83	18	37.2	2,290	B.
April.....	198	30	81.1	4,830	A.
May.....	545	96	321	19,800	B.
June.....	900	455	717	42,700	B.
July.....	1,010	252	517	31,800	B.
August.....	255	127	192	11,800	B.
September.....	215	77	104	6,170	B.
October.....	103	52	73.5	4,520	B.
November.....	81	40	60.6	3,600	B.
December.....	55	27	40.8	2,510	B.
The year.....	1,010	18	183	133,000	

ST. VRAIN CREEK AT LYONS, COLO.

Location.—Three-fourths of a mile below Lyons, in sec. 17, T. 3 N., R. 70 W., one fourth mile below the junction of North and South St. Vrain creeks and just below Stone Canyon.

Records available.—August 1, 1887, to October 31, 1890; June 13, 1895, to October 31, 1903; July 1, 1904, to December 31, 1911.

Drainage area.—209 square miles.

Gage.—Inclined staff gage installed August 9, 1909, at practically the same datum as the inclined staff gage used from 1895 to 1903. It is not known whether the gage used prior to 1895 was located at the present site.

Channel.—Character not known, as only computed records are received.

Discharge measurements.—Made from car and cable.

Winter flow.—Ice causes backwater during a portion of the winter months.

Diversions.—There are court decrees for the diversion of 166 second-feet from the St. Vrain and tributaries above the station. Below there are court decrees for 1,632 second-feet from St. Vrain Creek and flood-water diversions of 190,000 acre-feet.

Cooperation.—From 1887 to 1890 and from July 1, 1904, to 1911 the station was maintained by the State engineer, by whom the records have been furnished.

Discharge measurements of St. Vrain Creek at Lyons, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 9	C. E. Turner.....	1.45	1.5	July 31	C. C. Hezmalhalch.....	2.70	151
Mar. 9	.....do.....	1.93	24.1	Aug. 21	.....do.....	2.43	82.4
Apr. 12	.....do.....	1.98	28.6	Sept. 14	Grieve and Hezmalhalch.....	2.34	70.0
28	.....do.....	2.28	67.6	Oct. 16	C. E. Turner.....	2.15	43.6
May 18	.....do.....	3.12	249	Dec. 15	.....do.....	1.77	10.2
26	Thos. Grieve.....	3.15	247				

Daily gage height, in feet, of St. Vrain Creek at Lyons, Colo., for 1911.

[Lloyd Hess, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.7	1.85	1.7	2.0	2.4	3.5	3.3	2.6	2.3	2.4	1.95	1.85
2.....		1.8	1.85	2.05	2.45	3.5	3.5	2.6	2.3	2.4	1.95	1.85
3.....		1.8	1.8	2.1	2.55	3.5	3.6	2.8	2.6	2.2	2.0	1.9
4.....		1.7	1.8	2.05	2.5	3.55	3.6	2.7	2.6	2.2	2.0	1.85
5.....	1.8		1.85	2.1	2.5	3.6	3.45	2.7	2.5	2.2	2.0	1.9
6.....	1.8		1.9	2.05	2.8	3.6	3.4	2.7	2.5	2.45	2.0	1.8
7.....	1.8		1.9	2.0	2.85	3.6	3.45	2.7	2.5	2.45	2.0	1.75
8.....	1.8		1.85	2.0	3.0	3.7	3.4	2.45	2.45	2.45	2.0	1.7
9.....	1.8		1.9	2.0	3.0	4.0	3.3	2.4	2.3	2.4	2.0	1.65
10.....	1.8	1.0	1.9	2.1	2.95	3.7	3.1	2.45	2.2	2.3	1.95	1.7
11.....	1.85	1.8	1.9	2.05	2.85	3.65	3.05	2.5	2.15	2.2	1.75	1.65
12.....	1.85	1.75	1.85	2.0	2.85	3.7	3.1	2.55	2.25	2.2	1.80	1.65
13.....	1.85	1.7	1.9	1.95	3.0	3.8	3.05	2.45	2.25	2.2	2.0	1.7
14.....	1.8	1.7	1.8	1.95	3.0	3.7	3.05	2.45	2.3	2.1	2.0	1.65
15.....	1.8	1.7	1.9	1.85	3.1	3.8	3.1	2.4	2.35	2.1	2.0	1.7
16.....	1.75	1.7	1.9	2.05	3.1	3.9	3.05	2.5	2.3	2.1	2.0	1.65
17.....	1.7	1.75	1.8	2.1	3.1	3.8	3.0	2.4	2.25	2.1	1.70	1.6
18.....	1.7	1.6	1.85	2.0	3.05	3.5	3.05	2.45	2.2	2.1	1.80	1.6
19.....	1.7	1.6	1.9	2.05	3.2	3.55	3.1	2.5	2.15	2.1	1.95	1.6
20.....	1.7	1.6	1.9	2.1	3.1	3.6	3.1	2.45	2.0	2.1	2.0	1.6
21.....	1.7	1.65	1.9	2.1	3.0	3.8	3.05	2.45	2.0	2.1	1.7	0.0
22.....	1.75	1.6	2.0	2.2	2.9	4.0	3.05	2.45	2.1	2.1	1.7	0.0
23.....	1.85	1.75	1.9	2.3	2.9	3.8	3.1	2.6	2.1	2.2	1.6	1.6
24.....	1.8	1.75	1.9	2.25	3.0	3.6	3.0	2.65	2.1	2.1	.0	1.6
25.....	1.75	1.8	1.9	2.3	3.05	3.5	2.9	2.6	2.1	2.05	1.7	1.6
26.....	1.75	1.8	1.85	2.15	3.2	3.45	2.85	2.5	2.05	2.0	1.75	1.6
27.....	1.7	1.8	1.85	2.1	3.2	3.4	2.9	2.4	2.1	2.0	1.8	1.6
28.....	1.75	1.7	2.0	2.25	3.15	3.4	2.85	2.4	2.1	1.95	1.8	0.0
29.....	1.8		1.9	2.5	3.15	3.4	2.8	2.35	2.25	2.0	1.75	1.6
30.....	1.9		2.0	2.55	3.25	3.35	2.8	2.35		2.0	1.85	1.6
31.....	1.9		2.0		3.50		2.7	2.4		2.0		0.0

Daily discharge, in second-feet, of St. Vrain Creek at Lyons, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	8	16	8	28	82	372	302	118	66	82	24	16
2.....	5	13	16	33	90	372	372	118	66	82	24	16
3.....	5	13	13	38	108	372	410	160	118	52	28	19
4.....	5	8	13	33	98	391	410	138	118	52	28	16
5.....	13	2	16	38	98	410	354	138	98	52	28	19
6.....	13	2	19	33	160	410	336	138	98	90	28	13
7.....	13	2	19	28	172	410	354	138	98	90	28	10
8.....	13	2	16	28	210	450	336	90	90	90	28	8
9.....	13	4	19	28	210	576	302	82	66	82	28	6
10.....	13	6	19	38	197	450	238	90	52	66	24	8
11.....	16	13	19	33	172	430	224	98	45	52	10	6
12.....	16	10	16	28	172	450	238	108	59	52	13	6
13.....	16	8	19	24	210	490	224	90	59	52	28	8
14.....	13	8	13	24	210	450	224	90	66	38	28	6
15.....	13	8	19	16	238	490	238	82	74	38	28	8
16.....	10	8	19	33	238	532	224	98	66	38	28	6
17.....	8	10	13	38	238	490	210	82	59	38	8	5
18.....	8	5	16	28	224	372	224	90	52	38	13	5
19.....	8	5	19	33	268	391	238	98	45	38	24	5
20.....	8	5	19	38	238	410	238	90	28	38	28	5
21.....	8	6	19	38	210	490	224	90	28	38	8	3
22.....	10	5	28	52	184	576	224	90	38	38	8	3
23.....	16	10	19	66	184	490	238	118	38	52	5	5
24.....	13	10	19	59	210	410	210	128	38	38	3	5
25.....	10	13	19	66	224	372	184	118	38	33	8	5
26.....	10	13	16	45	268	354	172	98	33	28	10	5
27.....	8	13	16	38	268	336	184	82	38	28	13	5
28.....	10	8	28	59	253	336	172	82	38	24	13	3
29.....	13	.....	19	98	253	336	160	74	59	28	10	5
30.....	19	.....	28	108	285	319	160	74	70	28	16	5
31.....	19	.....	28	.....	372	.....	138	82	.....	28	.....	3

NOTE.—Daily discharge interpolated for days for which gage heights are missing.

Monthly discharge of St. Vrain Creek at Lyons, Colo., for 1911.

[Drainage area, 209 square miles.]

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	19	5	11	700
February.....	16	2	8.1	448
March.....	28	8	18	1,130
April.....	108	16	42	2,480
May.....	372	82	205	12,600
June.....	576	319	425	25,300
July.....	410	138	250	15,400
August.....	160	74	102	6,290
September.....	118	33	61	3,650
October.....	90	24	49	3,020
November.....	28	3	19	1,130
December.....	19	3	7.7	472
The year.....	576	2	100	72,600

BOULDER CREEK AT ORODELL, COLO.

Location.—At Orodell station in sec. 27, T. 1 N., R. 71 W.; just below mouth of Fourmile Creek.

Records available.—March 18, 1907, to November 30, 1911. From May 14, 1895, to December 20, 1909, a station was maintained about 1 mile below the present site, chiefly by the State engineer. The records at the two points are not directly comparable, as some water is diverted for irrigation between. From 1902 to 1906 the records for the lower station were published only in the reports of the State engineer.

Drainage area.—108 square miles (State engineer's report).

Gage.—Automatic recording gage installed by the Central Colorado Power Co.

Channel.—Not known, as only the computed records are furnished.

Discharge measurements.—Made from car and cable.

Winter flow.—Ice causes backwater during the winter months and during that period discharge measurements are made to determine the flow.

Diversions.—There are no diversions from Boulder Creek above the station but there are court decrees for diversions of 165 second-feet from tributaries entering above. Below the station there are decrees for diversions of 2,871 second-feet from Boulder Creek.

Cooperation.—Station maintained by the State engineer in cooperation with the Central Colorado Power Co., by which the records are furnished.

Discharge measurements of Boulder Creek at Orodell, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 14 ^a	C. L. Chatfield.....	2.50	2.4	June 1	Thos. Grieve.....	3.05	220
Feb. 10 ^a	C. E. Turner.....	1.66	5.6	9	C. C. Hezmalhalch.....	3.42	444
Mar. 5	Chatfield and Turner.....	2.48	2.6	Aug. 1	do.....	2.48	83
10	C. E. Turner.....	2.66	6.0	22	do.....	2.20	54
Apr. 13	do.....	2.49	2.7	Sept. 15	Hezmalhalch and Grieve.....	1.90	26
26	do.....	1.93	32.0	Oct. 17	C. E. Turner.....	1.68	14.4
May 18	do.....	3.00	206	Dec. 16	do.....	1.92	12.2

^a Ice conditions.

^b Gage heights to temporary gage datum.

Daily gage heights, in feet, of Boulder Creek at Orodell, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		2.71	.....	1.40	2.37	3.08	2.82	2.28	2.15	.....	1.65
2.....		2.65	.....	1.45	2.46	3.15	2.95	2.45	2.10	.....	1.65
3.....		2.67	.....	1.50	2.42	3.25	3.15	2.40	2.10	.....	1.65
4.....		2.70	.....	1.60	2.28	3.05	3.20	2.36	2.05	.....	1.7
5.....		2.65	1.35	1.50	2.32	3.20	3.25	2.28	2.05	.....	1.7
6.....		2.60	1.35	1.80	2.45	3.20	3.20	2.18	2.05	.....	1.7
7.....		2.60	1.35	1.45	2.63	3.28	3.28	2.20	2.00	.....	1.7
8.....		2.55	1.35	1.45	2.83	3.32	3.20	2.15	2.00	.....	1.85
9.....		2.62	1.40	1.55	2.90	3.38	3.13	2.18	2.00	.....	1.65
10.....		2.50	1.50	1.60	2.86	.....	3.08	2.37	2.00	.....	1.8
11.....		2.50	1.50	1.55	2.65	3.37	3.05	2.30	2.00	.....	1.6
12.....		2.45	1.40	1.45	2.50	3.40	3.03	2.14	1.95	.....	1.6
13.....		2.48	1.35	1.40	.....	3.46	2.97	2.23	1.90	.....	2.05
14.....	2.50	2.48	1.35	1.45	.....	3.42	2.85	2.28	1.85	.....	1.75
15.....	2.52	2.50	1.40	.....	.....	3.38	2.87	2.28	1.85	.....	1.85
16.....	2.52	2.52	1.35	.....	.....	3.40	2.78	2.18	.....	.....	1.7
17.....	2.54	2.48	1.40	.....	.....	.....	2.73	2.22	.....	1.7	1.75
18.....	2.56	2.50	1.35	.....	.....	.....	2.69	2.20	.....	1.7	1.65
19.....	2.55	2.45	1.40	.....	.....	.....	2.76	2.15	.....	1.65	1.65
20.....	2.53	2.40	1.40	.....	3.02	.....	2.65	2.20	.....	1.7	1.55
21.....	2.50	2.60	1.45	.....	2.85	.....	2.64	2.20	.....	1.75	1.6
22.....	2.50	3.05	1.45	.....	2.78	.....	2.55	2.20	.....	.....	1.75
23.....	2.48	3.10	1.40	1.85	2.69	.....	2.55	2.35	.....	.....	1.7
24.....	2.50	3.20	1.40	1.76	2.62	.....	2.60	2.35	.....	.....	1.9
25.....	2.52	3.10	1.45	1.88	2.75	3.30	2.65	2.35	.....	.....	1.7
26.....	2.53	2.35	1.70	1.95	2.93	3.22	2.60	2.40	.....	.....	1.85
27.....	2.55	2.35	1.55	2.00	3.05	3.00	2.65	2.30	.....	.....	1.8
28.....	2.60	2.38	1.40	2.25	2.98	2.98	2.50	2.30	.....	1.65	1.95
29.....	2.75	.....	1.35	2.45	3.00	3.00	2.53	2.20	.....	1.85	2.0
30.....	2.80	.....	1.40	2.37	3.00	2.93	2.45	2.10	.....	1.6	1.75
31.....	2.74	.....	1.40	.....	3.12	.....	2.45	2.05	.....	1.65	.....

NOTE.—Gage heights Jan. 1 to Feb. 28 distorted by ice.

Daily discharge, in second-feet, of Boulder Creek at Orodell, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	5	7	2	4	78	228	165	66	50	.....	12
2.....	5	6	2	5.5	93	246	194	92	44	.....	12
3.....	5	6	3	7	86	274	246	83	44	.....	12
4.....	5	7	3	10	66	220	260	77	40	.....	15
5.....	5	6	3.5	7	71	260	274	66	40	.....	15
6.....	4	5	3.5	20	92	260	260	54	40	.....	15
7.....	4	5	3.5	5.5	124	325	282	56	35	.....	15
8.....	4	5	3.5	5.5	167	380	260	50	35	.....	24
9.....	4	5	4	8.5	183	433	241	54	35	.....	12
10.....	4	6	7	10	174	423	228	78	35	.....	20
11.....	3	6	7	8.5	128	414	220	68	35	.....	10
12.....	3	5	4	5.5	100	417	214	49	31	.....	10
13.....	3	5	3.5	4	115	428	199	60	27	.....	10
14.....	2.5	5	3.5	5.5	130	413	172	66	24	.....	48
15.....	2.5	6	4	8	145	390	176	66	24	.....	24
16.....	2.5	6	3.5	10	155	388	156	54	.....	.....	15
17.....	2.5	6	4	12	165	374	124	58	.....	15	18
18.....	2.5	6	3.5	15	180	360	137	56	.....	15	12
19.....	2.5	5	4	17	195	350	152	50	.....	12	12
20.....	2.5	5	4	19	211	340	128	56	.....	15	8
21.....	2.5	7	5.5	21	172	330	126	56	.....	18	10
22.....	2.5	9	5.5	22	156	320	109	56	.....	18	18
23.....	2.5	23	4	24	137	310	109	76	.....	19	15
24.....	2.5	18	4	18	122	300	118	76	.....	15	27
25.....	2.5	12	5.5	26	150	294	128	76	.....	15	15
26.....	2.5	2	15	31	190	265	118	83	.....	15	24
27.....	2.5	2	8.5	35	220	206	128	68	.....	12	20
28.....	5	2	4	62	201	201	100	68	.....	12	31
29.....	8	.....	3.5	92	206	206	105	56	.....	24	35
30.....	9	.....	4	78	206	190	92	44	.....	10	18
31.....	8	.....	4	.....	238	.....	92	40	.....	12	.....

NOTE.—Daily discharge estimated, because of ice, Jan. 1 to Feb. 28. Discharge interpolated for days for which gage heights are missing.

Monthly discharge of Boulder Creek at Orodell, Colo., for 1911.

[Drainage area, 108 square miles.]

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	9	2.5	3.5	236
February.....	23	2	6.7	373
March.....	15	2	4.4	270
April.....	92	4	20	1,180
May.....	238	66	150	9,240
June.....	433	190	318	18,900
July.....	282	92	171	10,500
August.....	92	40	63	3,880
September 1-15.....	50	24	36	1,070
October 17-31.....	24	10	15	448
November.....	40	8	17	1,060
The period.....	.....	.....	.....	47,200

SOUTH BOULDER CREEK NEAR ROLLINSVILLE, COLO.

Location.—At highway bridge in sec. 35, T. 1 S., R. 73 W., 1 mile west of Rollinsville, in the Pike National Forest. The nearest important tributary, Jennie Creek, enters 3 miles above.

Records available.—September 10, 1910, to December 31, 1911.

Drainage area.—39 square miles (measured from topographic sheets).

Gage.—Vertical staff.

Channel.—Fairly permanent.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—There are no court decrees for diversions above the station, and therefore it is probable that the records represent the natural run-off.

Accuracy.—Conditions are favorable for fairly accurate results and the estimates of discharge should be reliable.

Cooperation.—Station is maintained in cooperation with the United States Forest Service.

Discharge measurements of South Boulder Creek near Rollinsville, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 16 ^a	R. H. Fletcher	1.10	8.1
Apr. 6	do.	1.05	17.9
June 30	E. O. Christiansen	1.75	91.8
Sept. 17	H. B. Waha	1.10	17.4
Dec. 6 ^a	do.	.98	8.5

^a Ice conditions.

Daily gage height, in feet, and discharge, in second-feet, of South Boulder Creek near Rollinsville, Colo., for 1910.

[F. D. Whitney, observer.]

Day.	September.		October.		Day.	September.		October.	
	Gage height.	Discharge.	Gage height.	Discharge.		Gage height.	Discharge.	Gage height.	Discharge.
1			0.80	5	16		11		
2			.80	5	17		10		
3			.80	5	18	.90	9		
4			.85	7	19		9		
5			.90	9	20	.90	9		
6			.90	9	21	.95	12		
7					22	.90	9		
8					23	.90	9		
9					24		7		
10	0.90	9			25	.80	5		
11	.90	9			26		5		
12	.95	12			27		5		
13	.95	12			28		5		
14	.95	12			29		5		
15	.95	12			30		5		

Daily gage height, in feet, of South Boulder Creek near Rollinsville, Colo., for 1911.

[Ray R. Clarke, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.			0.91		1.17			1.40				
2.		0.89	.92	0.99					1.36	1.15		
3.		.86	.90	1.00		2.20		1.35				
4.		.87	.87		1.36	2.20	2.00	1.30		1.15		
5.		.90		1.00	1.38	2.20			1.25			
6.		.85	.85	1.05	1.55		2.30				1.30	0.98
7.		.86	.90			2.20	2.10	1.45	1.22	1.20		
8.		.89	.84	1.02	1.62		2.00	1.40	1.20		1.18	
9.		.85			1.78					1.20		
10.						2.25		1.35				
11.		1.00		.98						1.50		1.20
12.		.90			1.78	3.00	1.90	1.30				1.30
13.		.96		1.04	1.70	2.20	1.80		1.15			
14.		.94	.95		1.80	1.68	1.80					
15.			.94	.81	1.90		1.75	1.30	1.18			
16.		.90	.98	.90			1.75		1.35	1.50		1.40
17.		.89	.93		2.00	2.15	1.75	1.30	1.15		1.20	
18.			.98		2.00	2.15		1.30			1.10	
19.		.95		1.08	2.20			1.30	1.15			
20.		.92	.97			2.15	1.65	1.32		1.30	1.05	
21.		.89	1.00				1.65		1.10			
22.	0.82	.88	.90	1.10					1.10			
23.	.78		.92		1.90	1.95			1.10		1.00	
24.		.91	.92		1.80	1.90			1.10	1.30		
25.	.92	.90	.96	1.10			1.50	1.45		1.20	1.02	
26.	.94	.90		1.20		1.80		1.38				
27.	.95	.93	.92	1.40	2.00	1.80	1.45			1.20		
28.	.92	.91	.95	1.44							1.00	
29.			.96		2.20	1.80	1.50	1.38	1.12			
30.	.88		.92		2.00	1.75					1.00	
31.	.88				2.10		1.45					

NOTE.—Ice caused backwater approximately Jan. 1 to Apr. 15 and Nov. 17 to Dec. 31.

Daily discharge, in second-feet, of South Boulder Creek near Rollinsville, Colo., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.		24			46			
2.						42	22	
3.			168		40			
4.		42	168	131	35		22	
5.		44	168			30		
6.		64		187				35
7.			168	149	52	28	26	
8.		74		131	46	26		25
9.		97					26	
10.			178		40			
11.							58	
12.		97	335	115	35			
13.		85	168	100		22		
14.		100	82	100				
15.		115		92	35	25		
16.	8			92		40	58	
17.		131	158	92	35	22		
18.		131	158		35			
19.	18	168			35	22		
20.			158	78	37		35	
21.				78		19		
22.	19					19		
23.		115	123			19		
24.		100	115			19	35	
25.	19			58	52		26	
26.	26		100		44			
27.	46	131	100	52			26	
28.	51							
29.		168	100	58	44	20		
30.		131	92					
31.		149		52				

SOUTH BOULDER CREEK AT ELDORADO SPRINGS, COLO.¹

Location.—At the mouth of the canyon at Eldorado Springs, in sec. 30, T. 1 S., R. 70 W., 3 miles southwest of Marshall. No important tributaries within several miles.

Records available.—May 15, 1895, to September 30, 1901; July 1, 1904, to December 31, 1911.

Drainage area.—125 square miles (measured from topographic sheets).

Gage.—Vertical staff; datum unchanged.

Channel.—Not known, as only the computed estimates are received.

Discharge measurements.—Made by wading.

Winter flow.—Ice causes backwater during the winter months, and measurements are made to determine the flow.

Diversions.—There are court decrees for diversions of 137 second-feet above the station and 1,658 second-feet below. There are also a number of flood-water decrees.

Cooperation.—Since 1904 the station has been maintained by the State engineer by whom the records are furnished. The records for 1904 to 1908 were published only in the reports of the State engineer.

Discharge measurements of South Boulder Creek at Eldorado Springs, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 10	C. E. Turner.....	0.71	12.0	June 8	C. C. Hezmalhalch.....	2.25	230
Mar. 10	.....do.....	1.16	16.3	Aug. 2	.....do.....	1.30	34.0
Apr. 10	.....do.....	1.16	17.3	Sept. 23	.....do.....	1.80	80.0
Apr. 13	.....do.....	1.12	12.8	Sept. 15	.....do.....	1.15	17.2
May 19	.....do.....	2.20	207	Dec. 15	C. E. Turner.....	.92	7.3

Daily gage height, in feet, of South Boulder Creek at Eldorado Springs, Colo., for 1911.

[B. E. Cheseboro, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.9	1.1	0.9	1.20	1.6	2.3	1.8	1.45	1.25	1.2	1.2	1.1
2.....	.85	1.0	.95	1.2	1.55	2.45	2.0	1.4	1.2	1.2	1.0	1.1
3.....	.9	1.0	1.0	1.2	1.6	2.45	2.2	1.4	1.3	1.1	1.15	1.1
4.....	.9	1.0	1.0	1.2	1.65	2.3	2.25	1.4	1.3	1.15	1.15	1.05
5.....	.9	1.05	1.0	1.25	1.65	2.4	2.2	1.35	1.3	1.1	1.1	1.05
6.....	.9	.95	1.0	1.2	1.75	2.35	2.25	1.35	1.25	1.25	1.1	1.0
7.....	.9	.95	1.05	1.2	1.9	2.3	2.2	1.3	1.2	1.25	1.0	1.0
8.....	.95	1.0	1.1	1.2	1.95	2.35	2.1	1.25	1.2	1.2	1.15	1.0
9.....	.9	1.0	1.1	1.3	1.95	2.5	2.0	1.25	1.15	1.2	1.1	.9
10.....	1.0	1.0	1.1	1.2	2.05	2.4	1.9	1.3	1.15	1.2	1.1	.95
11.....	1.0	1.0	1.2	1.25	1.9	2.3	1.9	1.65	1.15	1.2	1.1	.95
12.....	1.0	1.0	1.1	1.25	1.9	2.3	1.85	1.6	1.15	1.2	1.0	.9
13.....	1.05	1.0	1.1	1.2	1.95	2.35	1.85	1.5	1.15	1.2	1.0	.9
14.....	1.0	1.0	1.1	1.2	2.0	2.3	1.95	1.35	1.15	1.2	1.05	.9
15.....	1.0	1.0	1.1	1.2	2.0	2.35	1.9	1.35	1.2	1.2	1.15	.9
16.....	1.0	1.0	1.2	1.2	2.1	2.35	1.9	1.35	1.15	1.1	1.15	.95
17.....	1.0	1.0	1.15	1.25	2.1	2.35	1.8	1.3	1.1	1.2	1.05	.95
18.....	1.0	1.0	1.2	1.2	2.15	2.15	1.8	1.3	1.1	1.2	1.05	.95
19.....	1.0	1.0	1.2	1.25	2.25	2.15	1.8	1.3	1.1	1.1	1.1	.95
20.....	1.0	.9	1.15	1.3	2.1	2.15	1.7	1.3	1.1	1.1	1.1	.95
21.....	1.0	.9	1.2	1.35	2.0	2.3	1.7	1.4	1.15	1.2	1.05	.95
22.....	1.0	.9	1.2	1.4	1.95	2.35	1.7	1.55	1.1	1.15	1.05	.95
23.....	1.0	.9	1.2	1.45	1.9	2.35	1.7	1.7	1.1	1.1	1.0	.95
24.....	1.0	.95	1.2	1.4	1.9	2.1	1.65	1.6	1.1	1.1	1.1	.95
25.....	1.05	1.0	1.2	1.4	2.0	2.1	1.6	1.5	1.1	1.1	1.1	.95
26.....	1.05	1.0	1.2	1.45	2.05	2.0	1.6	1.4	1.05	1.15	1.05	.95
27.....	1.05	1.0	1.2	1.5	2.1	1.95	1.55	1.4	1.05	1.1	1.0	.95
28.....	1.0	.9	1.2	1.6	2.15	1.95	1.5	1.35	1.05	1.1	.9	.95
29.....	1.1	.....	1.2	1.65	2.1	1.95	1.5	1.3	1.05	1.05	1.0	.95
30.....	1.1	.....	1.2	1.55	2.2	1.9	1.5	1.25	1.1	1.0	1.1	.95
31.....	1.1	.....	1.2	.....	2.3	.....	1.5	1.2	.....	1.05	.....	.....

NOTE.—Ice present Jan. 1 to Mar. 2.

¹ Called South Boulder Creek near Marshall in 1910 report.

Daily discharge, in second-feet, of South Boulder Creek at Eldorado Springs, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	4	2	6	20	58	246	104	48	21	20	20	14
2.....	4	2	8	20	52	316	153	43	18	20	9	14
3.....	4	2	9	20	58	316	212	44	25	14	17	14
4.....	4	2	9	20	66	246	231	44	25	17	17	12
5.....	4	2	9	24	66	292	212	38	25	14	14	12
6.....	4	2	9	20	84	269	231	38	21	24	14	9
7.....	4	2	12	20	117	246	212	33	18	24	9	9
8.....	4	2	14	20	130	269	181	29	19	20	17	9
9.....	4	1	14	27	130	340	153	28	15	20	14	6
10.....	4	1	14	20	159	293	127	32	16	20	14	8
11.....	4	1	20	24	117	250	127	75	17	20	14	8
12.....	4	1	14	24	117	250	116	66	17	20	9	6
13.....	4	1	14	20	130	272	116	50	17	20	9	6
14.....	4	1	14	20	144	250	140	33	17	20	12	6
15.....	4	1	14	20	144	272	127	33	20	20	17	6
16.....	3	2	20	20	174	272	127	32	17	14	17	8
17.....	3	2	17	24	174	231	104	27	14	20	12	8
18.....	3	2	20	20	191	196	104	27	14	20	12	8
19.....	3	2	20	24	227	196	104	25	14	14	14	8
20.....	3	4	17	27	174	196	85	24	14	14	14	8
21.....	3	4	20	31	144	250	85	31	17	20	12	8
22.....	3	4	20	35	130	272	85	45	14	17	12	8
23.....	3	4	20	40	117	231	85	68	14	14	9	8
24.....	3	7	20	35	117	181	76	50	14	14	14	8
25.....	3	9	20	35	144	181	68	39	14	14	14	8
26.....	2	9	20	40	159	153	68	30	12	17	12	8
27.....	2	9	20	45	174	140	61	30	12	14	9	8
28.....	2	6	20	58	191	140	54	27	12	14	6	8
29.....	2	.....	20	66	174	140	54	23	12	12	9	8
30.....	2	.....	20	52	208	127	54	20	14	9	14	8
31.....	2	.....	20	.....	246	.....	54	17	.....	12	.....	8

NOTE.—Discharge estimated Jan. 1 to Mar. 2.

Monthly discharge of South Boulder Creek at Eldorado Springs, Colo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	4	2	3.3	202
February.....	9	1	3.1	173
March.....	20	6	16	980
April.....	66	20	29	1,730
May.....	246	52	139	8,560
June.....	340	127	234	14,000
July.....	231	54	120	7,360
August.....	75	17	37	2,280
September.....	25	12	17	990
October.....	24	9	17	1,020
November.....	20	6	13	766
December.....	14	6	8.6	530
The year.....	340	1	53.2	38,600

BIG THOMPSON CREEK NEAR ARKINS, COLO.

Location.—At private bridge at the mouth of the canyon, in sec. 10, T. 5 N., R. 70 W., 2 miles southwest of Arkins; nearest perennial tributary, Buckhorn Creek, enters several miles below.

Records available.—April 1, 1888, to October 31, 1890; May 9, 1895, to September 2, 1903; July 16, 1904, to August 31, 1911. The records from 1904 to 1908 were published only in the reports of the State engineer.

Drainage area.—305 square miles.

Gage.—Vertical staff gage which remained unchanged from April 1, 1899, to July 16, 1904, when it was washed out. A second gage was installed at that time, which was referred to a different datum. In the spring of 1909 a third gage was installed, which was referred to a third datum.

Channel.—Practically permanent except during extreme flood stages.

Discharge measurements.—Made from bridge.

Winter flow.—Ice causes backwater during a portion of the winter months, and measurements are made to determine the discharge.

Diversions.—There is a court decree for a diversion of 198 second-feet from Big Thompson Creek above the station. Below, there are decrees for diversions of 2,624 second-feet from Big Thompson Creek, and flood-water diversions of 24,800 acre-feet.

Cooperation.—From 1888 to 1890 and subsequent to 1903 this station has been maintained by the State engineer, by whom the records are furnished.

Discharge measurements of Big Thompson Creek near Arkins, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 8 ^a	C. E. Turner	0.96	6.5	June 19	C. E. Turner	2.68	519
Mar. 8	.....do.....	1.12	29.6	July 30	C. C. Hezmalhalch	1.80	157
Apr. 12	.....do.....	1.13	35.5	Aug. 20	.....do.....	1.55	103
27	.....do.....	1.30	65.3	Oct. 15	C. E. Turner	1.23	59.6
May 17	.....do.....	2.19	319	Dec. 14 ^a	.....do.....	1.05	16.2

^a Ice condition.

Daily gage height, in feet, and discharge, in second-feet, of Big Thompson Creek near Arkins, Colo., for 1911.

[J. F. Wagener, observer.]

Day.	May.		June.		July.		August.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1.....			2.65	500	2.3	362	1.7	134
2.....			2.8	560	2.55	460	1.65	124
3.....			2.65	500	2.75	540	1.6	114
4.....			2.75	540	2.75	540	1.6	114
5.....			2.75	520	2.75	540	1.6	114
6.....			2.7	520	2.6	477	1.55	105
7.....			2.8	560	2.55	455	1.6	114
8.....			2.85	581	2.5	435	1.55	105
9.....			3.0	644	2.55	453	1.5	96
10.....			2.8	560	2.3	355	1.55	105
11.....	2.0	255	2.75	540	2.2	315	1.7	134
12.....	1.9	222	2.8	560	2.1	280	1.65	124
13.....	2.0	255	2.95	623	2.1	280	1.5	96
14.....	2.05	272	2.85	581	2.2	313	1.5	96
15.....	2.2	325	2.95	623	2.15	293	1.5	96
16.....	2.35	381	2.95	623	2.2	310	1.55	105
17.....	2.3	362	3.05	665	2.15	290	1.6	114
18.....	2.3	362	2.75	540	2.10	270	1.55	105
19.....	2.35	381	2.8	560	2.3	340	1.45	88
20.....	2.1	290	2.85	581	2.2	305	1.5	96
21.....	1.95	238	2.95	623	2.1	267	1.6	114
22.....	1.85	207	3.0	644	2.2	300	1.65	124
23.....	1.9	222	2.8	560	2.3	338	1.95	196
24.....	2.0	255	2.75	540	2.15	280	1.85	170
25.....	2.1	290	2.65	500	2.05	245	1.7	134
26.....	2.3	362	2.45	420	1.95	210	1.6	114
27.....	2.25	344	2.4	400	1.95	210	1.5	96
28.....	2.2	325	2.45	420	1.9	193	1.45	88
29.....	2.2	325	2.5	440	1.8	160	1.4	80
30.....	2.35	381	2.35	381	1.75	145	1.4	80
31.....	2.55	460	.....	.....	1.75	145	1.35	74

Monthly discharge of Big Thompson Creek near Arkins, Colo., for 1911.

[Drainage area, 305 square miles.]

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
May 11-31.....	460	207	310	12,900
June.....	644	381	544	32,400
July.....	540	145	326	20,000
August.....	196	74	111	6,840

CACHE LA POUDRE RIVER NEAR ELKHORN, COLO.

Location.—At the lower bridge at Fry's ranch in the southern part of T. 9 N., R. 73 W., 7 miles southwest of Elkhorn post office.

Records available.—January 6, 1909, to December 31, 1911.

Drainage area.—250 square miles (measured from King's Atlas).

Gage.—Chain gage; datum unchanged.

Channel.—Fairly permanent.

Discharge measurements.—Made from bridge.

Winter flow.—Ice causes backwater during the winter months and frequent measurements are made to determine the discharge.

Diversions.—There are no diversions from the Cache la Poudre above the station, but the flow is increased by a diversion from Laramie River by the Skyline ditch which has a court decree for 400 second-feet.

Artificial control.—The flow is controlled to a certain extent by the reservoir at Chambers Lake, which is operated in the interest of irrigation diversions below.

Accuracy.—As the estimates of discharge are based on very frequent discharge measurements they should be excellent.

Cooperation.—Station maintained in cooperation with private persons through Mr. George B. McFadden, of Denver.

Discharge measurements of Cache la Poudre River near Elkhorn, Colo., in 1911.

[N. W. Fry and H. Mertens, hydrographers.]

Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 5.....	3.48	26	Feb. 1.....	2.44	30	Mar. 6.....	2.38	29
7.....	3.34	28	2.....	2.07	10	7.....	2.28	20
8.....	3.17	25	3.....	2.03	10	7.....	2.54	34
9.....	2.78	17	4.....	2.02	18	8.....	2.29	25
10.....	2.64	21	6.....	2.25	18	9.....	2.30	24
11.....	2.62	18	7.....	2.11	11	10.....	2.38	32
12.....	2.56	24	8.....	2.13	13	11.....	2.26	28
13.....	2.56	26	9.....	2.14	14	12.....	2.39	31
14.....	2.59	30	10.....	2.24	17	13.....	2.73	60
15.....	2.60	32	11.....	2.28	19	14.....	2.60	41
16.....	2.70	34	12.....	2.32	23	15.....	2.50	39
17.....	2.59	35	13.....	2.38	25	16.....	2.41	33
18.....	2.57	33	14.....	2.24	21	18.....	2.36	31
19.....	2.45	31	15.....	2.16	15	19.....	2.38	33
20.....	2.40	24	16.....	2.33	24	20.....	2.36	35
24.....	2.49	30	17.....	2.23	23	21.....	2.31	29
25.....	2.53	37	24.....	3.12	39	22.....	2.34	29
26.....	2.53	40	25.....	2.33	24	24.....	2.31	29
27.....	2.49	33	Mar. 1.....	2.51	25	26.....	3.30	34
28.....	2.57	43	2.....	2.24	22	27.....	2.67	56
29.....	2.53	40	3.....	2.52	24	28.....	2.23	28
30.....	2.70	43	4.....	2.28	20	29.....	2.56	45
31.....	2.69	43	5.....	2.31	25	30.....	2.09	15

Discharge measurements of Cache la Poudre River near Elkhorn, Colo., in 1911—Contd.

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.		Feet.	Sec.-ft.
Mar. 31.....	2.20	21	June 22.....	6.14	1,560	Sept. 10.....	2.86	79
Apr. 1.....	2.29	27	23.....	5.92	1,170	11.....	2.83	74
2.....	2.37	33	24.....	5.82	1,110	12.....	2.86	80
3.....	2.46	39	25.....	5.50	996	13.....	2.86	84
4.....	2.49	39	27.....	5.34	849	14.....	2.90	84
5.....	2.40	35	28.....	5.30	801	15.....	2.90	88
6.....	2.37	33	29.....	5.28	802	15.....	2.90	82
7.....	2.29	24	30.....	5.00	633	16.....	2.87	80
8.....	2.19	19	July 1.....	4.91	567	17.....	2.80	68
9.....	2.50	39	2.....	5.72	1,040	18.....	2.73	59
10.....	2.48	41	3.....	5.78	1,030	19.....	2.68	58
11.....	2.36	30	4.....	5.27	800	20.....	2.68	58
12.....	2.41	35	5.....	5.22	797	21.....	2.66	62
15.....	2.44	32	6.....	5.22	802	22.....	2.63	54
16.....	2.12	16	7.....	5.06	679	23.....	2.70	62
17.....	2.39	32	8.....	4.98	623	24.....	2.90	84
18.....	2.39	33	9.....	4.98	588	25.....	2.92	85
19.....	2.38	33	10.....	4.78	477	26.....	2.76	67
20.....	2.49	41	11.....	4.50	444	27.....	2.50	43
21.....	2.50	43	12.....	4.38	424	28.....	2.92	86
22.....	2.59	49	13.....	4.40	385	29.....	3.23	137
23.....	2.71	63	14.....	4.70	480	30.....	3.27	87
24.....	2.74	67	15.....	4.78	495	Oct. 1.....	3.27	156
25.....	2.71	66	16.....	4.96	578	2.....	3.20	125
26.....	2.68	63	17.....	4.62	416	3.....	3.10	121
27.....	2.92	91	18.....	4.40	378	4.....	3.08	108
28.....	3.04	103	19.....	4.54	400	5.....	3.14	122
30.....	3.01	106	20.....	4.42	384	6.....	3.53	192
May 1.....	2.92	91	21.....	4.37	362	7.....	3.36	169
2.....	2.87	89	22.....	4.36	389	8.....	3.28	151
3.....	2.86	83	23.....	4.38	350	9.....	3.12	114
4.....	2.92	99	24.....	4.20	268	10.....	2.76	70
5.....	3.17	134	25.....	4.12	252	11.....	3.08	111
6.....	3.56	197	26.....	4.02	232	12.....	3.00	99
7.....	3.70	307	27.....	4.00	239	13.....	2.92	89
8.....	4.26	386	28.....	3.94	221	14.....	2.98	96
9.....	4.41	469	30.....	3.78	176	15.....	2.76	69
10.....	4.84	582	31.....	3.68	164	16.....	2.96	91
11.....	4.33	423	Aug. 1.....	3.66	154	19.....	3.00	98
12.....	4.30	421	2.....	3.60	162	21.....	2.38	40
13.....	4.44	532	3.....	3.56	160	22.....	2.68	55
14.....	4.90	628	4.....	3.50	135	23.....	3.02	97
15.....	5.13	723	5.....	3.48	135	24.....	2.96	89
16.....	5.33	844	6.....	3.60	170	25.....	2.96	87
17.....	5.43	858	7.....	3.60	166	28.....	2.32	39
18.....	5.61	1,040	8.....	3.36	134	29.....	2.60	45
19.....	5.48	1,130	9.....	3.30	118	30.....	2.82	72
20.....	5.00	639	10.....	3.32	127	31.....	2.76	71
21.....	4.57	514	11.....	3.62	168	Nov. 2.....	2.56	48
22.....	4.52	468	12.....	3.60	165	3.....	2.72	63
23.....	4.54	488	13.....	3.36	123	4.....	2.90	75
24.....	4.98	500	14.....	3.23	112	5.....	2.67	60
25.....	5.23	811	15.....	3.21	104	7.....	2.57	46
26.....	5.52	961	16.....	3.19	96	8.....	2.76	70
27.....	5.20	756	17.....	3.20	100	10.....	3.07	69
28.....	5.28	787	18.....	3.18	106	15.....	3.07	55
29.....	5.50	958	19.....	3.18	102	16.....	2.84	52
30.....	5.62	1,030	20.....	3.16	98	18.....	2.70	41
June 31.....	5.90	1,230	21.....	3.40	128	19.....	2.54	36
1.....	6.10	1,380	22.....	3.40	129	20.....	2.50	35
2.....	6.20	1,600	23.....	4.00	251	21.....	2.51	36
3.....	6.16	1,540	24.....	3.56	163	22.....	2.87	36
4.....	5.98	1,380	25.....	3.36	123	24.....	2.84	31
5.....	6.10	1,420	26.....	3.26	108	25.....	2.84	37
6.....	6.14	1,490	27.....	3.12	99	Dec. 1.....	2.97	27
7.....	6.16	1,480	28.....	3.07	97	2.....	2.59	27
8.....	6.26	1,930	29.....	3.10	102	3.....	2.49	26
9.....	6.46	2,080	30.....	3.00	87	4.....	2.43	21
10.....	6.20	1,740	31.....	2.94	73	5.....	2.47	23
11.....	6.14	1,660	Sept. 1.....	2.94	70	6.....	2.37	19
12.....	6.20	1,820	2.....	3.02	82	7.....	2.43	22
13.....	6.24	1,770	3.....	3.00	75	8.....	2.38	21
14.....	6.20	1,670	4.....	3.10	94	9.....	2.38	21
15.....	6.10	1,590	5.....	3.08	88	12.....	2.53	28
17.....	6.30	1,970	6.....	3.00	104	15.....	2.73	24
18.....	6.15	1,540	7.....	3.04	106	17.....	2.78	28
19.....	6.08	1,380	8.....	2.98	92	22.....	2.86	25
20.....	6.10	1,440	9.....	2.90	87	23.....	2.89	28
21.....	6.08	1,510						

Daily gage height, in feet, of Cache la Poudre River near Elkhorn, Colo., for 1911.

[N. W. Fry, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	3.22	2.44	2.51	2.29	2.92	6.10	4.91	3.66	2.94	3.27	2.80	2.97
2.....	2.41	2.07	2.44	2.37	2.87	6.20	5.72	3.60	3.02	3.20	2.56	2.59
3.....	2.48	2.03	2.52	2.46	2.86	6.16	5.78	3.56	3.00	3.10	2.72	2.49
4.....	2.70	2.48	2.28	2.49	2.92	5.98	5.27	3.50	3.10	3.08	2.90	2.43
5.....	3.48	2.34	2.31	2.40	3.17	6.10	5.22	3.48	3.08	3.14	2.67	2.47
6.....	3.60	2.44	2.38	2.37	3.56	6.14	5.22	3.60	3.00	3.53	2.80	2.37
7.....	3.34	2.11	2.54	2.29	3.70	6.16	5.06	3.60	3.04	3.36	2.57	2.43
8.....	3.17	2.13	2.29	2.19	4.26	6.26	4.98	3.36	2.98	3.28	2.76	2.38
9.....	2.78	2.14	2.30	2.50	4.41	6.46	4.98	3.30	2.90	3.12	2.60	2.38
10.....	2.64	2.24	2.38	2.48	4.84	6.20	4.78	3.32	2.86	2.76	2.78	2.60
11.....	2.62	2.28	2.26	2.36	4.33	6.14	4.50	3.62	2.83	3.08	2.50	2.53
12.....	2.56	2.32	2.39	2.41	4.30	6.20	4.38	3.60	2.86	3.00	1.98	2.53
13.....	2.56	2.38	2.73	2.18	4.44	6.24	4.40	3.36	2.88	2.92	3.00	2.87
14.....	2.59	2.24	2.60	2.34	4.90	6.20	4.70	3.23	2.90	2.98	3.13	2.83
15.....	2.60	2.16	2.50	2.44	5.13	6.10	4.78	3.21	2.90	3.03	3.07	2.73
16.....	2.70	2.33	2.41	2.12	5.33	6.30	4.96	3.19	2.87	2.76	2.98	2.78
17.....	2.59	2.23	2.35	2.39	5.43	6.35	4.62	3.20	2.80	2.96	3.23	2.78
18.....	2.57	2.45	2.36	2.39	5.61	6.15	4.40	3.19	2.73	3.00	2.84	2.87
19.....	2.45	2.54	2.38	2.38	5.48	6.08	4.64	3.18	2.68	3.00	2.70	2.92
20.....	2.40	2.52	2.36	2.49	5.00	6.10	4.42	3.16	2.68	2.98	2.54	2.90
21.....	2.47	2.34	2.31	2.50	4.57	6.08	4.37	3.40	2.66	2.38	2.50	2.87
22.....	2.36	2.36	2.34	2.59	4.52	6.14	4.36	3.40	2.63	2.68	2.54	2.86
23.....	2.57	2.64	2.24	2.71	4.54	5.92	4.38	4.00	2.70	3.02	2.38	2.89
24.....	2.49	3.12	2.31	2.74	4.98	5.82	4.20	3.56	2.90	2.96	2.87	2.90
25.....	2.53	2.33	2.13	2.71	5.23	5.50	4.12	3.36	2.92	2.96	2.84	2.94
26.....	2.53	2.42	3.30	2.68	5.52	5.40	4.02	3.26	2.76	2.90	2.64	3.00
27.....	2.49	2.36	2.67	2.92	5.20	5.34	4.00	3.12	2.50	2.84	3.02	3.14
28.....	2.57	2.35	2.73	3.04	5.28	5.30	3.94	3.07	2.92	2.32	2.70	3.26
29.....	2.53	.....	2.56	3.20	5.50	5.28	3.80	3.10	3.23	2.60	2.85	3.36
30.....	2.70	.....	2.09	3.01	5.62	5.00	3.78	3.00	2.92	2.82	2.92	3.80
31.....	2.69	.....	2.20	.....	5.90	.....	3.68	2.94	.....	2.76	.....	3.72

NOTE.—Ice caused backwater Jan. 1 to Apr. 1 and Nov. 24 to Dec. 31.

Daily discharge, in second-feet, of Cache la Poudre River near Elkhorn, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	26	30	25	27	77	1,490	565	176	79	119	65	37
2.....	26	10	22	31	72	1,590	1,140	166	87	110	45	27
3.....	26	10	24	37	71	1,550	1,190	160	85	97	58	26
4.....	26	18	20	39	77	1,370	779	151	97	95	75	21
5.....	26	18	25	33	106	1,490	744	148	95	102	54	23
6.....	27	18	29	31	160	1,530	744	166	85	156	65	19
7.....	28	11	27	26	182	1,550	646	166	90	131	46	22
8.....	25	13	25	20	308	1,660	600	131	83	120	61	21
9.....	17	14	24	40	353	1,880	600	123	75	100	48	21
10.....	21	17	32	39	530	1,590	500	126	71	61	63	23
11.....	18	19	28	31	329	1,530	380	169	68	95	40	25
12.....	24	23	31	34	320	1,590	344	166	71	85	11	28
13.....	26	25	60	20	362	1,630	350	131	73	77	85	27
14.....	30	21	41	29	560	1,590	460	114	75	83	101	25
15.....	32	15	39	36	688	1,490	500	111	75	89	93	24
16.....	34	24	33	17	821	1,700	590	109	72	61	83	26
17.....	35	23	32	32	894	1,760	428	110	65	81	114	28
18.....	33	25	31	32	1,040	1,540	350	109	59	85	69	27
19.....	31	27	33	32	934	1,470	396	107	54	85	56	27
20.....	24	29	35	39	610	1,490	356	105	54	83	43	26
21.....	26	31	29	40	408	1,470	341	137	53	32	40	26
22.....	27	33	29	47	388	1,530	338	137	50	54	43	25
23.....	28	36	29	57	396	1,320	344	240	56	87	32	28
24.....	30	39	29	60	600	1,230	290	160	75	81	32	27
25.....	37	24	32	57	751	950	270	131	77	81	33	26
26.....	40	24	34	54	966	870	245	118	61	75	33	25
27.....	33	24	56	77	730	828	240	100	40	69	34	25
28.....	43	25	28	90	786	800	228	93	77	28	35	25
29.....	40	.....	45	110	950	786	200	97	114	48	36	25
30.....	43	.....	15	86	1,050	610	196	85	77	67	37	25
31.....	43	.....	21	.....	1,300	.....	179	79	.....	61	.....	25

NOTE.—Daily discharge determined from a rating curve that is very well defined. Discharge estimated or interpolated Jan. 1 to 4, 6, 21, 23, Feb. 5, 18 to 23, 26 to 28, Mar. 17, 23, 25, and Nov. 24 to 30, Dec. 10, 11, 13, 14, 16, 18 to 21 and 24 to 31. Discharge obtained from discharge measurements for other days between Jan. 1 and Apr. 1 and Nov. 24 and Dec. 31.

Monthly discharge of Cache la Poudre River near Elkhorn, Colo., for 1911.

[Drainage area, 250 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accu- racy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....	43	17	29.8	0.119	0.14	1,830	B.
February.....	39	10	22.3	.089	.09	1,240	B.
March.....	60	15	31.1	.124	.14	1,910	B.
April.....	110	17	43.4	.174	.19	2,580	A.
May.....	1,300	71	543	2.17	2.50	33,400	A.
June.....	1,880	610	1,400	5.60	6.25	83,300	A.
July.....	1,190	179	469	1.88	2.17	28,800	A.
August.....	240	79	133	.532	.61	8,180	A.
September.....	114	40	73.1	.292	.33	4,350	A.
October.....	156	28	83.8	.335	.39	5,150	A.
November.....	114	11	54.3	.217	.24	3,230	A.
December.....	37	19	25.3	.101	.12	1,560	B.
The year.....	1,880	10	242	.969	13.17	176,000	

CACHE LA POUDRE RIVER NEAR FORT COLLINS, COLO.

Location.—In sec. 33, T. 9 N., R. 70 W., 1,000 feet below the intake for the Fort Collins waterworks, 15 miles above Fort Collins, 500 yards above junction with North Fork.

Records available.—January 8, 1909, to December 31, 1911.

Drainage area.—495 square miles (measured from King's Atlas).

Gage.—Vertical staff; datum unchanged.

Channel.—Fairly permanent.

Discharge measurements.—Made from car and cable.

Winter flow.—Ice causes backwater during the winter months, and frequent measurements are made to determine the discharge.

Diversions.—There are no diversions between this station and the one above, near Elkhorn, except the intake for the Fort Collins waterworks.

Accuracy.—As the estimates of discharge are based on very frequent discharge measurements they should be excellent.

Cooperation.—Station maintained in cooperation with private persons through Mr. George B. McFadden, of Denver.

Discharge measurements of Cache la Poudre River near Fort Collins, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 1	F. H. Stearley.....	2.35	48	Mar. 5	Fletcher and Stearley..	2.00	45
5	do.....	2.5	60	5	do.....	2.00	43
10	do.....	2.5	61	8	F. H. Stearley.....	2.00	53
15	do.....	2.5	63	11	do.....	2.00	53
17	do.....	2.35	48	14	do.....	1.90	62
20	do.....	2.3	54	16	do.....	2.00	63
23	do.....	2.15	25	20	do.....	2.00	62
26	do.....	2.3	53	24	do.....	2.00	62
Feb. 1	do.....	2.2	50	27	do.....	1.75	28
4	do.....	1.75	29	30	do.....	1.75	29
7	do.....	1.85	40	Apr. 2	do.....	1.90	51
10	do.....	2.00	57	9	do.....	1.90	48
17	do.....	1.90	46	11	Miles and Turner.....	2.00	51
21	do.....	2.00	42	12	F. H. Stearley.....	2.00	62
24	do.....	2.00	42	15	do.....	2.00	58
28	do.....	2.15	45	18	do.....	1.95	58
Mar. 2	do.....	2.20	47	20	do.....	1.95	55
4	do.....	2.25	48	24	do.....	2.2	104

Discharge measurements of Cache la Poudre River near Fort Collins, Colo., in 1911—
Continued.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 1	F. H. Stearley	2.60	170	Sept. 15	F. H. Stearley	2.30	103
4	do	2.90	271	18	do	2.25	92.9
6	do	3.10	317	21	do	2.20	86.4
9	do	4.00	676	25	do	2.25	117
14	do	4.30	869	29	do	2.30	101
20	do	4.40	924	Oct. 1	do	2.50	160
22	do	4.00	691	6	do	2.75	209
24	do	4.30	868	9	do	2.50	163
June 2	do	5.90	2,110	13	do	2.60	179
7	do	5.80	2,030	16	do	2.40	146
15	do	5.80	2,070	19	do	2.35	93.3
21	do	5.80	2,030	23	do	2.70	193
27	do	4.90	1,240	28	do	2.20	83.7
29	do	4.70	1,140	Nov. 1	do	2.20	98.9
July 5	do	4.70	1,140	4	do	2.10	86.2
11	do	4.00	705	8	do	2.15	80.2
15	do	4.00	709	10	do	2.25	98.5
19	do	3.80	656	12	do	1.80	37.3
23	do	3.90	674	16	do	2.15	82.4
Aug. 1	do	3.10	324	18	do	2.20	96.4
4	do	2.95	243	22	do	1.75	31.7
8	do	2.92	285	28	do	1.80	32.2
12	do	3.05	292	Dec. 2	do	2.30	53.3
16	do	2.75	215	6	do	2.30	51.2
22	do	3.00	247	10	do	2.30	47.3
30	do	2.55	148	14	do	2.10	44.1
Sept. 4	do	2.50	141	19	do	2.15	47.3
8	do	2.50	146	23	do	2.20	49.6
12	do	2.30	103	29	do	2.20	49.1

NOTE.—Ice present Jan. 1 to Mar. 4 and Dec. 2 to 29.

Daily gage height, in feet, of Cache la Poudre River near Fort Collins, Colo., for 1911.

[F. H. Stearley, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.	2.35	2.10	2.20	1.90	2.65	5.50	4.35	3.05	2.42	2.60	2.18	2.30
2.	2.40	1.98	2.25	1.90	2.75	5.80	4.90	3.05	2.45	2.65	2.18	2.35
3.	2.50	1.85	2.28	1.92	2.85	5.55	5.05	2.95	2.45	2.70	2.08	2.32
4.	2.50	1.78	2.28	2.00	2.95	5.55	4.75	2.93	2.42	2.72	2.08	2.40
5.	2.50	1.82	2.00	2.00	3.05	5.85	4.65	3.05	2.45	2.78	2.08	2.35
6.	2.50	1.85	2.00	2.00	3.20	5.87	4.55	2.95	2.45	2.72	2.05	2.30
7.	2.55	1.88	2.00	1.95	3.60	5.87	4.55	2.92	2.45	2.62	2.08	2.30
8.	2.50	1.95	2.00	1.90	3.85	5.75	4.45	2.85	2.45	2.60	2.12	2.28
9.	2.50	2.05	2.00	1.90	4.20	5.90	4.35	2.80	2.35	2.45	2.12	2.22
10.	2.50	2.05	2.00	2.00	4.35	5.75	4.25	3.10	2.35	2.45	2.23	2.30
11.	2.50	2.05	2.00	2.00	3.75	5.55	4.02	3.05	2.25	2.72	1.95	2.25
12.	2.50	1.92	1.95	2.00	4.05	5.45	4.05	2.98	2.25	2.65	1.72	2.20
13.	2.50	1.90	1.88	2.00	4.20	5.40	3.95	2.90	2.25	2.55	1.85	2.15
14.	2.50	1.92	1.95	2.05	4.45	5.50	3.92	2.78	2.25	2.45	2.00	2.15
15.	2.48	1.90	2.00	2.00	4.80	5.70	4.10	2.75	2.25	2.45	2.10	2.15
16.	2.40	1.90	2.00	2.00	5.10	5.70	4.20	2.72	2.25	2.35	2.15	2.10
17.	2.35	1.90	2.00	1.95	5.15	5.35	3.90	2.75	2.22	2.35	2.18	2.12
18.	2.35	1.90	2.00	1.92	5.00	5.45	3.85	2.72	2.20	2.32	2.15	2.15
19.	2.30	1.95	2.00	1.92	4.85	5.35	3.75	2.75	2.18	2.32	2.05	2.15
20.	2.30	1.98	2.00	1.98	4.35	5.35	3.72	2.78	2.15	2.38	1.95	2.18
21.	2.28	2.00	2.02	2.05	4.25	5.65	3.75	2.92	2.18	2.25	1.95	2.12
22.	2.22	2.00	2.05	2.12	4.00	5.40	3.75	2.92	2.28	2.15	1.85	2.2
23.	2.18	2.00	2.00	2.18	4.15	5.20	3.85	3.02	2.45	2.70	1.85	2.18
24.	2.20	2.00	2.00	2.20	4.45	5.10	3.60	2.95	2.28	2.50	1.85	2.15
25.	2.22	2.00	2.00	2.28	4.75	4.90	3.50	2.95	2.20	2.35	2.00	2.15
26.	2.30	2.05	1.85	2.30	4.85	4.90	3.50	2.72	2.22	2.25	1.95	2.15
27.	2.30	2.10	1.80	2.45	4.90	4.80	3.42	2.65	2.18	2.18	2.00	2.12
28.	2.22	2.12	1.82	2.58	5.00	4.70	3.40	2.55	2.25	2.15	1.88	2.15
29.	2.20	.....	1.82	2.75	5.10	4.68	3.35	2.55	2.25	2.18	1.80	2.18
30.	2.12	.....	1.78	2.75	5.10	4.5	3.25	2.48	2.25	2.18	1.90	2.20
31.	2.15	.....	1.90	.....	5.35	.....	3.25	2.45	.....	2.15	.....	2.20

Daily discharge, in second-feet, of Cache la Poudre River near Fort Collins, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	48	50	47	49	178	1,760	900	292	129	165	88	51
2.....	51	43	47	49	202	2,030	1,270	292	135	178	88	53
3.....	54	36	48	52	230	1,800	1,390	260	135	190	73	53
4.....	57	29	48	62	260	1,800	1,160	254	129	195	73	52
5.....	60	32	62	62	292	2,080	1,080	292	135	210	73	51
6.....	60	36	62	62	345	2,090	1,020	260	135	195	69	51
7.....	60	40	62	56	500	2,090	1,020	251	135	170	73	50
8.....	61	46	62	49	625	1,980	960	230	135	165	79	49
9.....	61	52	62	49	810	2,120	900	215	116	135	79	48
10.....	61	57	62	62	900	1,980	840	310	116	135	96	47
11.....	61	56	62	62	575	1,800	710	292	99	195	56	46
12.....	62	54	56	62	725	1,720	725	269	99	178	30	45
13.....	62	52	47	62	810	1,670	675	245	99	155	44	44
14.....	63	51	56	69	960	1,760	660	210	99	135	62	44
15.....	63	49	62	62	1,190	1,940	750	202	99	135	76	45
16.....	56	47	62	62	1,430	1,940	810	195	99	116	84	46
17.....	48	46	62	56	1,470	1,630	650	202	94	116	88	46
18.....	50	45	62	52	1,350	1,720	625	195	91	111	84	47
19.....	52	44	62	52	1,230	1,630	575	202	88	111	69	47
20.....	54	43	62	59	900	1,630	560	210	84	121	56	48
21.....	45	42	65	69	840	1,900	575	251	88	99	56	48
22.....	35	42	69	79	700	1,670	575	251	104	84	44	49
23.....	25	42	62	88	780	1,510	625	282	135	190	44	50
24.....	34	42	62	91	960	1,430	500	260	104	145	44	50
25.....	44	42	62	104	1,160	1,270	460	260	91	116	62	50
26.....	53	43	44	107	1,230	1,270	460	195	94	99	56	50
27.....	53	44	38	135	1,270	1,190	428	178	88	88	62	49
28.....	52	45	40	161	1,350	1,120	420	155	99	84	47	49
29.....	52	40	202	1,430	1,110	400	155	99	88	38	49	49
30.....	51	36	202	1,430	990	362	141	99	88	49	49	49
31.....	50	49	-----	1,630	-----	362	135	-----	84	-----	49	49

NOTE.—Daily discharge determined from a rating curve that is very well defined. Discharge estimated or interpolated Jan. 2 to 4, 6 to 9, 11 to 14, 16, 18, 19, 21, 22, 24, 25, 27 to 31; Feb. 2, 3, 5, 6, 8, 9, 11 to 16, 18 to 20, 22, 23, 25 to 27; Mar. 2, 3; Dec. 1, 3 to 5, 7 to 9, 11 to 13, 15 to 18, 20 to 22, 24 to 28, 30, 31. Discharges obtained from discharge measurements for other days between Jan. 1 and Mar. 4 and Dec. 1 and 31.

Monthly discharge of Cache la Poudre River near Fort Collins, Colo., for 1911.

[Drainage area, 495 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....	63	25	52.8	0.107	0.12	3,250	C.
February.....	57	29	44.6	.090	.09	2,480	C.
March.....	69	36	55.5	.112	.13	3,410	A.
April.....	202	49	79.6	.161	.18	4,740	A.
May.....	1,630	178	896	1.81	2.09	55,100	B.
June.....	2,120	990	1,690	3.41	3.80	101,000	B.
July.....	1,390	362	724	1.46	1.68	44,500	B.
August.....	310	135	230	.465	.54	14,100	A.
September.....	135	84	108	.218	.24	6,430	A.
October.....	210	84	138	.279	.32	8,480	A.
November.....	96	30	64.7	.131	.15	3,850	A.
December.....	53	44	48.5	.098	.11	2,980	C.
The year.....	2,120	25	345	.695	9.45	250,000	

CACHE LA POUDRE RIVER AT MOUTH OF CANYON, NEAR FORT COLLINS, COLO.

Location.—In sec. 15, T. 8 N., R. 70 W., 3 miles below the intake of the Fort Collins waterworks, 12 miles above Fort Collins; half a mile above mouth of Lewstone Creek.

Records available.—March 15, 1884, to October 15, 1901; February 3, 1910, to December 31, 1911.

Drainage area.—1,060 square miles.

Gage.—An automatic recording gage installed November 30, 1909; datum unchanged. No information available concerning the gage used from 1884 to 1901.

Channel.—Practically permanent.

Discharge measurements.—Made from car and cable.

Winter flow.—Ice causes backwater during the winter months and measurements are made to determine the flow.

Diversions.—There is a court decree for a diversion of 57 second-feet from Cache la Poudre River between this station and the one 3 miles above, and decrees for diversions of 119 second-feet from intervening tributaries. Below the station there are decrees for diversions of 3,105 second-feet from the river. In addition, there are numerous decrees for flood-water diversions.

Cooperation.—From 1884 to 1901 the records were maintained by Prof. L. G. Carpenter of the Colorado State Agricultural College. Since 1910 the records have been furnished by the State engineer, by whom the station is maintained.

Discharge measurements of Cache la Poudre River at mouth of canyon, near Fort Collins, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 7 ^a	C. E. Turner.....	-0.20	44.2	July 28	C. C. Hezmalhalch.....	1.85	373
Mar. 7	.....do.....	0.88	54.5	Aug. 18	.....do.....	1.44	178
Apr. 11	.....do.....	1.12	104	Sept. 15	Grieve & Hezmalhalch.	1.20	108
27	.....do.....	1.29	138	Oct. 14	C. E. Turner.....	1.18	103
May 17	.....do.....	3.02	1,326	Dec. 12 ^a	.....do.....	1.08	39.6
27	Thos. Grieve.....	2.92	1,191				

^a Ice conditions.

Daily gage height, in feet, of Cache la Poudre River at mouth of canyon, near Fort Collins, Colo., for 1911.

[T. R. McKnight, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		0.7	1.45	3.3	3.5	1.6	1.65	1.5	0.65	1.0
2.....		.7	1.45	3.4	3.5	1.7	1.9	1.5	.9	1.2
3.....		.85	1.45	3.45	3.25	1.45	1.9	1.35	.9	.95
4.....		1.0	1.55	3.4	3.4	1.45	1.85	1.3	.85	.7
5.....		.7	.95	1.65	3.45	3.15	1.45	1.75	1.3	.9
6.....		.7	.85	2.05	3.45	3.0	1.55	1.45	1.5	.9
7.....		.75	.85	2.1	3.4	3.1	1.35	1.5	1.55	.8
8.....		.95	.8	2.3	3.6	2.95	1.45	1.55	1.4	.9
9.....		.7	.8	2.15	3.8	2.5	1.45	1.55	1.4	.95
10.....		.7	.95	2.55	3.65	2.4	1.4	1.35	1.35	1.05
11.....		.65	.95	2.35	3.4	2.35	1.4	1.25	1.25	.....
12.....		.7	.8	2.3	3.4	2.3	1.5	1.25	1.25	.....
13.....		.65	.75	2.4	3.4	2.25	1.55	1.30	1.2	.8
14.....		.6	.8	2.6	3.3	2.35	1.45	1.2	1.2	1.05
15.....		.6	.85	2.7	3.4	2.3	1.45	1.25	1.15	1.1
16.....		.75	.85	2.85	3.6	2.3	1.4	1.25	1.15	1.1
17.....		.8	.9	2.9	3.8	2.3	1.4	1.25	1.1	1.1
18.....		.85	.85	2.9	3.4	2.15	1.45	1.15	1.15	1.2
19.....		.7	.85	2.95	3.25	2.0	1.45	1.15	1.15	1.1
20.....		.75	.85	2.65	3.25	2.15	1.4	1.15	1.15	.95
21.....		.8	.9	2.55	3.25	2.1	1.4	1.15	1.15	.95
22.....		.8	.95	2.5	3.2	2.3	1.5	1.15	1.0	.9
23.....		.85	1.0	2.5	3.2	1.95	1.7	1.15	1.15	.9
24.....		.8	1.2	2.6	3.15	1.85	1.7	1.25	1.15	.9
25.....		.7	1.2	2.6	2.9	1.15	1.7	1.2	1.1	.95
26.....		.7	1.2	3.0	2.8	1.53	1.6	1.2	1.05	.85
27.....		.8	1.2	2.8	3.0	1.85	1.5	1.15	1.1	.7
28.....		.8	1.2	2.75	3.3	1.6	1.5	1.15	.....	.6
29.....		.85	1.2	2.9	3.45	1.85	1.5	1.25	.7	.6
30.....		.85	1.45	2.95	3.5	1.75	1.55	1.35	.7	.8
31.....		.8	.....	3.1	.....	1.65	1.6	.....	.75	.....

NOTE.—Ice present Jan. 1 to Mar. 4 and Dec. 10 to 31.

Daily discharge, in second-feet, of Cache la Poudre River at mouth of canyon, near Fort Collins, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	45	45	35	35	198	1,625	1,860	255	278	215	70	70
2.....	45	45	35	35	198	1,860	1,860	300	400	215	70	70
3.....	45	45	35	50	198	1,800	1,568	198	400	162	62	60
4.....	45	45	35	70	235	1,740	1,740	198	375	145	62	60
5.....	45	45	35	62	278	1,800	1,455	198	325	145	55	60
6.....	45	45	35	50	490	1,800	1,290	235	198	215	55	50
7.....	45	45	40	50	520	1,740	1,400	162	215	235	45	50
8.....	55	45	62	45	660	1,985	1,240	198	235	180	55	50
9.....	55	45	45	45	555	2,235	810	198	235	180	62	50
10.....	55	45	35	62	855	2,048	730	180	162	162	80	45
11.....	55	45	32	62	695	1,740	695	180	130	130	75	45
12.....	55	45	35	45	660	1,740	660	180	130	130	70	40
13.....	55	45	32	40	730	1,740	625	235	145	115	62	40
14.....	55	45	30	45	900	1,625	695	198	115	115	80	40
15.....	55	45	30	50	990	1,740	660	198	130	102	90	40
16.....	50	45	40	50	1,140	1,985	660	180	130	102	90	40
17.....	50	45	45	50	1,190	2,235	660	180	130	90	90	40
18.....	50	45	50	55	1,190	1,740	555	198	102	102	90	40
19.....	50	45	35	50	1,240	1,568	460	198	102	102	90	40
20.....	50	40	40	50	945	1,568	555	180	102	102	62	40
21.....	45	40	45	55	855	1,568	520	180	102	102	62	40
22.....	45	40	45	62	810	1,510	660	215	102	70	55	40
23.....	45	40	50	70	810	1,510	430	300	102	102	55	40
24.....	45	40	45	115	900	1,455	162	300	130	102	55	40
25.....	45	40	35	115	900	1,190	102	300	115	90	62	40
26.....	45	40	35	115	1,290	1,090	235	255	115	80	50	40
27.....	45	40	45	115	1,090	1,290	162	215	102	80	50	40
28.....	45	40	45	115	1,040	1,625	255	215	102	80	50	40
29.....	45	.....	50	115	1,190	1,800	375	215	130	80	50	40
30.....	45	.....	50	198	1,240	1,860	325	235	162	80	50	40
31.....	45	.....	45	.....	1,400	.....	278	255	.....	80	.....	40

NOTE.—Daily discharge estimated because of ice Jan. 1 to Mar. 4 and Dec. 10 to 31. Discharge Nov. 11–12 interpolated because of missing gage heights.

Monthly discharge of Cache la Poudre River at mouth of canyon, near Fort Collins, Colo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	55	45	48	2,980
February.....	45	40	43	2,410
March.....	62	30	40	2,460
April.....	198	35	69	4,120
May.....	1,400	198	819	50,400
June.....	2,240	1,090	1,710	102,000
July.....	1,860	102	764	47,000
August.....	300	162	218	13,400
September.....	400	102	173	10,300
October.....	235	70	126	7,720
November.....	90	45	65	3,880
December.....	70	40	46	2,800
The year.....	2,240	30	343	249,000

LOUP RIVER AT COLUMBUS, NEBR.

Location.—At highway bridge in sec. 25, T. 17 N., R. 1 W., at Columbus, Nebr.

No tributaries between the station and the mouth of the river 3 miles below.

Records available.—October 13, 1894, to December 31, 1911.

Drainage area.—13,500 square miles.

Gage.—A chain gage installed at the highway bridge June 24, 1904, and set to read the same as the original vertical staff gage, which was located $1\frac{1}{2}$ miles above the bridge and was used from October 13, 1894, to that date. Owing to the slope of the river, however, the datum of the chain gage is 8.56 feet lower than that of the upper gage.

Channel.—Extremely shifting.

Discharge measurements.—Made from highway bridge.

Winter flow.—Ice causes backwater during the winter months and observations are discontinued.

Diversions.—Prior to September 1, 1912, there were approved diversions of 1,764 second-feet for irrigation and 4,700 second-feet for power from Loup River above the station. There were also approved diversions of 2,046 second-feet for irrigation and 3,130 second-feet for power, from tributaries entering above.

Accuracy.—The extremely shifting channel makes it impossible to make estimates of daily discharge without almost weekly measurements, as the gage heights afford only an approximate indication of the flow.

Cooperation.—During 1911 the station was maintained in cooperation with the State engineer, by whom the field data were furnished.

Discharge measurements of Loup River at Columbus, Nebr., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 23	A. A. Dobson.....	4.22	2,980	July 31	A. B. Price.....	4.10	1,900
Apr. 25	A. B. Price.....	4.45	2,470	Aug. 10	.....do.....	4.40	2,580
May 18	.....do.....	3.90	2,730	25	.....do.....	4.30	2,270
26	.....do.....	4.50	2,610	Sept. 11	.....do.....	4.70	3,320
June 13	.....do.....	4.50	2,180	24	.....do.....	4.40	2,070
21	.....do.....	4.30	1,970	Oct. 4	.....do.....	4.40	2,450
July 8	.....do.....	4.35	1,460	Nov. 10	.....do.....	4.40	4,170

Daily gage height, in feet, of Loup River at Columbus, Nebr., for 1911.

[W. D. Benson, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		4.4	5.25	4.5	4.15	3.95	4.0	4.4		
2.....		4.4	4.55	4.6	4.1	4.05	4.25	4.4	4.5	
3.....		4.35	4.45	4.5	4.2	4.25	4.4	4.45		
4.....		4.5	4.5		4.15	4.15	4.3	4.4	4.2	
5.....		4.6	4.65	4.6	4.2	4.25	4.45	4.65	4.15	
6.....		4.4	4.75	4.55	4.2	4.2		6.5	4.45	
7.....		4.3	4.65	4.6		4.4	4.4	5.95	4.45	
8.....		4.3	4.6	4.65	4.35	4.45	4.4	5.0	4.45	4.45
9.....		4.35	4.5	4.4	4.55	4.35	4.8	4.8	4.2	4.2
10.....			4.3	4.45	4.45	4.5	5.55	4.3	4.25	4.35
11.....		4.35	4.25	4.4	4.8	4.4	4.65	4.55		4.5
12.....	4.6		4.35	4.5	4.45	4.3	4.8	4.35		4.7
13.....	4.45	4.5		4.5	4.3	4.4	4.35	4.4		4.75
14.....	4.6	4.55	6.0	4.5	5.35		4.3	4.55		4.6
15.....	4.6	4.5	4.45	4.45	4.5	4.35	4.35	4.6		4.55
16.....	4.75	4.45		4.3	4.7	4.35	4.15	4.65		4.5
17.....	4.55	4.5	3.85	4.3	5.0	4.15	4.25	4.8	4.5	4.2
18.....	4.5	4.4	4.25	4.45	4.7	4.1	4.35	4.65		
19.....	4.3	4.5		4.45	4.5	4.25	4.35	4.7		4.45
20.....	4.15	4.55	4.15	4.4	4.65	4.5	4.3	4.8	4.9	
21.....	4.0	4.45	4.4	4.35	4.45	4.65	4.35	4.75	4.7	4.8
22.....	4.5	4.4	4.9	4.3	4.3	4.5	4.4	4.6	4.3	4.65
23.....		4.4	5.65	4.25		4.75		4.65		4.6
24.....	4.2	4.45	4.35	4.25	5.1	4.55	4.4	4.7		4.4
25.....	4.2	4.45	4.35	4.35	4.8	4.3	4.4	4.75		4.65
26.....	4.4	4.5	4.5	4.5	4.65	4.25	4.4	4.75		
27.....	4.4	4.45	4.7	5.1	4.45	4.2	4.4	4.6		
28.....	4.45		4.7	4.95	4.2	4.3	4.4	4.5		
29.....	4.45	4.55	4.75	4.55	4.0		4.6	4.5		
30.....	4.45	4.75	4.65	4.3	4.0	4.2	4.6	4.6		
31.....	4.4		4.7		4.0	3.85		4.3		

NOTE.—Ice caused backwater at gage Nov. 11 to Dec. 31.

ELKHORN RIVER AT WATERLOO, NEBR.

Location.—At the highway bridge half a mile north of Waterloo on the line between secs. 3 and 10, T. 15 N., R. 10 E. No tributary within several miles.

Records available.—May 19 to December 31, 1911.

Drainage area.—Not measured.

Gage.—Chain gage; datum unchanged.

Channel.—Extremely shifting.

Discharge measurements.—Made from the highway bridge.

Winter flow.—Records not of sufficient length to determine effect of ice.

Diversions.—Prior to September 1, 1912, there were approved diversions of 147 second-feet for irrigation and 538 second-feet for power from Elkhorn River above the station. From the tributaries entering above there were approved diversions of 174 second-feet for power development.

Accuracy.—Daily discharge computed indirectly and can be considered only approximate.

Cooperation.—Station maintained by the State engineer, by whom the field data are furnished.

Discharge measurements of Elkhorn River at Waterloo, Nebr., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 19	A. B. Price.....	3.00	1,060	Aug. 9	A. B. Price.....	1.40	537
30	do.....	2.60	930	28	do.....	1.50	425
June 12	do.....	1.90	655	Sept. 12	do.....	1.30	303
23	do.....	2.10	844	Oct. 3	do.....	1.60	491
July 8	do.....	1.60	598	Nov. 9	do.....	2.10	920
31	do.....	1.40	434				

Daily gage height, in feet, of Elkhorn River at Waterloo, Nebr., for 1911.

[John Todd, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		2.50	4.00	1.30	1.51	1.60	2.13	2.90
2		2.45	3.75	1.28	1.50	1.65	2.13	2.70
3		2.40	3.55	1.37	1.45	1.65	2.15	2.60
4		2.35	2.90	1.48	1.40	1.68	2.12	2.90
5		2.37	2.34	1.40	1.30	1.70	2.10	2.90
6		2.33	2.05	1.50	1.28	1.90	2.15	2.86
7		2.35	1.90	1.60	1.35	2.05	2.14	2.98
8		2.15	1.70	1.64	1.32	2.10	2.20	2.65
9		2.10	1.50	1.69	1.38	2.20	2.20	2.68
10		2.05	1.75	1.60	1.40	2.55	2.27	2.98
11		2.00	1.67	1.54	1.40	2.55	2.20	3.05
12		1.90	1.70	1.50	1.41	2.60	1.50	2.81
13		1.90	1.77	1.50	1.54	2.40	2.24	2.96
14		1.90	1.75	1.47	1.46	2.28	2.40	2.77
15		1.85	1.70	1.44	1.38	2.10	2.45	2.61
16		1.76	1.75	1.44	1.34	2.05	2.45	2.61
17		2.35	1.73	1.46	1.36	2.00	2.35	2.67
18		2.50	1.65	1.54	1.32	2.00	2.45	2.52
19	3.00	3.40	1.64	1.64	1.30	2.00	2.45	2.35
20		2.75	1.60	2.02	1.30	2.01	2.36	2.40
21		2.35	1.55	1.58	1.35	2.10	2.30	2.30
22		2.30	1.50	1.47	1.28	2.00	2.40	2.38
23		2.10	1.50	1.40	1.32	2.20	2.40	2.24
24	3.35	1.90	1.58	1.40	1.40	2.18	1.73	2.20
25	3.30	1.90	1.55	1.46	1.40	2.18	2.10	2.26
26	3.20	1.84	1.56	1.45	1.42	2.15	2.45	2.15
27	3.10	1.70	1.54	1.40	1.41	2.16	2.33	2.80
28	3.00	2.50	1.46	1.56	1.38	2.15	2.40	3.15
29	2.70	3.75	1.40	1.50	1.40	2.10	2.69	3.06
30	2.60	4.25	1.40	1.50	1.47	2.18	2.90	3.28
31	2.57		1.31	1.50		2.10		3.30

NOTE.—Gage heights distorted by ice Nov. 12, 24, 25, 29, 30, and Dec. 1 to 31.

Daily discharge, in second-feet, of Elkhorn River at Waterloo, Nebr., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		840	3,420	380	417	480	963
2.....		800	3,080	400	410	520	963
3.....		860	2,810	460	380	520	985
4.....		820	1,920	540	350	544	952
5.....		830	1,300	510	300	560	930
6.....		900	980	590	292	730	985
7.....		920	830	660	325	880	974
8.....		740	650	720	310	930	1,040
9.....		780	500	770	340	1,040	1,040
10.....		740	700	690	350	1,490	1,120
11.....		700	630	640	350	1,490	1,040
12.....		660	650	610	356	1,560	1,060
13.....		660	710	560	438	1,290	1,090
14.....		660	700	545	386	1,140	1,290
15.....		620	650	520	340	930	1,360
16.....		545	700	520	320	880	1,360
17.....		1,100	680	490	330	830	1,220
18.....		1,280	610	560	310	830	1,360
19.....	1,060	2,420	610	630	300	830	1,360
20.....	1,170	1,580	580	960	300	840	1,240
21.....	1,280	1,100	540	580	325	930	1,160
22.....	1,390	1,050	500	500	292	830	1,290
23.....	1,500	840	500	450	310	1,040	1,290
24.....	1,600	660	570	450	350	1,020	1,310
25.....	1,540	660	540	386	350	1,020	1,340
26.....	1,400	630	550	380	362	985	1,360
27.....	1,400	560	530	350	356	996	1,200
28.....	1,280	1,340	460	452	340	985	1,290
29.....	960	2,980	435	410	350	930	1,200
30.....	860	3,670	435	410	392	1,020	1,200
31.....	900	-----	380	410	-----	930	-----

NOTE.—Daily discharge determined from a series of parallel rating curves poorly defined; discharge interpolated May 20 to 23, Nov. 12, 24, 25, 29, and 30.

Monthly discharge of Elkhorn River at Waterloo, Nebr., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May 19-31.....	1,600	860	1,260	32,500	D.
June.....	3,670	545	1,060	63,100	D.
July.....	3,420	380	908	55,800	D.
August.....	960	350	533	32,800	D.
September.....	438	292	344	20,500	D.
October.....	1,560	480	935	57,500	D.
November.....	1,360	930	1,170	69,600	D.
December.....	-----	-----	1,000	61,500	-----
The period.....	-----	-----	-----	393,000	-----

KANSAS RIVER BASIN.

REPUBLICAN RIVER AT BOSTWICK, NEBR.

Location.—At highway bridge about 1 mile southwest of Bostwick, on the line between secs. 22 and 23 in T. 1 N., R. 8 W. Nearest tributary a small intermittent stream which enters a short distance below.

Records available.—June 6, 1904, to December 31, 1911. From June 20, 1896, to November 30, 1903, a station was maintained at Superior, 10 miles downstream. As there are no important tributaries nor diversions between, the records at the two points are very nearly comparable.

Drainage area.—23,300 square miles.

Gage.—Chain gage; datum unchanged.

Channel.—Shifting at intervals.

Discharge measurements.—Made from bridge.

Winter flow.—Ice causes backwater during the winter months and during that period the observations are discontinued.

Diversions.—Prior to September 1, 1912, there were approved diversions of 862 second-feet for irrigation and 150 second-feet for power from Republican River above the Bostwick station.

Accuracy.—During 1911 the channel did not shift to any great extent and the estimates of discharge should be reliable.

Cooperation.—During 1911 this station was maintained in cooperation with the State engineer, by whom the field data were furnished.

Discharge measurements of Republican River at Bostwick, Nebr., in 1911.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 8	A. A. Dobson.....	0.91	384	Aug. 8	A. B. Price.....	9.28	15,500
May 14	A. B. Price.....	1.70	367	Sept. 17	.....do.....	3.00	1,700
June 7	.....do.....	1.30	129	Nov. 1	.....do.....	1.20	293
July 22	.....do.....	1.85	413				

Daily gage height, in feet, of Republican River at Bostwick, Nebr., for 1911.

[J. W. Keifer, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.9	2.2	3.2	1.5	1.5	1.3	0.9	2.6	2.2	1.7	1.2	1.5
2.....	1.9	1.9	3.0	1.5	1.4	1.3	.9	2.0	2.0	1.3	1.2	1.5
3.....	1.9	1.9	2.0	1.5	1.5	1.4	.9	9.65	1.8	1.3	1.2	1.5
4.....	1.9	1.9	2.0	1.5	1.5	1.3	.8	9.3	1.7	1.2	1.2	1.2
5.....	1.9	1.9	1.9	1.5	1.6	1.3	.8	9.92	1.7	1.2	1.2	1.2
6.....	1.9	2.0	1.9	1.5	1.6	1.3	.8	10.0	1.8	1.2	1.2	1.3
7.....	1.9	2.0	1.9	1.5	1.6	1.3	.8	9.15	1.6	1.2	1.2	1.3
8.....	1.9	1.9	2.0	1.6	1.6	1.3	.7	9.45	1.5	1.3	1.2	1.3
9.....	1.9	1.7	2.0	1.7	1.6	1.3	.9	9.52	1.7	3.4	1.1	1.4
10.....	1.9	1.7	1.9	1.7	1.6	1.2	.9	8.92	2.0	2.5	1.2	1.4
11.....	1.9	1.7	1.9	1.7	1.6	1.2	1.0	6.95	1.7	2.0	1.2	1.5
12.....	1.9	1.7	1.8	1.7	1.6	1.1	1.0	4.7	2.0	1.8	1.3	1.4
13.....	1.9	1.8	1.8	1.7	1.6	1.1	4.2	3.8	4.5	1.7	1.3	1.4
14.....	1.9	1.9	1.8	1.6	1.7	1.1	2.7	3.4	3.0	1.5	1.3	1.4
15.....	.....	1.9	1.7	1.6	1.6	1.0	3.0	4.2	2.4	1.4	1.3	1.4
16.....	1.9	1.9	1.7	1.6	1.6	1.0	4.6	3.3	2.2	1.4	1.3	1.4
17.....	.....	1.9	1.7	1.5	1.6	1.0	3.7	3.0	2.0	1.3	1.3	1.4
18.....	.....	1.9	1.7	1.5	2.0	1.0	2.9	2.8	1.9	1.3	1.3	1.3
19.....	2.1	1.8	1.7	1.5	1.9	1.2	2.4	3.0	1.9	1.3	1.3	1.4
20.....	2.1	2.2	1.7	1.5	1.8	1.1	2.1	3.7	1.9	1.3	1.3	1.3
21.....	2.1	1.9	1.6	1.5	1.7	1.9	2.0	3.6	1.8	1.3	1.3	1.3
22.....	2.1	2.0	1.6	1.5	1.6	1.8	1.9	3.5	1.7	1.2	1.3	1.3
23.....	2.1	2.0	1.6	1.5	1.6	1.6	4.0	3.3	1.7	1.2	1.3	1.4
24.....	2.1	1.9	1.6	1.4	1.5	1.5	2.8	4.2	1.7	1.2	1.4	1.5
25.....	2.1	2.0	1.6	1.4	1.5	1.3	3.0	3.1	1.4	1.2	1.4	1.5
26.....	2.3	2.0	1.6	1.4	1.4	1.2	3.5	2.7	1.4	1.2	1.4	1.5
27.....	2.2	2.0	1.6	1.3	1.5	1.1	4.0	2.4	1.4	1.2	1.4	1.4
28.....	2.2	1.6	1.5	1.4	1.5	1.1	2.8	2.3	1.3	1.1	1.5	1.4
29.....	2.2	.....	1.5	2.0	1.4	1.1	2.5	2.4	1.3	1.1	1.5	1.4
30.....	2.2	.....	1.5	1.9	1.4	1.0	2.5	2.4	1.4	1.1	1.5	1.4
31.....	2.2	.....	1.5	.....	1.4	.....	2.2	2.5	.....	1.2	.....	1.4

^a Maximum reading 10.1.

NOTE.—Backwater from ice Jan. 1 to Feb. 1 and Nov. 24 to Dec. 31.

Daily discharge, in second-feet, of Republican River at Bostwick, Nebr., for 1911.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		1,930	240	240	160	55	1,130	850	510	280
2.....		1,650	240	200	160	55	550	700	320	280
3.....		550	240	240	200	55	16,700	570	320	280
4.....		550	240	240	160	40	15,700	510	280	280
5.....	470	470	240	290	160	40	17,400	510	280	280
6.....	550	470	240	290	160	40	17,600	570	280	280
7.....	550	470	240	290	160	40	15,100	460	280	280
8.....	470	550	290	290	160	25	16,200	410	320	280
9.....	340	550	340	290	160	55	16,400	510	2,210	250
10.....	340	470	340	290	120	55	14,500	700	1,130	280
11.....	340	470	340	290	120	70	9,200	510	700	280
12.....	340	400	340	290	90	70	4,300	700	570	320
13.....	400	400	340	290	90	3,400	2,790	3,900	510	320
14.....	470	400	290	340	90	1,260	2,210	1,690	410	320
15.....	470	340	290	290	70	1,650	3,400	1,030	360	320
16.....	470	340	290	290	70	4,100	2,070	850	360	320
17.....	470	340	240	290	70	2,640	1,690	700	320	320
18.....	470	340	240	550	70	1,520	1,450	630	320	320
19.....	400	340	240	470	120	910	1,690	630	320	320
20.....	720	340	240	400	90	630	2,640	630	320	320
21.....	470	290	240	340	470	550	2,490	570	320	320
22.....	550	290	240	290	400	470	2,350	510	280	320
23.....	550	290	240	290	290	3,100	2,070	510	290	320
24.....	470	290	200	240	210	1,390	3,400	510	280	.....
25.....	550	290	200	240	160	1,650	1,810	360	280	.....
26.....	550	290	200	200	120	2,350	1,340	360	280	.....
27.....	550	290	160	240	90	3,100	1,030	360	280	.....
28.....	290	240	200	240	90	1,390	940	320	250	.....
29.....		240	550	200	90	1,010	1,030	320	250	.....
30.....		240	470	200	70	1,010	1,030	360	250	.....
31.....		240		200		720	1,130		280	.....

NOTE.—Daily discharge determined from rating curves well defined from Feb. 5 to Aug. 10, and fairly well defined from Aug. 11 to Nov. 2.

Monthly discharge of Republican River at Bostwick, Nebr., for 1911.

[Drainage area, 23,300 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January.....			300	0.013	0.02	18,400	D.
February.....	720	290	459	.020	.02	25,500	C.
March.....	1,930	240	463	.020	.02	28,500	B.
April.....	550	160	273	.012	.01	16,200	B.
May.....	550	200	285	.012	.01	17,500	B.
June.....	470	70	150	.0064	.007	8,930	B.
July.....	4,100	25	1,080	.046	.05	66,400	C.
August.....	17,600	550	5,850	.251	.29	360,000	C.
September.....	3,900	320	708	.030	.03	42,100	C.
October.....	2,210	250	424	.018	.02	26,100	C.
November.....	320	250	299	.013	.01	17,800	C.
December.....			250	.011	.01	15,400	D.
The year.....	17,600	25	888	.038	.50	643,000	

NOTE.—Discharge Feb. 1 to 4 estimated at 400 second-feet per day. Discharge Nov. 24 to 30 estimated at 300 second-feet. Means for January and December estimated and are only approximate.

BIG BLUE RIVER AT BEATRICE, NEBR.

Location.—At Sixth Street bridge at Beatrice, Nebr. Nearest tributary a small stream entering from the north a mile or more below.

Records available.—October 15, 1910, to December 31, 1911. Records of gage heights have been kept by the United States Weather Bureau from January 1 to July 31 of each year since June 1, 1905.

Drainage area.—3,363 square miles (United States Weather Bureau).

Gage.—Chain gage, owned by the United States Weather Bureau.

Channel.—Shifting.

Discharge measurements.—Made from bridge.

Winter flow.—Ice causes some backwater during a portion of the winter months.

Flood discharge.—The highest recorded stage was 25.6 feet above the present gage datum, and occurred May 29, 1903.

Diversions.—Prior to September 1, 1912, there were approved diversions of 841 second-feet for power, from the Big Blue above Beatrice; below, the approved diversions amount to 500 second-feet for power.

Accuracy.—Although the channel is shifting sufficient measurements have been obtained to make estimates of discharge which are fair.

Cooperation.—Station maintained in cooperation with the State engineer, by whom the field data are furnished.

Discharge measurements of Big Blue River at Beatrice, Nebr., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 21	A. A. Dobson.....	1.32	289	July 3	A. B. Price.....	0.75	161
Apr. 7	.....do.....	1.38	305	Aug. 2	.....do.....	1.70	505
May 1	A. B. Price.....	1.60	408	Sept. 16	.....do.....	2.30	839
June 9	.....do.....	1.30	307	Oct. 31	.....do.....	1.50	316

Daily gage height, in feet, and discharge, in second-feet, of Big Blue River at Beatrice, Nebr., for 1910.

[H. E. Palmer, observer.]

Day.	October.		November.		December.		Day.	October.		November.		December.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.		Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1....	1.3	325	1.4	365	16....	1.4	365	1.3	325	1.3	325
2....	1.3	325	1.3	325	17....	1.4	365	1.4	365	1.3	325
3....	1.3	325	1.3	325	18....	1.6	450	1.4	365	1.3	325
4....	1.2	290	1.3	325	19....	1.5	405	1.3	325	1.1	260
5....	1.2	290	1.3	325	20....	1.4	365	1.3	325	1.2	290
6....	1.2	290	1.3	325	21....	1.3	325	1.3	325	1.3	325
7....	1.2	290	1.2	290	22....	1.3	325	1.3	325	1.1	260
8....	1.2	290	1.2	290	23....	1.3	325	1.3	325	1.1	260
9....	1.3	325	1.2	290	24....	1.2	290	1.3	325	1.1	260
10....	1.3	325	1.3	325	25....	1.3	325	1.3	325	1.2	290
11....	1.3	325	1.4	365	26....	1.4	365	1.3	325	1.2	290
12....	1.3	325	1.3	325	27....	1.4	365	1.3	325	1.2	290
13....	1.3	325	1.3	325	28....	1.4	365	1.4	365	1.3	325
14....	1.2	290	1.3	325	29....	1.4	365	1.4	365	1.3	325
15....	1.4	365	1.2	290	1.4	365	30....	1.4	365	1.4	365	1.2	290
							31....	1.4	365	.....	.....	1.2	290

Daily gage height, in feet, of Big Blue River at Beatrice, Nebr., for 1911.

[H. E. Palmer, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.3	1.4	1.4	1.3	1.6	1.1	1.0	1.9	1.7	3.8	1.2	1.4
2.....		1.4	1.5	1.2	1.7	1.2	1.0	1.7	1.5	5.1	1.2	1.0
3.....		1.3	1.4	1.2	1.8	1.1	.9	1.4	1.5	3.6	1.1	1.3
4.....		1.4	1.3	1.3	1.8	1.1	.8	1.3	1.5	2.4	1.0	1.4
5.....		1.4	1.2	1.1	1.8	1.7	.7	1.4	1.5	2.3	1.1	1.4
6.....		1.3	1.3	1.2	1.7	1.2	.8	1.4	1.4	2.2	1.2	1.5
7.....		1.3	1.3	1.3	1.6	1.1	.9	1.4	1.4	2.2	1.2	1.3
8.....		1.2	1.3	1.3	1.5	1.1	1.0	1.9	1.5	2.2	1.2	1.2
9.....		1.2	1.4	1.4	1.4	1.0	1.0	2.4	1.4	2.3	1.2	1.2
10.....	1.5	1.2	1.4	1.0	1.5	1.1	.9	2.4	2.9	2.2	1.2	1.4
11.....	1.7	1.3	1.4	1.2	1.7	1.3	.8	2.2	2.0	.....	1.1	1.4
12.....	1.7	1.3	1.4	1.2	1.6	1.1	.9	2.0	2.9	2.3	1.2	1.4
13.....	1.8	1.3	1.5	1.3	1.4	1.1	.9	2.0	2.5	2.6	1.2	1.4
14.....	1.8	1.4	1.4	1.3	1.4	1.1	.9	2.1	2.4	3.2	1.2	1.4
15.....	1.9	1.8	1.3	1.4	1.4	1.1	1.0	1.7	2.4	1.6	1.2	1.3
16.....	2.1	2.0	1.3	1.3	1.3	1.1	1.0	1.5	2.4	1.4	1.2	1.3
17.....	2.1	2.2	1.3	1.2	1.3	1.1	1.0	1.4	2.4	1.3	1.2	1.3
18.....	2.0	2.0	1.3	1.2	1.3	1.0	.8	1.3	2.2	1.4	1.2	1.3
19.....	1.6	2.1	1.3	1.3	1.3	1.0	.8	1.3	2.2	1.3	1.3	1.4
20.....	1.4	1.5	1.2	1.3	1.2	.9	1.0	1.4	1.8	1.3	1.3	1.5
21.....	1.4	1.2	1.2	1.3	1.2	.9	1.0	1.5	1.5	1.3	1.2	1.5
22.....	1.3	1.5	1.3	1.2	1.2	1.0	.9	1.8	1.4	1.2	1.2	1.5
23.....	1.3	1.6	1.3	1.3	1.2	1.1	24.0	2.5	1.4	1.1	1.2	1.4
24.....	1.3	1.7	1.2	1.2	1.2	1.0	(a)	1.7	1.3	1.1	1.2	1.2
25.....	1.3	1.7	1.3	1.2	1.3	.9	8.7	1.8	1.2	1.0	1.3	1.2
26.....	1.5	1.6	1.3	1.1	1.3	.8	3.7	1.9	1.3	1.1	1.3	1.3
27.....	1.4	1.5	1.3	1.3	1.3	.9	3.3	2.0	1.3	1.1	1.2	1.7
28.....	1.4	1.2	1.2	1.3	1.2	.9	3.1	2.0	1.3	1.2	.5	1.9
29.....	1.4	.....	1.3	1.3	1.2	.9	2.8	2.1	1.3	1.1	.9	1.7
30.....	1.3	.....	1.3	1.8	1.2	.9	2.4	2.0	1.4	1.2	1.0	1.6
31.....	1.4	.....	1.2	.....	1.1	.....	2.3	1.9	.....	1.3	.....	.....

a Gage not read, as trees lodged against the gage.

NOTE.—Ice present Jan. 2 to 18 and Dec. 26 to 31.

Daily discharge, in second-feet, of Big Blue River at Beatrice, Nebr., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		365	365	325	450	260	230	605	500	2,160	290	365
2.....		365	405	290	500	290	230	500	405	3,480	290	230
3.....		325	365	290	550	260	200	365	405	1,900	260	325
4.....		365	325	325	550	260	175	325	405	920	230	365
5.....		365	290	260	550	500	150	365	405	850	260	365
6.....		325	325	290	500	290	175	365	365	780	290	405
7.....		325	325	325	450	260	200	365	365	780	290	325
8.....		290	325	325	405	260	230	605	405	780	290	290
9.....		290	365	365	365	230	230	920	365	850	290	290
10.....		290	365	230	405	260	200	920	1,300	780	290	365
11.....		325	365	290	500	325	175	780	660	815	260	365
12.....		325	365	290	450	260	200	660	1,300	850	290	365
13.....		325	405	325	365	260	200	660	990	1,060	290	365
14.....		365	365	325	365	260	200	720	920	1,580	290	365
15.....		550	325	365	365	260	230	500	920	450	290	325
16.....		660	325	325	325	260	230	405	920	365	290	325
17.....		780	325	290	325	260	230	365	920	325	290	325
18.....		660	325	290	325	230	175	325	780	365	290	325
19.....	450	720	325	325	325	230	175	325	780	325	325	365
20.....	365	405	290	325	290	200	230	365	550	325	325	405
21.....	365	290	290	325	290	200	230	405	405	325	290	405
22.....	325	405	325	290	290	230	200	550	365	290	290	405
23.....	325	450	325	325	290	260	22,400	990	365	260	290	365
24.....	325	500	290	290	290	230	14,700	500	325	260	290	290
25.....	325	500	325	290	325	200	7,060	550	290	230	325	290
26.....	405	450	325	260	325	175	2,060	605	325	260	325	.....
27.....	365	405	325	325	325	200	1,670	660	325	260	290	.....
28.....	365	290	290	325	290	200	1,480	660	325	290	310	.....
29.....	365	.....	325	325	290	200	1,220	720	325	260	330	.....
30.....	325	.....	325	550	290	200	920	605	365	290	350	.....
31.....	365	.....	290	.....	260	.....	850	605	.....	325	.....	.....

NOTE.—Daily discharge determined from a rating curve that is fairly well defined below 1,000 second-feet; discharge estimated Nov. 28 to 30.

Monthly discharge of Big Blue River at Beatrice, Nebr., for 1910-11.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
1910.					
October.....	450	290	361	22,200	C.
November.....	365	290	323	19,200	B.
December.....	365	260	310	19,100	B.
1911.					
January.....	450	-----	325	20,000	C.
February.....	780	290	415	23,000	B.
March.....	405	290	332	20,400	B.
April.....	550	260	316	18,800	B.
May.....	550	260	375	23,100	B.
June.....	500	175	250	14,900	B.
July.....	22,400	150	1,830	113,000	C.
August.....	990	325	560	34,400	B.
September.....	1,300	290	569	33,900	B.
October.....	3,460	230	736	45,300	C.
November.....	350	230	294	17,500	B.
December.....	405	-----	331	20,400	C.
The year.....	22,400	150	531	385,000	

NOTE.—Discharge Oct. 1 to 14 estimated at 365 second-feet. Discharge Jan. 1 to 18 and Dec. 26 to 31 estimated at 300 and 275 second-feet, respectively.

LITTLE BLUE RIVER NEAR FAIRBURY, NEBR.

Location.—At highway bridge in sec. 26, T. 2 N., R. 2 E., $1\frac{1}{2}$ miles south of Fairbury. Nearest tributary a small stream entering half a mile above.

Records available.—May 23, 1908, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Chain gage; datum unchanged.

Channel.—Shifting.

Discharge measurements.—Made from bridge.

Winter flow.—Ice causes backwater for only a short time during the winter months.

Artificial control.—The dam of the Fairbury Roller Mills, located 2 miles above, may control the flow to a certain extent during the low-water season, causing a daily fluctuation. The gage is read once each day.

Diversions.—Prior to September 1, 1912, there were approved diversions of 180 second-feet for power from the Little Blue above Fairbury. There were none below.

Accuracy.—Estimates have been made by indirect method for shifting channels, and can be considered only fair.

Cooperation.—Station maintained in cooperation with the State engineer, by whom the field data are furnished.

Discharge measurements of Little Blue River near Fairbury, Nebr., in 1911.

Date.	Hydrographer.	Gage- height.	Dis- charge.	Date.	Hydrographer.	Gage- height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 28..	A. A. Dobson.....	3.52	187	July 12..	A. B. Price.....	2.60	94.7
Mar. 30..	do.....	2.96	129	Aug. 7..	do.....	5.65	926
Apr. 15..	do.....	2.99	145	Sept. 15..	do.....	3.50	300
May 7...	D. D. Price.....	3.20	133	Oct. 31..	do.....	3.00	180
June 8..	A. B. Price.....	2.80	129				

Daily gage height, in feet, of Little Blue River near Fairbury, Nebr., for 1911.

[Clark Hulbert, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	3.1	3.2	3.3	3.0	4.8	2.9	2.5	3.2	3.5	9.5	3.0	2.9
2.....	3.2	3.1	3.6	3.0	3.7	2.8	2.4	3.0	3.4	6.4	2.9	3.0
3.....		3.0	3.1	2.9	3.3	2.8	2.6	3.2	3.3	4.1	3.0	3.1
4.....		3.0	3.1	3.0	3.3	2.8	2.5	3.1	3.7	3.5	3.0	3.3
5.....		3.1	3.0	3.0	3.3	3.0	2.4	3.0	3.4	3.3	3.0	3.0
6.....		3.1	3.1	3.1	3.2	2.9	3.2	6.1	3.3	3.3	3.1	3.0
7.....		3.0	3.1	2.9	3.1	2.9	2.5	6.4	3.3	3.2	3.0	3.1
8.....		3.0	3.1	3.0	3.1	2.8	2.4	4.8	3.4	3.1	3.0	2.9
9.....	3.6	3.0	3.1	2.9	3.9	2.8	2.6	5.3	3.3	3.1	2.9	3.0
10.....	3.3	3.1	3.1	3.1	3.3	2.9	2.0	5.0	4.3	3.2	2.9	3.1
11.....	3.5	3.1	3.0	3.1	3.1	2.8	2.7	4.3	3.3	3.1	3.0	3.1
12.....	3.7	3.0	3.1	3.0	3.1	2.7	2.5	3.9	3.2	3.1	2.8	3.0
13.....	3.4	3.1	3.0	3.0	3.0	2.8	2.6	3.7	3.2	3.3	3.0	3.0
14.....	3.9	3.2	3.0	2.9	3.0	2.7	2.7	3.5	3.5	3.1	2.9	3.0
15.....	3.4	3.1	3.1	3.0	3.1	2.7	2.5	3.4	3.5	3.0	3.1	3.1
16.....	3.4	3.3	3.1	3.0	3.1	2.7	4.3	3.3	3.4	3.1	3.1	3.1
17.....	3.7	3.4	3.0	3.0	3.0	2.7	3.5	3.3	3.3	3.1	3.2	3.0
18.....	3.5	3.4	3.1	3.0	3.0	2.7	3.5	3.2	3.2	3.0	3.1	3.0
19.....	3.4	3.2	2.9	2.9	2.9	2.8	3.2	3.7	3.1	3.0	2.9	3.0
20.....	3.2	3.1	3.0	3.0	2.9	2.8	3.6	6.9	3.2	3.1	3.0	3.1
21.....	3.3	3.1	3.1	2.9	3.0	2.6	3.5	7.25	3.2	3.1	3.0	3.1
22.....	3.5	3.3	3.1	2.9	3.0	2.7	3.3	9.2 ^a	3.0	2.9	3.0	2.9
23.....	3.6	3.4	3.0	3.0	3.0	2.7	3.2	6.3	3.0	2.8	3.0	3.0
24.....	3.4	3.4	3.0	2.9	3.0	2.7	8.7	5.8	3.0	2.9	2.9	3.0
25.....	3.2	3.5	2.9	2.9	2.9	2.6	4.6	5.2	3.0	3.0	3.0	2.9
26.....	3.2	3.2	3.0	3.0	2.9	2.3	4.4	4.7	3.0	3.0	2.9	3.0
27.....	3.2	3.1	2.9	3.0	2.9	2.6	4.4	4.2	2.9	3.1	2.9	3.1
28.....	3.5	3.4	3.0	3.0	2.9	2.6	3.9	4.0	3.0	3.0	2.9	3.1
29.....	3.1		3.0	3.1	2.9	2.5	3.4	3.8	2.9	3.0	3.0	3.1
30.....	3.4		2.9	5.5	3.0	2.5	3.3	3.6	3.2	2.9	2.6	3.4
31.....	3.2		2.9		2.9		3.2	3.6		3.0		3.3

^a Maximum reading, 9.6.

NOTE.—River frozen over Jan. 3 to 8 and Dec. 30 and 31.

Daily discharge, in second-feet, of Little Blue River near Fairbury, Nebr., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	125	150	175	145	450	125	90	200	290	3,340	190	180
2.....	135	140	220	145	225	115	80	190	270	1,360	180	190
3.....	144	130	150	130	165	115	100	215	250	420	190	200
4.....	153	130	150	145	165	115	90	200	320	280	190	230
5.....	162	140	135	145	165	135	80	190	270	230	190	190
6.....	171	140	150	160	150	125	175	1,140	250	230	200	190
7.....	180	130	150	130	140	130	90	1,290	250	215	190	200
8.....	188	130	150	145	125	120	80	575	270	200	190	180
9.....	195	130	150	130	250	120	100	770	250	200	180	190
10.....	150	140	150	160	150	130	100	650	470	215	180	200
11.....	180	140	135	160	125	120	110	425	250	200	190	200
12.....	210	130	150	145	125	110	90	330	225	200	170	190
13.....	165	140	135	145	115	120	110	290	250	230	190	190
14.....	250	150	135	130	115	140	120	260	300	200	180	190
15.....	165	140	150	145	125	110	100	245	300	190	200	200
16.....	165	165	150	135	125	110	380	230	285	200	200	200
17.....	210	180	135	135	115	110	235	230	270	200	215	190
18.....	180	180	150	135	130	110	235	215	255	190	200	190
19.....	165	150	125	125	115	120	190	290	240	190	180	190
20.....	135	140	135	135	115	120	250	1,640	255	200	190	200
21.....	150	140	150	125	130	100	235	1,840	255	200	190	200
22.....	180	165	150	125	130	110	200	3,110	230	180	190	180
23.....	195	180	135	135	130	110	200	1,300	230	170	190	190
24.....	165	180	135	125	130	110	2,670	1,040	230	180	180	190
25.....	135	195	125	125	115	100	490	770	230	190	190	180
26.....	135	150	135	135	115	70	440	580	230	190	180	190
27.....	135	140	125	130	115	100	440	430	220	200	180	200
28.....	180	180	135	130	125	100	320	380	230	190	180	200
29.....	140		135	140	125	90	230	330	220	190	190	200
30.....	180		125	680	135	90	215	290	255	180	150	200
31.....	150		130		125		200	290		190		200

NOTE.—Daily discharge determined from a series of parallel rating curves and by the indirect method for shifting channels; discharge interpolated for days for which gage heights are missing.

Monthly discharge of Little Blue River near Fairbury, Nebr., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	250	125	167	10,300	D.
February.....	195	130	150	8,330	D.
March.....	220	125	144	8,850	D.
April.....	680	125	156	9,280	D.
May.....	450	115	147	9,040	D.
June.....	135	70	112	6,660	D.
July.....	2,670	80	272	16,700	D.
August.....	3,110	190	643	39,500	D.
September.....	470	220	262	15,600	C.
October.....	3,340	170	347	21,300	C.
November.....	215	150	187	11,100	C.
December.....	230	180	194	11,900	C.
The year.....	3,340	70	233	169,000	

MISCELLANEOUS MEASUREMENTS.

Miscellaneous measurements in Missouri River drainage basin in 1911.

Missouri River proper.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Dis- charge.
Apr. 7 ^a	Missouri River.....	Mississippi River.	Kansas City, Mo.....	Feet. b 8.85	Sec.-ft. 48,700

Upper Missouri drainage basin.

July 12	Red Rock River.....	Beaverhead River.	Twitchell's ranch near Monida, Mont.	140
---------	---------------------	----------------------	---	-------	-----

Dearborn River drainage basin.

Jan. 16	Fish Creek.....	Dearborn River.	Clemons, Mont.....	.....	13
Mar. 20	Middle Fork Dearborn River.	.....do.....	Stearns, Mont.....	.....	26
June 6	.....do.....	.....do.....	.....do.....	.....	94

Sun River drainage basin.

Oct. 23	South Fork of North Fork of Sun River.	North Fork of Sun River.	1 mile above the fork near Warm Springs, Mont.	1.06	137
23	North Fork of North Fork of Sun River.	.....do.....	.....do.....	89.1	127
22	North Fork Sun River.	Sun River....	Sun River Canyon, near Augus- ta, Mont.	76.58	346
Mar. 20	DuBray Creek.....	South Fork of Sun River.	Highway bridge near Augusta, Mont.	.....	20
June 7	.....do.....	.....do.....	.....do.....	.....	141

Marias River drainage basin.

May 12	Dupuyer ditch.....	.....	Above Lake Frances near Valier, Mont.	.....	37
13	Teton Cooperative canal.	.....	Near Strabane, Mont.....	.....	22
June 21	.....do.....	.....	.....do.....	.....	128

^a Made at Hannibal Railroad bridge near foot of Broadway, Kansas City, Mo. Measurement by G. I. Parker.

^b St. Louis directrix is 303.3 feet below zero of the gage.

*Miscellaneous measurements in Missouri River drainage basin in 1911—Continued.***Judith River drainage basin.**

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
May 4	Big Spring Creek.....	Judith River..	Lewistown, Mont.....	<i>Feet.</i>	<i>Sec.-ft.</i> 185

Milk River drainage basin.

Apr. 18	Wolf Creek ditch.....	.....	Near Wolf Point, Mont.....	2.10	0.50
May 17	.....do.....	.....	.....do.....	2.17	1.7
June 15	.....do.....	.....	.....do.....	2.17	1.8

Yellowstone River drainage basin.

May 31	East Boulder River...	Boulder River.	Near McLeod, Mont.....	-0.2	15.7
Sept. 5	Bighorn canal.....	.....	Near headgates near St. Xavier, Mont.	2.6	67
Mar. 30	West Boulder River...	Boulder River.	Bruffeys, Mont.....	1.19	47
Nov. 3	Little Wind River.....	Popo Agie River.	Near Fort Washakie, Wyo.....	.....	a 35.0
3	Sage Creek.....	Little Wind River.	Fort Washakie, Wyo.....	.....	a 10.0
Oct. 15	Popo Agie River.....	do.....	Above mouth at Arapahoe, Wyo.....	.....	160
15	Torrey Creek.....	do.....	Dubois, Wyo.....	.....	a 25.0
15	Red Creek.....	do.....	.....do.....	.....	a 5.0
15	Meadow Creek.....	do.....	J. K. Ranch, Wyo.....	.....	a 15.0
Nov. 3	Bull Lake Creek.....	do.....	.....do.....	.....	a 30.0
4	Dry Creek.....	Wind River.....	Crowheart, Wyo.....	.....	a 20.0
June 21	Poison Creek.....	Bighorn River	Shoshoni, Wyo.....	.....	a 3.0
Oct. 28	South Fork of Paint Rock Creek.	Paint Rock Creek.	Near Hyattville, Wyo.....	.....	a 10.0
28	East Fork of Paint Rock Creek.	do.....	.....do.....	.....	a 10.0
28	Paint Rock Creek.....	No Wood Creek.	Below confluence of Southeast Fork of Paint Rock Creek, Wyo.	.....	47.7

White River basin, South Dakota.

Aug. 27	Keya Paha River.....	White River..	Sec. 34, T. 38 N., R. 26 W.....	.....	9.0
28	Little White River.....	do.....	Sec. 23, T. 41 N., R. 29 W.....	.....	65

Platte River drainage basin.^b

June 11	Beaver Creek.....	North Platte River.	Encampment, Wyo.....	.....	39.9
21	.....do.....	do.....	do.....	.....	35.0
July 12	.....do.....	do.....	do.....	.....	a .8
June 21	Deer Creek.....	do.....	Near Glenrock, Wyo.....	.....	15.0
July 2	Box Elder Creek.....	do.....	Careyhurst, Wyo.....	.....	a 3.0
20	do.....	do.....	do.....	.....	a 3.0
June 22	La Prele Creek.....	do.....	Near Inez, Wyo.....	.....	3.0
22	Elkhorn Creek.....	do.....	Near Bona, Wyo.....	.....	1.0
May 20	Horseshoe Creek.....	do.....	Hausp Spur, near Glendo, Wyo.....	2.00	15.6
21	do.....	do.....	do.....	1.98	13.5
June 23	do.....	do.....	do.....	1.40	12.0
22	Cottonwood Creek.....	do.....	Badger, Wyo.....	.....	a .5
Oct. 19	do.....	do.....	do.....	.....	a 3.0
May 22	Laramie River.....	do.....	Uva, Wyo.....	.....	12.5
June 23	do.....	do.....	do.....	.....	48.9
July 2	do.....	do.....	do.....	.....	4.7
21	do.....	do.....	do.....	.....	10.7
Oct. 19	do.....	do.....	do.....	.....	a 8.0
July 20	Horseshoe Creek.....	do.....	Hausp Spur, Wyo.....	.....	a 1.0
Oct. 19	do.....	do.....	Cassa, Wyo.....	.....	a 2.0
May 12	North Platte River.....	Missouri River	Bridgeport, Nebr.....	c 5.25	833
June 26	do.....	do.....	do.....	c 5.33	1,220
Apr. 26	do.....	do.....	Henry, Nebr.....	c 1.30	640
June 14	do.....	do.....	do.....	c 2.05	1,220

^a Discharge estimated.^b See also p. 235.^c Gage height from State gage.

*Miscellaneous measurements in Missouri River drainage basin in 1911—Continued.***Platte River drainage basin—Continued.**

Date.	Stream.	Tributary to—	Locality.	Gage height.	Dis-charge.
				<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 10	North Fork of South Platte River.	South Platte River.	South Platte, Colo.	a 2.52	46.1
Feb. 22	do.	do.	do.	a 1.96	29.9
Mar. 16	do.	do.	do.	a 1.00	52.4
May 10	do.	do.	do.	2.75	269
Aug. 18	do.	do.	do.	2.00	116
29	do.	do.	do.	1.90	83.4
Nov. 4	do.	do.	do.	1.62	46.1
Dec. 16	do.	do.	do.	a 2.70	28.8
Apr. 14	Threemile Creek.	Geneva Creek.	Near Grant, Colo.		1.4
July 13	do.	do.	do.		7.7
Sept. 8	Geneva Creek.	North Fork of South Platte River.	Grant, Colo.		33.4
8	do.	do.	do.		33.5
July 14	Craig Park Creek.	do.	Estabrook, Colo.		b 9.0
12	Ditch at Cassells, Colo.	From North Fork of South Platte River.	Cassells, Colo.		12.5
12	do.	Brandy Creek power house.	do.		.6
	do.	Total flow.	do.		13.1
	do.	Waste.	do.		.3
	do.	Water to turbine.	do.		12.8
Apr. 13	Deer Creek.	North Fork of South Platte River.	Crossons, Colo.		b 4.0
14	do.	do.	do.		b 5.0
July 4	do.	do.	do.		b 5.0
5	do.	do.	do.		b 7.0
14	do.	do.	do.		b 8.0
Apr. 14	Elk Creek.	do.	Pine Grove, Colo.		b 4.0
July 4	do.	do.	do.		b 5.0
Apr. 14	Buffalo Creek.	do.	Near Buffalo, Colo.		b 4.0
July 12	do.	do.	do.		b 2.0
July 27	Tarryall Creek.	South Platte River.	Robbins ranch, near Jefferson, Colo.	.95	49.8
9	Twin Creek.	do.	Lake George, Colo.		b .25
12	Turkey Creek.	do.	Pine Grove, Colo.		b 7.0
12	Chicago Creek.	do.	Idaho Springs, Colo.		b 4.0
12	Soda Creek.	do.	do.		b 4.0
Sept. 23	North Fork of Clear Creek.	do.	Mouth at Empire station, Colo.		b 10.0
23	Middle Fork of Clear Creek.	do.	Mouth at Georgetown, Colo.		b 50.0
23	South Fork of Clear Creek.	do.	do.		b 50.0
Mar. 1	North Clear Creek.	Clear Creek.	Forkscreek, Colo.		b 3.0
13	do.	do.	do.		25.7
June 29	do.	do.	do.		b 7.0
Aug. 12	do.	do.	do.		b 5.0
Sept. 23	do.	do.	do.		b 6.0
Nov. 8	do.	do.	do.		b 8.0
Dec. 22	do.	do.	do.		b 1.0
May 13	Roscoe Creek.	do.	10 miles above Golden, Colo.		0
13	Elk Creek.	do.	8 miles above Golden, Colo.		b .5
13	Beaver Creek.	do.	7½ miles above Golden, Colo.		b 2.0
Sept. 22	do.	do.	do.		0
Nov. 8	do.	do.	do.		b .5
Sept. 22	Golden Creek.	do.	Golden, Colo.		0
Dec. 22	Clear Creek.	South Platte River.	do.		b 15.0
Oct. 1	South Boulder Creek.	do.	Pine Cliff, Colo.		b 10.0
1	do.	do.	Rollinsville, Colo.		b 15.0
1	Lump Gulch Creek.	South Boulder Creek.	do.		b 3.0
Apr. 1	Lonetree Creek.	Clear Creek.	Greeley, Colo.		b 1.0
1	Crow Creek.	do.	Kersey, Colo.		0

a Ice conditions.

b Estimated.

The following measurements of streams and ditches along North Platte River from the Wyoming State line to Kearney, Nebr., were made by R. H. Fletcher from September 15 to October 12, 1911. The capacity of the ditches was determined by Kutter's formulas, values of $N=0.020$ to 0.030 , values of $S=0.0005$ to 0.002 . For ditches that were dry the value of S was determined by levels taken to high-water marks in ditches.

Measurements of streams and irrigation ditches along North Platte River from Wyoming State line to Kearney, Nebr., in 1911.

Date.	Stream or ditch.	Location.	Discharge.	Capacity.
			<i>Second-feet.</i>	<i>Second-feet.</i>
Sept. 15	North Platte River.....	Henry, Nebr.....	1,007	
15	.....do.....	Morrill, Nebr.....	513	
17	.....do.....	Mitchell, Nebr.....	710	
18	.....do.....	Scottsbluff, Nebr.....	879	
19	.....do.....	Minatare, Nebr.....	699	
21	.....do.....	Bayard, Nebr.....	573	
22	.....do.....	Bridgeport, Nebr.....	457	
24	.....do.....	Lisco, Nebr.....	529	
25	.....do.....	Oshkosh, Nebr.....	559	
27	.....do.....	Lewellen, Nebr.....	646	
29	.....do.....	Keystone, Nebr.....	638	
Oct. 6	.....do.....	North Platte, Nebr.....	3,505	
10	.....do.....	Gothenburg, Nebr.....	2,408	
12	.....do.....	Kearney, Nebr.....	1,492	
Sept. 16	Dry Sheep Creek.....	Morrill, Nebr.....	19	
27	Blue Creek.....	Lewellen, Nebr.....	84	
27	.....do.....	.....do.....	(mouth) Dry.	
28	Otter Creek.....	Le Moyne, Nebr.....	Est. 15	
28	Loneragan Creek.....	.....do.....	Est. 4	
28	Spring or Sand Creek.....	.....do.....	Est. 2	
28	Whitetail Creek.....	Keystone, Nebr.....	Est. 12	
14	Mitchell ditch.....	Henry, Nebr. (highway).....	118	276
14	.....do.....	Henry, Nebr. (head gate).....	120	289
14	Gering ditch.....	Henry, Nebr.....	130	268
15	Tri-State ditch.....	.....do.....	432	1,359
16	.....do.....	Morrill, Nebr.....	417	1,053
17	.....do.....	Mitchell, Nebr.....	395	
15	Ramshorn ditch.....	Morrill, Nebr.....	Dry.	75
16	Enterprise ditch.....	Morrill, Nebr. (head gate).....	Dry.	328
17	.....do.....	Mitchell, Nebr. (1 mile below head gate).....	24	118
16	.....do.....	Morrill, Nebr.....	Est. 20	
17	Winters Creek ditch.....	Scotts Bluff, Nebr.....		213
17	Homestead ditch.....	.....do.....	Abandoned.	
18	Central Irrigation and Power ditch.....	Opposite Scotts Bluff, Nebr. (head gate).....	Dry.	49
18	.....do.....	Gering, Nebr. (below waste-way).....	Dry.	46
18	Steamboat ditch.....	Minatare, Nebr.....	Dry.	118
18	Castlerock ditch.....	.....do.....	60	210
19	Minatare ditch.....	.....do.....	Dry.	178
19	North Fork Minatare ditch.....	.....do.....	Dry.	92
19	South Fork Minatare ditch.....	.....do.....	Dry.	58
19	Ninemile ditch.....	.....do.....	91	238
19	Short Line ditch.....	Bayard, Nebr.....	Dry.	41
20	Chimneyrock ditch.....	.....do.....	Est. 15	143
20	Alliance ditch.....	.....do.....	45	99
20	Belmont ditch.....	.....do.....	72	255
22	.....do.....	Bridgeport, Nebr.....	50	133
20	Empire ditch.....	Bayard, Nebr.....	Dry.	23
21	Schemerhorn ditch.....	Northport, Nebr.....	Dry.	57
21	H. T. Clark ditch.....	.....do.....	Dry.	Abandoned.
21	Browns Creek ditch.....	.....do.....	79	163
23	Beerline ditch.....	Broadwater, Nebr.....	Dry.	49
23	Lees Creek ditch.....	.....do.....	Dry.	13
23	Lisco Irrigation Co. ditch.....	Lisco, Nebr.....	Dry.	154
24	Hannah ditch.....	.....do.....	Dry.	Abandoned.
24	Rush Creek ditch.....	.....do.....	Dry.	26
25	Wilcox ditch.....	.....do.....	Dry.	Abandoned.
25	Spohn ditch.....	Oshkosh, Nebr.....	Dry.	35
25	Lyons ditch.....	.....do.....	Dry.	Abandoned.
25	Oshkosh or Robinson Gumaer ditch.....	.....do.....	Dry.	31

Measurement of streams and irrigation ditches along North Platte River from Wyoming State line to Kearney, Nebr., in 1911—Continued.

Date.	Stream or ditch.	Location.	Discharge.	Capacity.
			<i>Second-feet.</i>	<i>Second-feet.</i>
25	Gyger ditch.....	Oshkosh, Nebr.....	Dry.	Abandoned.
26	Roberts or Midland ditch.....	do.....	17	Full capacity.
26	Overland ditch.....	do.....	Dry.	Abandoned.
26	Bushnell ditch.....	do.....	Dry.	Abandoned.
26	Signal Bluff ditch.....	do.....	Dry.	Abandoned.
28	Robins-Williams ditch.....	Lewellen, Nebr.....	Dry.	Abandoned.
26	Alfalfa Irrigation ditch.....	do.....	Est. 12	72
27	Vance-Orr ditch.....	do.....	Est. 2	17
28	Holcomb ditch.....	Le Moyne, Nebr.....	Dry.	Abandoned.
28	Meyers-Phelas ditch.....	Martin, Nebr.....	Dry.	Abandoned.
28	Fernstrom or Nisson ditch.....	do.....	Dry.	Abandoned.
29	Southerland or Paxton ditch.....	Keystone, Nebr.....	73	171
29	Sheridan or Wilson ditch.....	Sarben, Nebr.....	Dry.	Abandoned.
Oct. 1	South Side ditch.....	Southerland, Nebr.....	Dry.	Abandoned.
1	North Platte or old ditch canal.....	do.....	83	189
1	Hershey ditch.....	do.....	83	Full capacity.
2	Farmers-Merchants or Suburban ditch.....	Hershey, Nebr.....	Dry.	145
9	Gothenburg ditch.....	Brady, Nebr.....	82	265
11	Farmers and Merchants ditch.....	Cozad, Nebr.....	Dry.	306
12	Kearney ditch.....	Kearney, Nebr.....	86	546

Blue Creek ditches.

Sept 27	Ramsey ditch.....	Lewellen, Nebr.....	Est. 7	Est. 75
27	Equitable, etc., ditch.....	do.....	35	Full capacity.
27	Iowa Improvement Irrigation ditch.....	do.....	About 2	Est. 30
26	Meeker or Graf ditch.....	do.....	26	Full capacity.

INDEX.

A.		Arapahoe, Wyo.—Continued.	
	Page.		Page.
Absarokee, Mont.,		Little Wind River below:	
Rosebud River at:		description.....	189
description.....	170	discharge.....	189
discharge.....	170	discharge, daily.....	190
discharge, daily.....	171	discharge, monthly.....	190
discharge, monthly.....	172	gage height.....	189
gage height.....	171	Popo Agie River at:	
Stillwater River near:		discharge.....	347
description.....	168		
discharge.....	168	Arkins, Colo.,	
discharge, daily.....	169	Big Thompson Creek near:	
discharge, monthly.....	169	description.....	327-328
gage height.....	169	discharge.....	328
Accuracy of measurements, degree of.....	16-17	discharge, daily.....	328
Acknowledgments to those aiding.....	17-19	discharge, monthly.....	329
Acre-foot, definition of.....	12	gage height.....	328
Agency ditch near—		Arlington, Wyo.,	
Harlem, Mont.:		Rock Creek near:	
description.....	140	description.....	264
discharge.....	140	discharge.....	264
discharge, daily.....	140	discharge, daily.....	265
discharge, monthly.....	141	discharge, monthly.....	266
gage height.....	140	gage height.....	265
Alder, Mont.,		Augusta, Mont.,	
Ruby River near:		Du Bray Creek near:	
description.....	40	discharge.....	346
discharge.....	40	Ford Creek near:	
discharge, daily.....	41	description.....	79
discharge, monthly.....	42	discharge.....	79
gage height.....	41	discharge, daily.....	80
Alfalfa Irrigation ditch at—		discharge, monthly.....	81
Lewellen, Nebr.:		gage height.....	79-80
discharge.....	350	North Fork of Sun River near:	
Alliance ditch at—		description.....	71-72
Bayard, Nebr.:		discharge.....	72, 346
discharge.....	349	discharge, daily.....	73
Alzada, Mont.,		discharge, monthly.....	73
Little Missouri River near:		gage height.....	72
description.....	224	Smith Creek near:	
discharge.....	224	description.....	81
gage height.....	224	discharge.....	81
American Fork near—		discharge, daily.....	82
Harlowton, Mont.:		discharge, monthly.....	83
description.....	112	gage height.....	82
discharge.....	112	South Fork of Sun River at:	
discharge, daily.....	113	description.....	77
discharge, monthly.....	113	discharge.....	77
gage height.....	112	discharge, daily.....	78
Appropriation of water, laws for.....	19-24	discharge, monthly.....	79
Appropriations, amount of.....	9	gage height.....	77-78
Arapahoe, Wyo.,		Willow Creek near:	
Little Wind River above:		description.....	75-76
description.....	187	discharge.....	76
discharge.....	187	discharge, daily.....	76
discharge, daily.....	188	discharge, monthly.....	77
discharge, monthly.....	188	gage height.....	76
gage height.....	187	Authority for work.....	9-10

B.			
Badger, Wyo.,		Page.	
Cottonwood Creek at:			
discharge.....	347		
Badger Creek near—			
Family, Mont.:			
description.....	87		
discharge.....	87		
discharge, daily.....	88		
discharge, monthly.....	89		
gage height.....	88		
Barratts, Mont.,			
Beaverhead River at:			
description.....	30		
discharge.....	30		
discharge, daily.....	31		
discharge, monthly.....	32		
gage height.....	31		
Bayard, Nebr.,			
Alliance ditch at:			
discharge.....	349		
Belmont ditch at:			
discharge.....	349		
Chimneyrock ditch at:			
discharge.....	349		
Empire ditch at:			
discharge.....	349		
North Platte River at:			
discharge.....	349		
Shortline ditch at:			
discharge.....	349		
Beatrice, Nebr.,			
Big Blue River at:			
description.....	342		
discharge.....	342		
discharge, daily.....	342, 343		
discharge, monthly.....	344		
gage height.....	342-343		
Beaver Creek at or near—			
Encampment, Wyo.:			
discharge.....	347		
Golden, Colo.:			
discharge.....	348		
Saco, Mont.:			
description.....	129-130		
discharge.....	130		
discharge, daily.....	131		
gage height.....	130		
Beaver Creek overflow near—			
Bowdoin, Mont.:			
description.....	131		
discharge.....	131		
gage height.....	132		
Beaverhead River at—			
Barratts, Mont.:			
description.....	30		
discharge.....	30		
discharge, daily.....	31		
discharge, monthly.....	32		
gage height.....	31		
Beebe, J. C., work of.....	18		
Beerline ditch at—			
Broadwater, Nebr.:			
discharge.....	349		
Belmont ditch at—			
Bayard, Nebr.:			
discharge.....	349		
Bridgeport, Nebr.:			
discharge.....	349		
Big Blue River at—			
Beatrice, Nebr.:		Page.	
description.....		342	
discharge.....		342	
discharge, daily.....		342, 343	
discharge, monthly.....		344	
gage height.....		342-343	
Big Creek near—			
Downington, Wyo.:			
description.....		250	
discharge.....		250	
gage height.....		250	
Bighole River near—			
Dewey, Mont.:			
description.....		38	
discharge.....		38	
discharge, daily.....		39	
discharge, monthly.....		40	
gage height.....		39	
Bighorn canal near—			
St. Xavier, Mont.:			
discharge.....		347	
Bighorn River at or near—			
Hardin, Mont.:			
description.....		182	
discharge.....		182	
discharge, daily.....		183	
discharge, monthly.....		184	
gage height.....		183	
Thermopolis, Wyo.:			
description.....		180	
discharge.....		180	
discharge, daily.....		181	
discharge, monthly.....		182	
gage height.....		181	
Big Muddy Creek near—			
Culbertson, Mont.:			
description.....		148	
discharge.....		148	
discharge, daily.....		149	
discharge, monthly.....		149	
gage height.....		148	
Big Spring Creek at—			
Lewiston, Mont.:			
discharge.....		347	
Big Thompson Creek near—			
Arkins, Colo.:			
description.....		327-328	
discharge.....		328	
discharge, daily.....		328	
discharge, monthly.....		329	
gage height.....		328	
Big Timber, Mont.,			
North Fork of Big Timber Creek near:			
description.....		157	
discharge.....		157	
discharge, daily.....		158	
discharge, monthly.....		158	
gage height.....		157	
South Fork of Big Timber Creek near:			
description.....		159	
discharge.....		159	
discharge, daily.....		160	
discharge, monthly.....		160	
gage height.....		159	
Birch Creek near—			
Dupuyer, Mont.:			
description.....		91	
discharge.....		91	

Birch Creek near—Continued.		Boxelder Creek near—	
Dupuyer, Mont.—Continued.	Page.	Careyhurst, Wyo.:	Page.
discharge, daily.....	92	description.....	268
discharge, monthly.....	93	discharge.....	268, 347
gage height.....	92	discharge, daily.....	269
Birdseye, Mont.,		discharge, monthly.....	269
Sevenmile Creek at:		gage height.....	268
description.....	58	Brady, Nebr.,	
discharge.....	58	Gothenburg ditch at:	
discharge, daily.....	59	discharge.....	350
discharge, monthly.....	59	Bridgeport, Nebr.,	
gage height.....	58	Belmont ditch at:	
Blue Creek at—		discharge.....	349
Lewellen, Nebr.:		North Platte River at:	
discharge.....	349	discharge.....	347, 349
Bona, Wyo.,		Broadwater, Nebr.,	
Elkhorn Creek near:		Beerline ditch at:	
discharge.....	347	discharge.....	349
Bonanza, Wyo.,		Lees Creek ditch at:	
No Wood River at:		discharge.....	349
description.....	195	Broncho, N. Dak.,	
discharge.....	195	Little Knife River near:	
discharge, daily.....	196	description.....	224-225
discharge, monthly.....	196	discharge.....	225
gage height.....	195	discharge, daily.....	226
Paint Rock Creek near:		discharge, monthly.....	226
description.....	199	gage height.....	225
discharge.....	199	Browning, Mont.,	
discharge, daily.....	200	North Fork of Milk River near:	
discharge, monthly.....	201	description.....	126
gage height.....	200	discharge.....	126
Bostwick, Nebr.,		gage height.....	127
Republican River at:		South Fork of Milk River near:	
description.....	339-340	description.....	117-118
discharge.....	340	discharge.....	118
discharge, daily.....	340	discharge, daily.....	119
discharge, monthly.....	340	discharge, monthly.....	119
gage height.....	340	gage height.....	118
Boulder Creek at—		Browns Creek ditch at—	
Orodel, Colo.:		Northport, Nebr.:	
description.....	321-322	discharge.....	349
discharge.....	322	Bruffeys, Mont.,	
discharge, daily.....	323	West Boulder River at:	
discharge, monthly.....	323	discharge.....	347
gage height.....	322	Brush Creek near—	
Boulder River near—		Saratoga, Wyo.:	
Contact, Mont.:		description.....	253
description.....	161	discharge.....	253
discharge.....	161	discharge, daily.....	254
discharge, daily.....	162	discharge, monthly.....	254
discharge, monthly.....	162	gage height.....	253
gage height.....	161	Buffalo, Colo.,	
Boulder River, West Fork, at—		Buffalo Creek near:	
McLeod, Mont.:		discharge.....	348
description.....	163	Buffalo, Wyo.:	
discharge.....	163	Clear Creek at:	
discharge, daily.....	164	description.....	221
discharge, monthly.....	164	discharge.....	221
gage height.....	163	discharge, daily.....	222
Bowdoin, Mont.,		discharge, monthly.....	222
Beaver Creek overflow near:		gage height.....	221
description.....	131	Clear Creek near:	
discharge.....	131	description.....	220
gage height.....	132	discharge.....	220
		gage height.....	220

	Page.		Page.
Bull Lake Creek at—		Cassells, Colo.—Continued.	
I. K. Ranch, Wyo.:		North Fork of South Platte River at—	
discharge.....	347	Continued.	
C.		discharge, daily.....	308
Cache La Poudre River near—		discharge, monthly.....	308
Elkhorn, Colo.:		gage height.....	307
description.....	329	Castlerock ditch at—	
discharge.....	329-330	Minatare, Nebr.:	
discharge, daily.....	331	discharge.....	349
discharge, monthly.....	332	Central Irrigation and Power ditch near—	
gage height.....	331	Gering, Nebr.:	
Fort Collins, Colo.:		discharge.....	349
description.....	332	Scottsbluff, Nebr.:	
discharge.....	332-333	discharge.....	349
discharge, daily.....	334	Chandler, E. F., work of.....	18
discharge, monthly.....	334	Checkerboard Creek near—	
gage height.....	333	Delpine, Mont.:	
Fort Collins, Colo. (at mouth of canyon):		description.....	108
description.....	334-335	discharge.....	108
discharge.....	335	discharge, daily.....	109
discharge, daily.....	336	discharge, monthly.....	109
discharge, monthly.....	336	gage height.....	108
gage height.....	335	Chicago Creek at—	
Cannonball River near—		Idaho Springs, Colo.:	
Stevenson, N. Dak.:		discharge.....	348
description.....	228	Chimneyrock ditch at—	
discharge.....	229	Bayard, Nebr.:	
gage height.....	229	discharge.....	349
Canyon Creek, Mont.,		Chinook, Mont.,	
Little Prickly Pear Creek near:		Cook canal near:	
description.....	62	description.....	136
discharge.....	62	discharge.....	136
discharge, daily.....	63	discharge, daily.....	136
discharge, monthly.....	63	discharge, monthly.....	137
gage height.....	62	gage height.....	136
Carey Act projects, administration of.....	23-24	Fort Belknap canal near:	
Careyhurst, Wyo.,		description.....	141
Boxelder Creek near:		discharge.....	141
description.....	268	discharge, daily.....	142
discharge.....	268, 347	discharge, monthly.....	142
discharge, daily.....	269	gage height.....	142
discharge, monthly.....	269	Mathewson canal near:	
gage height.....	268	description.....	137
Carneyville, Wyo.,		discharge.....	137
Tongue River at:		discharge, daily.....	138
description.....	212	discharge, monthly.....	138
discharge.....	212	gage height.....	138
discharge, daily.....	213	North Fork of Milk River near:	
discharge, monthly.....	213	description.....	127
gage height.....	212	discharge.....	128
Cascade, Mont.,		discharge, daily.....	129
Missouri River at:		discharge, monthly.....	129
description.....	36	gage height.....	128
discharge.....	36	Paradise Valley canal near:	
discharge, daily.....	37	description.....	134
discharge, monthly.....	37	discharge.....	135
gage height.....	36	discharge, daily.....	135
Cassa, Wyo.,		discharge, monthly.....	135
Horseshoe Creek at:		gage height.....	135
discharge.....	347	Choteau, Mont.,	
Cassels, Colo.,		Deep Creek near:	
ditches at:		description.....	100
discharge.....	348	discharge.....	100
North Fork of South Platte River at:		discharge, daily.....	101
description.....	306-307	discharge, monthly.....	101
discharge.....	307	gage height.....	100
		Christiansen, E. O., work of.....	18

Chugwater Creek at—		Clemons, Mont.—Continued.	
Chugwater, Wyo.:	Page.	Falls Creek near—Continued.	Page.
description.....	280-281	discharge, daily.....	71
discharge.....	281	discharge, monthly.....	71
gage height.....	281	gage height.....	70
Clancy, Mont.,		Fish Creek at:	
Lump Gulch Creek near:		discharge.....	346
description.....	53-54	Coburn, Mont.,	
discharge.....	54	Pryor Creek near:	
discharge, daily.....	55	description.....	174
discharge, monthly.....	55	discharge.....	174
gage height.....	54	gage height.....	174
Prickly Pear Creek near:		Colorado, cooperation of.....	17-18
description.....	50	water laws of.....	19-20, 21-22, 23, 24
discharge.....	50	Columbus, Nebr.:	
discharge, daily.....	51	Loup River at:	
discharge, monthly.....	51	description.....	326-327
gage height.....	50	discharge.....	337
Clark (H. T.) ditch at—		gage height.....	327
Northport, Nebr.:		Platte River near:	
discharge.....	349	description.....	247
Clark Fork at—		discharge.....	247
Fromberg, Mont.:		gage height.....	248
description.....	172	Como, Colo.,	
discharge.....	172	Tarryall Creek near:	
discharge, daily.....	173	description.....	299-300
discharge, monthly.....	173	discharge.....	300
gage height.....	172	gage height.....	300
Clear Creek (Colo.) at—		Contact, Mont.,	
Empire Station, Colo.:		Boulder River near:	
discharge.....	348	description.....	161
Forkscreek, Colo.:		discharge.....	161
description.....	318	discharge, daily.....	162
discharge.....	318	discharge, monthly.....	162
discharge, daily.....	319	gage height.....	161
discharge, monthly.....	319	Cook canal near—	
gage height.....	318	Chinook, Mont.:	
Georgetown, Colo.:		description.....	136
discharge.....	348	discharge.....	136
Golden, Colo.:		discharge, daily.....	136
discharge.....	348	discharge, monthly.....	137
Idaho Springs, Colo.:		gage height.....	136
description.....	316	Cooperation, credit for.....	10, 17-18
discharge.....	316	Corbett dam, Wyo.,	
discharge, daily.....	317	Corbett tunnel at:	
gage height.....	317	discharge, daily.....	209
Clear Creek (Wyo.) at or near—		discharge, monthly.....	209
(at) Buffalo, Wyo.:		Shoshone River at:	
description.....	221	description.....	207
discharge.....	221	discharge.....	207
discharge, daily.....	222	discharge, daily.....	208
discharge, monthly.....	222	discharge, monthly.....	209
gage height.....	221	gage height.....	208
(near) Buffalo, Wyo.:		Corwin Springs, Mont.,	
description.....	220	Yellowstone River at:	
discharge.....	220	description.....	150
gage height.....	220	discharge.....	150
Clemons, Mont.:		discharge, daily.....	150, 151
Dearborn River near:		discharge, monthly.....	162
description.....	67-68	gage height.....	150-151
discharge.....	68	Cottonwood Creek at—	
discharge, daily.....	69	Badger, Wyo.:	
discharge, monthly.....	69	discharge.....	347
gage height.....	68	Cow Creek near—	
Falls Creek near:		Saratoga, Wyo.:	
description.....	70	description.....	256-257
discharge.....	70	discharge.....	257

Cow Creek near—Continued.		Dearborn River, Middle Fork, at—	
Saratoga, Wyo.—Continued.	Page.	Stearns, Mont.:	Page.
discharge, daily.....	257	discharge.....	346
discharge, monthly.....	258	Deep Creek near—	
gage height.....	257	Choteau, Mont.:	
Cozad, Nebr.,		description.....	100
Farmers-Merchants ditch at:		discharge.....	100
discharge.....	350	discharge, daily.....	101
Craig Park Creek at—		discharge, monthly.....	101
Estabrook, Colo.:		gage height.....	100
discharge.....	348	Townsend, Mont.:	
Crossons, Colo.,		description.....	48-49
Deer Creek at:		discharge.....	49
discharge.....	348	gage height.....	49
Crow Agency, Wyo.,		Deer Creek (Colo.) at—	
Little Bighorn River near:		Crossons, Colo.:	
description.....	207	discharge.....	348
discharge.....	207	Deer Creek (Wyo.) near—	
Crow Creek at—		Glenrock, Wyo.:	
Kersey, Colo.:		discharge.....	347
discharge.....	348	Definition of terms.....	12
Crowheart, Wyo.,		Delpine, Mont.,	
Dry Creek at:		Checkerboard Creek near:	
discharge.....	347	description.....	108
Culbertson, Mont.,		discharge.....	108
Big Muddy Creek near:		discharge, daily.....	109
description.....	148	discharge, monthly.....	109
discharge.....	148	gage height.....	108
discharge, daily.....	149	North Fork of Musselshell River near:	
discharge, monthly.....	149	description.....	102
gage height.....	148	discharge.....	102
Current meters, views of.....	17	discharge, daily.....	103
Cutbank Creek at—		discharge, monthly.....	103
Cutbank, Mont.:		gage height.....	102
description.....	89	Denver, Colo.,	
discharge.....	89	South Platte River at:	
discharge, daily.....	90	description.....	292
discharge, monthly.....	91	discharge.....	292
gage height.....	90	discharge, daily.....	293
		discharge, monthly.....	294
D.		gage height.....	292-293
Data, explanation of.....	14-16	Dewey, Mont.,	
Dayton, Wyo.,		Bighole River near:	
Tongue River near:		description.....	38
description.....	211	discharge.....	38
discharge.....	211	discharge, daily.....	39
gage height.....	211	discharge, monthly.....	40
Deadman Creek near—		gage height.....	39
Marysville, Mont.:		Discharge, tables of, explanation of.....	15
description.....	64	Dobson, A. A., work of.....	18
discharge.....	64	Downington, Wyo.,	
discharge, daily.....	64	Big Creek near:	
discharge, monthly.....	65	description.....	250
gage height.....	64	discharge.....	250
Dean, H. J., work of.....	18	gage height.....	250
Dearborn River basin:		Dry Creek at—	
miscellaneous measurements.....	346	Crowheart, Wyo.:	
stream flow.....	67-71	discharge.....	347
Dearborn River near—		Dry Sheep Creek at—	
Clemons, Mont.:		Morrill, Nebr.:	
description.....	67-68	discharge.....	349
discharge.....	68	Dubois, Wyo.,	
discharge, daily.....	69	Horse Creek at:	
discharge, monthly.....	69	description.....	185
gage height.....	68	discharge.....	185
Monida, Mont.:		gage height.....	186
discharge.....	346		

Dubois, Wyo.—Continued.

Red Creek at:	Page.
discharge.....	347
Torrey Creek at:	
discharge.....	347
Warm Springs Creek near:	
description.....	184
discharge.....	184
gage height.....	185
Wind River at:	
description.....	177
discharge.....	177
gage height.....	177-178
Duck Lake Creek near—	
Grant, Colo.:	
description.....	313-314
discharge.....	314
gage height.....	314
Dupuyer, Mont.,	
Birch Creek near:	
description.....	91
discharge.....	91
discharge, daily.....	92
discharge, monthly.....	93
gage height.....	92
Dupuyer Creek at:	
description.....	93
discharge.....	93
discharge, daily.....	94
discharge, monthly.....	95
gage height.....	94
Dupuyer ditch near—	
Valler, Mont.:	
discharge.....	346

E.

East Boulder Creek near—	
McLeod, Mont.:	
discharge.....	347
East Helena, Mont.,	
Prickly Pear Creek, Mont.:	
description.....	51-52
discharge.....	52
discharge, daily.....	53
discharge, monthly.....	53
gage height.....	52
Ebner, George, work of.....	18
Eldorado Springs, Colo.,	
South Boulder Creek at:	
description.....	326
discharge.....	326
discharge, daily.....	327
discharge, monthly.....	327
gage height.....	326
Elk Creek at or near—	
Golden, Colo.:	
discharge.....	348
Pine Grove, Colo.:	
discharge.....	348
Elkhorn, Colo.,	
Cache La Poudre River near:	
description.....	329
discharge.....	329-330
discharge, daily.....	331
discharge, monthly.....	332
gage height.....	331

Elkhorn Creek near—

Bona, Wyo.:	Page.
discharge.....	347
Elkhorn River at—	
Waterloo, Nebr.:	
description.....	338
discharge.....	338
discharge, daily.....	339
discharge, monthly.....	339
gage height.....	338
Empire ditch at—	
Bayard, Nebr.:	
discharge.....	349
Empire station, Colo.,	
Clear Creek at:	
discharge.....	348
Encampment, Wyo.,	
Beaver Creek at:	
discharge.....	347
Encampment River at—	
Encampment, Wyo.:	
description.....	254-255
discharge.....	255
discharge, daily.....	256
discharge, monthly.....	256
gage height.....	255
Equitable ditch at—	
Lewellen, Nebr.:	
discharge.....	350
Equivalents, convenient, list of.....	13-14
Estabrook, Colo.,	
Craig Park Creek at:	
discharge.....	348
F.	
Fairbury, Nebr.,	
Little Blue River near:	
description.....	344
discharge.....	344
discharge, daily.....	345
discharge, monthly.....	346
gage height.....	345
Fairplay, Colo.,	
Middle Fork of South Platte River at:	
description.....	283
discharge.....	283
gage height.....	283
Falls Creek near—	
Clemons, Mont.:	
description.....	70
discharge.....	70
discharge, daily.....	71
discharge, monthly.....	71
gage height.....	70
Family, Mont.,	
Badger Creek near:	
description.....	87
discharge.....	87
discharge, daily.....	88
discharge, monthly.....	89
gage height.....	88
Two Medicine Creek near:	
description.....	85
discharge.....	85
discharge, daily.....	86
discharge, monthly.....	87
gage height.....	86

Glendive, Colo.—Continued.

Laramie River at—Continued.	Page.
discharge, monthly.....	271
gage height.....	270
Glendo, Wyo.,	
Horseshoe Creek near:	
discharge.....	347
Glenrock, Wyo.,	
Deer Creek near:	
discharge.....	347
Golden, Colo.,	
Beaver Creek near:	
discharge.....	348
Clear Creek at:	
discharge.....	348
Elk Creek near:	
discharge.....	348
Golden Creek at:	
discharge.....	348
Roscoe Creek near:	
discharge.....	348
Goose Creek at—	
Sheridan, Wyo.:	
description.....	213
discharge.....	214
discharge, daily.....	214
discharge, monthly.....	215
gage height.....	214
Gothenburg, Nebr.,	
North Platte River at:	
discharge.....	349
Gothenburg ditch at—	
Brady, Nebr.:	
discharge.....	350
Grand River near—	
Wakpala, S. Dak.:	
description.....	230
discharge.....	230
Grand River, North Branch, at—	
Haley, N. Dak.:	
description.....	230
discharge.....	230
Grant, Colo.,	
Duke Lake Creek near:	
description.....	313-314
discharge.....	314
gage height.....	314
Geneva Creek at:	
description.....	312
discharge.....	312, 348
gage height.....	312
Geneva Creek near (above Jackwhacker Creek):	
description.....	309
discharge.....	309
gage height.....	309
Geneva Creek near (at old Geneva smelter):	
description.....	309
discharge.....	309
gage height.....	310
Geneva Creek near (at Sullivan's ranch):	
description.....	310
discharge.....	310
discharge, daily.....	311
discharge, monthly.....	312
gage height.....	311

Grant, Colo.—Continued.

North Fork of South Platte River at:	Page.
description.....	305
discharge.....	305
discharge, daily.....	306
discharge, monthly.....	306
gage height.....	305
Scott Gomer Creek near:	
description.....	314
discharge.....	314
discharge, daily.....	315
discharge, monthly.....	316
gage height.....	315
Smelter Creek near:	
description.....	313
discharge.....	313
gage height.....	313
Threemile Creek near:	
discharge.....	348
Gray, G. A., work of.....	18
Greeley, Colo.,	
Lonetree Creek at:	
discharge.....	348
Greybull River near—	
Meeteetse, Wyo.:	
description.....	201
discharge.....	201
discharge, daily.....	203
discharge, monthly.....	203
gage height.....	202
Gyger ditch at—	
Oshkosh, Nebr.:	
discharge.....	350
H.	
Haley, N. Dak.,	
North Branch of Grand River at:	
description.....	230
discharge.....	230
Hannah ditch at—	
Lisco, Nebr.:	
discharge.....	349
Hardin, Mont.,	
Bighorn River near:	
description.....	182
discharge.....	182
discharge, daily.....	183
discharge, monthly.....	184
gage height.....	183
Harlem, Mont.,	
Agency ditch near:	
description.....	140
discharge.....	140
discharge, daily.....	140
discharge, monthly.....	141
gage height.....	140
Harlem canal near—	
Zurich, Mont.:	
description.....	138
discharge.....	139
discharge, daily.....	139
discharge, monthly.....	139
gage height.....	139
Harlowton, Mont.,	
American Fork near:	
description.....	112
discharge.....	112
discharge, daily.....	113

Harlowton, Mont.—Continued.

American Fork near—Continued.	Page.
discharge, monthly	113
gage height	112
Lebo Creek near:	
description	114
discharge	114
discharge, daily	115
discharge, monthly	115
gage height	114
Musselshell River at:	
description	106
discharge	106
discharge, daily	107
discharge, monthly	107
gage height	106
Haufs Spur. See Glendo, Wyo.	
Havre, Mont.,	
Milk River at:	
description	120
discharge	120
discharge, daily	121
discharge, monthly	122
gage height	121
Hayman, Colo.,	
Tarryall Creek near:	
description	301
discharge	302
gage height	302
Heart River near—	
Richardton, N. Dak.:	
description	227
discharge	227
gage height	228
Helena, Mont.,	
Tenmile Creek near:	
description	55-56
discharge	56
discharge, daily	57
discharge, monthly	57
gage height	56
Henry, Nebr.:	
Enterprise ditch at:	
discharge	349
Gering ditch at:	
discharge	349
Mitchell ditch at:	
discharge	349
North Platte River at:	
discharge	347, 349
Tri-State ditch at:	
discharge	349
Hershey, Nebr.,	
Farmers-Merchants ditch at:	
discharge	350
Hershey ditch at—	
Southerland, Nebr.:	
discharge	350
Hinsdale, Mont.,	
Milk River near:	
description	124
discharge	124
discharge, daily	125
discharge, monthly	126
gage height	125
Holcomb ditch at—	
Le Moyne, Nebr.:	
discharge	350

Homestead ditch at—

Scottsbluff, Nebr.:	Page.
discharge	349
Horse Creek at and near—	
Dubois, Wyo.:	
description	185
discharge	185
gage height	186
Lagrange, Wyo.:	
description	282
discharge	282
gage height	282
Little Horse Creek, Wyo.:	
description	281-282
discharge	282
gage height	282
Horseshoe Creek near—	
Cassa, Wyo.:	
discharge	347
Glendo, Wyo.:	
discharge	347
Hudson, Wyo.,	
Little Popo Agie River at:	
description	191-192
discharge	192
gage height	192
Huntley, Mont.,	
Pryor Creek at:	
description	175
discharge	175
discharge, daily	176
discharge, monthly	176
gage height	175
Yellowstone River at:	
description	152
discharge	152
discharge, daily	153
discharge, monthly	154
gage height	153
Hyattsville, Wyo.,	
Paint Rock Creek near:	
description	199
discharge	199, 347
I.	
Idaho Springs, Colo.,	
Chicago Creek at:	
discharge	348
Clear Creek at:	
description	316
discharge	316
discharge, daily	317
gage height	317
Soda Creek at:	
discharge	398
Inez, Wyo.,	
La Prele Creek near:	
discharge	347
Intake (Lower Yellowstone dam), Mont.,	
Lower Yellowstone canal at:	
discharge, daily	156
discharge, monthly	156
Yellowstone River at:	
description	154
discharge, daily	155
discharge, monthly	156
gage height	155

	K.	
Interior, S. Dak.,		
White River near:	Page.	
description.....	231	
discharge.....	231	
gage height.....	231	
Interstate canal at—		
Whalen, Wyo.:		
discharge, daily.....	242	
discharge, monthly.....	243	
See also North Platte River and Inter-		
terstate canal.		
Iowa Improvement ditch at—		
Lewellen, Nebr.:		
discharge.....	350	
Irrigation districts, Colo., status of.....	23	
J.		
Jack Creek near—		
Saratoga, Wyo.:		
description.....	260	
discharge.....	260	
discharge, daily.....	261	
discharge, monthly.....	261	
gage height.....	260	
Jefferson, Colo.,		
Jefferson Creek at:		
description.....	303	
discharge.....	303	
gage height.....	303	
Michigan Creek near:		
description.....	304	
discharge.....	304	
gage height.....	304	
Tarryall Creek near:		
description.....	300	
discharge.....	301, 348	
gage height.....	301	
Jefferson River near—		
Silverstar, Mont.:		
description.....	32	
discharge.....	32	
discharge, daily.....	33	
discharge, monthly.....	34	
gage height.....	32-33	
Jelm, Wyo.,		
Laramie River near:		
description.....	271-272	
discharge.....	272	
discharge, daily.....	273	
discharge, monthly.....	273	
gage height.....	272	
J. K. ranch, Wyo.,		
Bull Lake Creek at:		
discharge.....	347	
Meadow Creek at:		
discharge.....	346	
Jones, B. E., work of.....	18	
Judith River basin:		
miscellaneous measurements.....	347	
Julesburg, Colo.,		
South Platte River at:		
description.....	297-298	
discharge.....	298	
discharge, daily.....	299	
discharge, monthly.....	299	
gage height.....	298	
Kansas City, Mo.,		
Missouri River at:		
discharge.....	346	
Kansas River basin:		
stream flow.....	339-346	
Kaycee, Wyo.,		
Middle Fork of Powder River at:		
description.....	217	
discharge.....	218	
discharge, daily.....	218	
discharge, monthly.....	219	
gage height.....	218	
North Fork of Powder River near:		
description.....	219	
discharge.....	219	
gage height.....	220	
South Fork of Powder River near:		
description.....	217	
discharge.....	217	
gage height.....	217	
Kearney, Nebr.,		
Kearney ditch at:		
discharge.....	350.	
North Platte River at:		
discharge.....	349	
Kearney, Wyo.,		
Piney Creek at:		
description.....	222	
discharge.....	222	
discharge, daily.....	223	
discharge, monthly.....	223	
gage height.....	223	
Kersey, Colo.,		
Crow Creek at:		
discharge.....	348	
South Platte River near:		
description.....	294	
discharge.....	294	
discharge, daily.....	296-297	
discharge, monthly.....	297	
gage height.....	295	
Keyapaha River in—		
T. 38 N., R. 26 W., S. Dak.:		
discharge.....	347	
Keystone, Nebr.,		
North Platte River at:		
discharge.....	349	
Southerland ditch at:		
discharge.....	350	
Whitetail Creek at:		
discharge.....	349	
L.		
Lagrange, Wyo.,		
Horse Creek near:		
description.....	282	
discharge.....	282	
gage height.....	282	
Lake George, Colo.,		
South Fork of South Platte at:		
description.....	284	
discharge.....	284	
gage height.....	284-285	
Twin Creek at:		
discharge.....	348	
Lamb, W. A., work of.....	18	

Lander, Wyo.,		Lewellen, Nebr.—Continued.	
Popo Agie River near:	Page.	Equitable ditch at:	Page.
description.....	190-191	discharge.....	350
discharge.....	191	Iowa improvement ditch at:	
gage height.....	191	discharge.....	350
La Prele Creek near—		Meeker ditch at:	
Inez, Wyo.:		discharge.....	350
discharge.....	347	North Platte River at:	
Laramie River at or near—		discharge.....	349
Glendive, Colo.:		Ramsey ditch at:	
description.....	260-270	discharge.....	350
discharge.....	270	Robins-Williams ditch at:	
discharge, daily.....	270-271	discharge.....	356
discharge, monthly.....	271	Vance-Orr ditch at:	
gage height.....	270	discharge.....	350
Jelm, Wyo.:		Lewiston, Mont.,	
description.....	271-272	Big Spring Creek at:	
discharge.....	272	discharge.....	347
discharge, daily.....	273	Lima, Mont.,	
discharge, monthly.....	273	Red Rock River at:	
gage height.....	272	description.....	28
Two Rivers, Wyo.:		discharge.....	28
description.....	276	discharge, daily.....	29
discharge.....	276	discharge, monthly.....	30
discharge, daily.....	277	gage height.....	29
discharge, monthly.....	277	Lisco, Nebr.,	
gage height.....	276	Hannah ditch at:	
Uva, Wyo.:		discharge.....	349
discharge.....	347	Lisco Irrigation Co.'s ditch at:	
Woods Landing, Wyo.:		discharge.....	349
description.....	274	North Platte River at:	
discharge.....	274	discharge.....	349
discharge, daily.....	275	Rush Creek ditch at:	
discharge, monthly.....	275	discharge.....	349
gage height.....	274-275	Wilcox ditch at:	
Laws, water, in Colorado.....	19-20, 21-22, 23, 24	discharge.....	349
Lebo Creek near—		Little Bighorn River near—	
Harlowton, Mont.:		Crow Agency, Wyo.:	
description.....	114	description.....	207
discharge.....	114	discharge.....	207
discharge, daily.....	115	Wyola, Mont.:	
discharge, monthly.....	115	description.....	206
gage height.....	114	discharge.....	206
Lees Creek ditch at—		gage height.....	206
Broadwater, Nebr.:		Little Blue River near—	
discharge.....	349	Fairbury, Nebr.:	
Le Moyne, Nebr.,		description.....	344
Holcomb ditch at:		discharge.....	344
discharge.....	350	discharge, daily.....	345
Lonergan Creek at:		discharge, monthly.....	346
discharge.....	349	gage height.....	345
Otto Creek at:		Little Goose Creek at—	
discharge.....	349	Sheridan, Wyo.:	
Spring Creek at:		description.....	215
discharge.....	349	discharge.....	215
Leshara, Nebr.,		discharge, daily.....	216
Platte River near:		discharge, monthly.....	216
description.....	248	gage height.....	216
discharge.....	248	Little Horse Creek, Wyo.,	
discharge, daily.....	249	Horse Creek near:	
discharge, monthly.....	250	description.....	281-282
gage height.....	249	discharge.....	282
Lewellen, Nebr.,		gage height.....	282
Alfalfa Irrigation ditch at:		Little Knife River near—	
discharge.....	350	Broncho, N. Dak.:	
Blue Creek at:		description.....	224-225
discharge.....	349	discharge.....	225

Little Knife River near—Continued.		Little Wind River near—Continued.	
Broncho, N. Dak.—Continued.	Page.	(below) Arapahoe, Wyo.:	Page.
discharge, daily.....	226	description.....	189
discharge, monthly.....	226	discharge.....	189
gage height.....	225	discharge, daily.....	190
Little Laramie River near—		discharge, monthly.....	190
Filmore, Wyo.:		gage height.....	189
description.....	277	Fort Washakie, Wyo.:	
discharge.....	277	discharge.....	347
discharge, daily.....	278	Lodgegrass Creek near—	
discharge, monthly.....	278	Lodgegrass, Mont.:	
gage height.....	278	description.....	211
Two Rivers, Wyo.:		discharge.....	211
description.....	278-279	Lonergan Creek at—	
discharge.....	279	Le Moyne, Nebr.:	
gage height.....	279	discharge.....	349
Little Missouri River near—		Lonetree Creek at—	
Alzada, Mont.:		Greeley, Colo.:	
description.....	224	discharge.....	348
discharge.....	224	Lost Horse Creek near—	
gage height.....	224	Marysville, Mont.:	
Little Popo Agie River at—		description.....	65
Hudson, Wyo.:		discharge.....	65
description.....	191-192	discharge, daily.....	65
discharge.....	192	discharge, monthly.....	66
gage height.....	192	gage height.....	65
Little Porcupine Creek near—		Loup River at—	
Frazer, Mont.:		Columbus, Nebr.:	
description.....	143	description.....	326-327
discharge.....	143	discharge.....	327
discharge, daily.....	143	gage height.....	327
discharge, monthly.....	144	Lower Yellowstone canal. <i>See</i> Intake, Mont.	
gage height.....	143	Lump Gulch Creek at or near—	
Little Prickly Pear Creek basin:		Clancy, Mont.:	
stream flow.....	60-67	description.....	53-54
Little Prickly Pear Creek near—		discharge.....	54
Canyon Creek, Mont.:		discharge, daily.....	55
description.....	62	discharge, monthly.....	55
discharge.....	62	gage height.....	54
discharge, daily.....	63	Rollinsville, Colo.:	
discharge, monthly.....	63	discharge.....	348
gage height.....	62	Luverne, Minn.,	
Marysville, Mont.:		Rock River at:	
description.....	60	description.....	233
discharge.....	60	discharge.....	233
discharge, daily.....	61	discharge, daily.....	234
discharge, monthly.....	61	discharge, monthly.....	234
gage height.....	60	gage height.....	234
Little White River in—		Lyons, Colo.,	
T. 41 N., R. 29 W., S. Dak.:		St. Vrain Creek at:	
discharge.....	347	description.....	319-320
Little Whitetail Creek near—		discharge.....	320
Whitehall, Mont.:		discharge, daily.....	321
description.....	45	discharge, monthly.....	321
discharge.....	45	gage height.....	320
discharge, daily.....	46	Lyons ditch at—	
discharge, monthly.....	45	Oshkosh, Nebr.:	
gage height.....	45	discharge.....	349
Little Wind River near—			
(above) Arapahoe, Wyo.:		M.	
description.....	187	McLeod, Mont.,	
discharge.....	187	East Boulder Creek near:	
discharge, daily.....	188	discharge.....	347
discharge, monthly.....	188	West Fork of Boulder River at:	
gage height.....	187	description.....	163
		discharge.....	163

McLeod, Mont.—Continued.

West Fork of Boulder River at:	Page.
discharge, daily.....	164
discharge, monthly.....	164
gage height.....	163
Malta, Mont.,	
Milk River at:	
description.....	122
discharge.....	122
discharge, daily.....	123
discharge, monthly.....	124
gage height.....	123
Marias River basin:	
miscellaneous measurements.....	346
stream flow.....	83-101
Marias River near—	
Shelby, Mont.:	
description.....	83
discharge.....	83
discharge, daily.....	84
discharge, monthly.....	85
gage height.....	84
Marias River, Dry Fork, near—	
Valier, Mont.:	
description.....	95
discharge.....	95
discharge, daily.....	96
discharge, monthly.....	97
gage height.....	96
Marsh Creek near—	
Marysville, Mont.:	
description.....	66
discharge.....	66
discharge, daily.....	67
discharge, monthly.....	67
gage height.....	66
Martin, Nebr.,	
Fernstrom ditch at:	
discharge.....	350
Meyers-Phelas ditch at:	
discharge.....	350
Martinsdale, Mont.,	
North Fork of Musselshell River near—	
description.....	104
discharge.....	104
discharge, daily.....	105
discharge, monthly.....	105
gage height.....	104
South Fork of Musselshell River near:	
description.....	110
discharge.....	110
discharge, daily.....	111
discharge, monthly.....	111
gage height.....	110
Marysville, Mont.,	
Deadman Creek near:	
description.....	64
discharge.....	64
discharge, daily.....	64
discharge, monthly.....	65
gage height.....	64
Little Prickly Pear Creek near:	
description.....	60
discharge.....	60
discharge, daily.....	61
discharge, monthly.....	61
gage height.....	60

Marysville, Mont.—Continued.

Lost Horse Creek near:	Page.
description.....	65
discharge.....	65
discharge, daily.....	65
discharge, monthly.....	66
gage height.....	65
Marsh Creek near:	
description.....	66
discharge.....	66
discharge, daily.....	67
discharge, monthly.....	67
gage height.....	66
Mathewson canal near—	
Chinook, Mont.:	
description.....	137
discharge.....	137
discharge, daily.....	138
discharge, monthly.....	138
gage height.....	138
Meadow Creek at—	
J. K. ranch, Wyo.:	
discharge.....	347
Medicine Bow River near—	
Medicine Bow, Wyo.:	
description.....	263
discharge.....	263
discharge, daily.....	264
discharge, monthly.....	264
gage height.....	263
Meeker ditch at—	
Lewellen, Nebr.:	
discharge.....	350
Meeteetse, Wyo.,	
Greybull River near:	
description.....	201
discharge.....	201
discharge, daily.....	203
discharge, monthly.....	203
gage height.....	202
Wood River near:	
description.....	204
discharge.....	204
discharge, daily.....	205
discharge, monthly.....	206
gage height.....	204-205
Melville, Mont.,	
Sweetgrass Creek above:	
description.....	165
discharge.....	165
discharge, daily.....	166
discharge, monthly.....	166
gage height.....	165
Sweetgrass Creek below:	
description.....	166
discharge.....	167
discharge, daily.....	167
discharge, monthly.....	168
gage height.....	167
Meyers-Phelas ditch at—	
Martin, Nebr.:	
discharge.....	350
Michigan Creek near—	
Jefferson, Colo.:	
description.....	304
discharge.....	304
gage height.....	304

Milk River at or near—		Missouri River at—Continued.	
Havre, Mont.:	Page.	Cascade, Mont.—Continued.	Page.
description.....	120	discharge, monthly.....	37
discharge.....	120	gage height.....	36
discharge, daily.....	121	Fort Benton, Mont.:	
discharge, monthly.....	122	description.....	38
gage height.....	121	discharge.....	38
Hinsdale, Mont.:		Kansas City, Mo.:	
description.....	124	discharge.....	346
discharge.....	124	Toston, Mont.:	
discharge, daily.....	125	description.....	34
discharge, monthly.....	126	discharge.....	34
gage height.....	125	discharge, daily.....	35
Malta, Mont.:		discharge, monthly.....	35
description.....	122	gage height.....	34-35
discharge.....	122	Missouri River basin proper:	
discharge, daily.....	123	miscellaneous measurements.....	346
discharge, monthly.....	124	stream flow.....	25-38
gage height.....	123	Mitchell, Nebr.,	
Milk River basin:		North Platte River at:	
miscellaneous measurements.....	347	description.....	243
stream flow.....	117-142	discharge.....	243, 349
Milk River, North Fork, near—		discharge, daily.....	244
Browning, Mont.:		discharge, monthly.....	245
description.....	126	gage height.....	244
discharge.....	126	Mitchell ditch at—	
gage height.....	127	Henry, Nebr.:	
Chinook, Mont.:		discharge.....	349
description.....	127	Monida, Mont.,	
discharge.....	127	Red Rock River near:	
discharge, daily.....	129	discharge.....	346
discharge, monthly.....	129	<i>See also</i> Red Rock reservoir.	
gage height.....	128	Monley, Gorie, work of.....	18
Milk River, South Fork, near—		Montana, cooperation of.....	17
Browning, Mont.:		water laws of.....	21, 22
description.....	117-118	Morrill, Nebr.,	
discharge.....	118	Dry Sheep Creek at:	
discharge, daily.....	119	discharge.....	349
discharge, monthly.....	119	Enterprise ditch at:	
gage height.....	118	discharge.....	349
Milk River valley, private canals in, flow of.	134-142	North Platte River at:	
Minatare, Nebr.,		discharge.....	349
Castlerock ditch at:		Ramshorn ditch at:	
discharge.....	349	discharge.....	349
Minatare ditch at:		Tri-State ditch at:	
discharge.....	349	discharge.....	349
Ninemile ditch at:		Mullen Creek near—	
discharge.....	349	French, Wyo.:	
North Platte River at:		description.....	250-251
discharge.....	349	discharge.....	251
Steamboat ditch at:		gage height.....	251
discharge.....	349	Musselshell River at—	
Miscellaneous measurements:		Harlowton, Mont.:	
Dearborn River basin.....	346	description.....	106
Judith River basin.....	347	discharge.....	106
Marias River basin.....	346	discharge, daily.....	107
Milk River basin.....	347	discharge, monthly.....	107
Missouri River proper basin.....	346	gage height.....	106
Platte River basin.....	347	Musselshell River basin:	
Sun River basin.....	346	stream flow.....	102-117
White River basin.....	347	Musselshell River, North Fork, near—	
Yellowstone River basin.....	347	Delpine, Mont.:	
Missouri River at—		description.....	102
Cascade, Mont.:		discharge.....	102
description.....	36	discharge, daily.....	103
discharge.....	36	discharge, monthly.....	103
discharge, daily.....	37	gage height.....	102

Musselshell River, North Fork, near—Contd.

Martinsdale, Mont.:	Page.
description.....	104
discharge.....	104
discharge, daily.....	105
discharge, monthly.....	105
gage height.....	104
Musselshell River, South Fork, near—	
Martinsdale, Mont.:	
description.....	110
discharge.....	110
discharge, daily.....	111
discharge, monthly.....	111
gage height.....	110

N.

Nashua, Mont.,	
Porcupine Creek at:	
description.....	132
discharge.....	132
discharge, daily.....	133
discharge, monthly.....	134
gage height.....	133
Nebraska, cooperation of.....	18
water laws of.....	21, 23
Ninemile ditch at—	
Minatare, Nebr.:	
discharge.....	349
Niobrara River at—	
Niobrara, Nebr.:	
description.....	232
discharge.....	232
gage height.....	232
North Clear Creek at—	
Forkscreek, Colo.:	
discharge.....	348
North Dakota, water laws of.....	21, 22-23
North Laramie River at—	
Uva, Wyo.:	
description.....	279-280
discharge.....	280
gage height.....	280
North Platte canal at—	
Southerland, Nebr.:	
discharge.....	350
North Platte River at or near—	
Bayard, Nebr.:	
discharge.....	349
Bridgeport, Nebr.:	
discharge.....	347, 349
Gothenburg, Nebr.:	
discharge.....	349
Henry, Nebr.:	
discharge.....	347, 349
Kearney, Nebr.:	
discharge.....	349
Keystone, Nebr.:	
discharge.....	349
Lewellen, Nebr.:	
discharge.....	349
Lisco, Nebr.:	
discharge.....	349
Minatare, Nebr.:	
discharge.....	349
Mitchell, Nebr.:	
description.....	243
discharge.....	243, 349
discharge, daily.....	244

North Platte River at or near—Contd.

Mitchell, Nebr.—Continued.	Page.
discharge, monthly.....	245
gage height.....	244
Morrill, Nebr.:	
discharge.....	349
North Platte, Nebr.:	
description.....	245
discharge.....	245, 349
discharge, daily.....	246
discharge, monthly.....	247
gage height.....	246
Oshkosh, Nebr.:	
discharge.....	349
Pathfinder, Wyo.:	
description.....	237
discharge.....	237
discharge, daily.....	238
discharge, monthly.....	239
gage height.....	239
Saratoga, Wyo.:	
description.....	235
discharge.....	235
discharge, daily.....	236
discharge, monthly.....	237
gage height.....	236
Scotts Bluff, Nebr.:	
discharge.....	349
North Platte River and Interstate canal at—	
Whalen, Wyo.:	
description.....	240
discharge.....	241
discharge, daily.....	241
discharge, monthly.....	242
Northport, Nebr.,	
Browns Creek ditch at:	
discharge.....	349
H. T. Clark ditch at:	
discharge.....	349
Schemerhorn ditch at:	
discharge.....	349
No Wood River at—	
Bonanza, Wyo.:	
description.....	195
discharge.....	195
discharge, daily.....	196
discharge, monthly.....	196
gage height.....	195
Nye, Mont.,	
Stillwater River near:	
description.....	168
discharge.....	168
Woodbine Creek near:	
description.....	170
discharge.....	170
O.	
Orodel, Colo.,	
Boulder Creek at:	
description.....	321-322
discharge.....	322
discharge, daily.....	323
discharge, monthly.....	323
gage height.....	322
Oshkosh, Nebr.,	
Bushnell ditch at:	
discharge.....	350
Gyger ditch at:	
discharge.....	350

Oshkosh, Nebr.—Continued.

Lyons ditch at:	Page.
discharge.....	349
Oshkosh ditch at:	
discharge.....	349
North Platte River at:	
discharge.....	349
Overland ditch at:	
discharge.....	350
Roberts ditch at:	
discharge.....	350
Signal Bluff ditch at:	
discharge.....	350
Spohn ditch at:	
discharge.....	349
Otter Creek at—	
Le Moyne, Nebr.:	
discharge.....	349
Overland ditch at—	
Oshkosh, Nebr.:	
discharge.....	350
Owl Creek near—	
Thermopolis, Wyo.:	
description.....	192
discharge.....	193
discharge, daily.....	194
discharge, monthly.....	194
gage height.....	193

P.

Paint Rock Creek near—

Bonanza, Wyo.:	
description.....	199
discharge.....	199
discharge, daily.....	200
discharge, monthly.....	201
gage height.....	200
Hyattsville, Wyo.:	
description.....	199
discharge.....	199, 347
Southeast Fork, Wyo.:	
discharge.....	347
Papers on water supply, list of.....	9, 10-12
Paradise Valley canal near—	
Chinook, Mont.:	
description.....	134
discharge.....	135
discharge, daily.....	135
discharge, monthly.....	135
gage height.....	135
Pass Creek near—	
Walcott, Wyo.:	
description.....	262
discharge.....	262
discharge, daily.....	262
discharge, monthly.....	263
gage height.....	262
Pathfinder, Wyo.,	
North Platte River at:	
description.....	237
discharge.....	237
discharge, daily.....	238
discharge, monthly.....	239
gage height.....	239
reservoir at:	
in-flow, daily.....	239
in-flow, monthly.....	340

Pine Cliff, Colo.,

South Boulder Creek at:	Page.
discharge.....	348
Pine Grove, Colo.,	
Elk Creek at:	
discharge.....	348
Turkey Creek at:	
discharge.....	348
Piney Creek at—	
Kearney, Wyo.:	
description.....	222
discharge.....	222
discharge, daily.....	223
discharge, monthly.....	223
gage height.....	223
Pipestone Creek near—	
Whitehall, Mont.:	
description.....	42
discharge.....	42
discharge, daily.....	42-43
discharge, monthly.....	43
gage height.....	42, 43
Platte River basin:	
miscellaneous measurements.....	347
stream flow.....	235-339
Platte River near—	
Columbus, Nebr.:	
description.....	247
discharge.....	247
gage height.....	248
Leshara, Nebr.:	
description.....	248
discharge.....	248
discharge, daily.....	249
discharge, monthly.....	250
gage height.....	249
Poison Creek at—	
Shoshoni, Wyo.:	
discharge.....	347
Poplar Creek basin:	
stream flow.....	146-149
Poplar River near—	
Poplar, Mont.:	
description.....	146
discharge.....	146
discharge, daily.....	146-147
discharge, monthly.....	146-147
gage height.....	146
Popo Agie River at or near—	
Arapahoe, Wyo.:	
discharge.....	347
Lander, Wyo.:	
description.....	190-191
discharge.....	191
gage height.....	191
Porcupine Creek at—	
Nashua, Mont.:	
description.....	132
discharge.....	132
discharge, daily.....	133
discharge, monthly.....	134
gage height.....	133
Powder River basin:	
stream flow.....	217-223
Powder River, Middle Fork, at—	
Kaycee, Wyo.:	
description.....	217
discharge.....	218

Powder River, Middle Fork, at—Contd.

Kaycee, Wyo.—Continued.	Page.
discharge, daily.....	218
discharge, monthly.....	219
gage height.....	218
Powder River, North Fork, near—	
Kaycee, Wyo.:	
description.....	219
discharge.....	219
gage height.....	220
Powder River, South Fork, near—	
Kaycee, Wyo.:	
description.....	217
discharge.....	217
gage height.....	217
Precipitation, map showing.....	14
Price, A. B., work of.....	18
Price, D. D., work of.....	18
Price current meters, views of.....	17
Prickly Pear Creek at or near—	
Clancy, Mont.:	
description.....	50
discharge.....	50
discharge, daily.....	51
discharge, monthly.....	51
gage height.....	50
East Helena, Mont.:	
description.....	51-52
discharge.....	52
discharge, daily.....	53
discharge, monthly.....	53
gage height.....	52
stream flow.....	50-59
Pryor Creek at or near—	
Coburn, Mont.:	
description.....	174
discharge.....	174
gage height.....	174
Huntley, Mont.:	
description.....	175
discharge.....	175
discharge, daily.....	176
discharge, monthly.....	176
gage height.....	175
Pryor, Mont.:	
description.....	174
discharge.....	174
R.	
Ramsay ditch at—	
Lewellon, Nebr.:	
discharge.....	350
Ramshorn ditch at—	
Morrill, Nebr.:	
discharge.....	349
Rating table, explanation of.....	15
Reclamation Service, cooperation of.....	17
Red Creek at—	
Dubois, Wyo.:	
discharge.....	347
Red Rock reservoir, Mont.,	
Red Rock River above:	
description.....	25
discharge.....	25
discharge, daily.....	26
discharge, monthly.....	26
gage height.....	25

Red Rock reservoir, Mont.—Continued.

Red Rock River below:	Page.
description.....	26-27
discharge.....	27
discharge, daily.....	27
discharge, monthly.....	28
gage height.....	27
Red Rock River at or near—	
Lima, Mont.:	
description.....	28
discharge.....	28
discharge, daily.....	29
discharge, monthly.....	30
gage height.....	29
(above) Red Rock reservoir (near Moni- da), Mont.:	
description.....	25
discharge.....	25
discharge, daily.....	26
discharge, monthly.....	26
gage height.....	25
(below) Red Rock reservoir (near Moni- da), Mont.:	
description.....	26-27
discharge.....	27
discharge, daily.....	27
discharge, monthly.....	28
gage height.....	27
Republican River at—	
Bostwick, Nebr.:	
description.....	339-340
discharge.....	340
discharge, daily.....	340
discharge, monthly.....	340
gage height.....	340
Richards, Raymond, work of.....	18
Richardton, N. Dak.,	
Heart River near:	
description.....	227
discharge.....	227
gage height.....	228
Riverton, Wyo.,	
Wind River at:	
description.....	178
discharge.....	179
discharge, daily.....	179
discharge, monthly.....	180
gage height.....	179
Roberts ditch at—	
Oshkosh, Nebr.:	
discharge.....	350
Robins-Williams ditch at—	
Lewellen, Nebr.:	
discharge.....	350
Rock Creek near—	
Arlington, Wyo.:	
description.....	264
discharge.....	264
discharge, daily.....	265
discharge, monthly.....	266
gage height.....	265
Rock River, Wyo.:	
description.....	266
discharge.....	266
discharge, daily.....	267
discharge, monthly.....	268
gage height.....	267

Rock River, Wyo.,		St. Xavier, Mont.,	
Rock Creek near:	Page.	Bighorn ditch near:	Page.
description.....	266	discharge.....	347
discharge.....	266	Rottengrass Creek near:	
discharge, daily.....	267	description.....	210
discharge, monthly.....	268	discharge.....	210
gage height.....	267	gage height.....	210
Luverna, Minn.:		Soap Creek at:	
description.....	233	description.....	210
discharge.....	233	discharge.....	210
discharge, daily.....	234	gage height.....	210
discharge, monthly.....	234	Salesville, Mont.,	
gage height.....	234	West Gallatin River near:	
Rollinsville, Colo.,		description.....	46
Lump Gulch Creek at:		discharge.....	46
discharge.....	348	discharge, daily.....	47-48
South Boulder Creek near:		discharge, monthly.....	48
description.....	324	gage height.....	47-48
discharge.....	324, 348	Saratoga, Wyo.,	
discharge, daily.....	324, 325	Brush Creek near:	
gage height.....	324-325	description.....	253
Roscoe Creek near—		discharge.....	253
Golden, Colo.:		discharge, daily.....	254
discharge.....	348	discharge, monthly.....	254
Rosebud River at—		gage height.....	253
Absarokee, Mont.:		Cow Creek near:	
description.....	170	description.....	256-257
discharge.....	170	discharge.....	257
discharge, daily.....	171	discharge, daily.....	257
discharge, monthly.....	172	discharge, monthly.....	258
gage height.....	171	gage height.....	257
Rottengrass Creek near—		Jack Creek near:	
St. Xavier, Mont.:		description.....	260
description.....	210	discharge.....	260
discharge.....	210	discharge, daily.....	261
gage height.....	210	discharge, monthly.....	261
Ruby River near—		gage height.....	260
Alder, Mont.:		North Platte River at:	
description.....	40	description.....	235
discharge.....	40	discharge.....	235
discharge, daily.....	41	discharge, daily.....	236
discharge, monthly.....	42	discharge, monthly.....	237
gage height.....	41	gage height.....	236
Run-off, definition of.....	12	Spring Creek near:	
map showing.....	14	description.....	258
Rush Creek ditch at—		discharge.....	258
Lisco, Nebr.:		discharge, daily.....	259
discharge.....	349	discharge, monthly.....	259
Russell, G. H., work of.....	18	gage height.....	259
		Sarben, Nebr.,	
		Sheridan ditch at:	
		discharge.....	350
		Schemerhorn ditch at—	
		Northport, Nebr.:	
		discharge.....	349
		Scott Gomer Creek at—	
		Grant, Colo.:	
		description.....	314
		discharge.....	314
		discharge, daily.....	315
		discharge, monthly.....	316
		gage height.....	315
		Scottsbluff, Nebr.:	
		Central Irrigation and Power ditch near:	
		discharge.....	349
		Homestead ditch at:	
		discharge.....	349

Scottsbluff, Nebr.—Continued.

North Platte River at:	Page.
discharge.....	349
Winters Creek ditch at:	
discharge.....	349
Second-foot, definition of.....	12
Sevenmile Creek at—	
Birdseye, Mont.:	
description.....	58
discharge.....	58
discharge, daily.....	59
discharge, monthly.....	59
gage height.....	58
Shelby, Mont.,	
Marias River near:	
description.....	83
discharge.....	83
discharge, daily.....	84
discharge, monthly.....	85
gage height.....	84
Sheridan, Wyo.,	
Goose Creek at:	
description.....	213
discharge.....	214
discharge, daily.....	214
discharge, monthly.....	215
gage height.....	214
Little Goose Creek at:	
description.....	215
discharge.....	215
discharge, daily.....	216
discharge, monthly.....	216
gage height.....	216
Sheridan ditch at—	
Sarben, Nebr.:	
discharge.....	350
Shortline ditch at—	
Bayard, Nebr.:	
discharge.....	349
Shoshone River at—	
Corbett dam, Wyo.:	
description.....	207
discharge.....	207
discharge, daily.....	208
discharge, monthly.....	209
gage height.....	208
Shoshoni, Wyo.,	
Poison Creek at:	
discharge.....	347
Signal Bluff ditch at—	
Oshkosh, Nebr.:	
discharge.....	350
Silverstar, Mont.,	
Jefferson River near:	
description.....	32
discharge.....	32
discharge, daily.....	33
discharge, monthly.....	34
gage height.....	32-33
Smelter Creek near—	
Grant, Colo.:	
description.....	313
discharge.....	313
gage height.....	313
Smith Creek near—	
Augusta, Mont.:	
description.....	81
discharge.....	81

Smith Creek near—Continued.

Augusta, Mont.—Continued.	Page.
discharge, daily.....	82
discharge, monthly.....	83
gage height.....	82
Soap Creek at—	
St. Xavier, Mont.:	
description.....	210
discharge.....	210
gage height.....	210
Soda Creek at—	
Idaho Springs, Colo.:	
discharge.....	348
South Boulder Creek at or near—	
Eldorado Springs, Colo.:	
description.....	326
discharge.....	326
discharge, daily.....	327
discharge, monthly.....	327
gage height.....	326
Pine Cliff, Colo.:	
discharge.....	348
Rollinsville, Colo.:	
description.....	324
discharge.....	324, 348
discharge, daily.....	324, 325
discharge, monthly.....	324-325
gage height.....	324-325
South Dakato, water laws of.....	21
Southerland, Nebr.,	
Hershey ditch at:	
discharge.....	350
North Platte canal at:	
discharge.....	350
South Side ditch at:	
discharge.....	350
Southerland ditch at—	
Keystone, Nebr.:	
discharge.....	35
South Platte River at or near—	
Denver, Colo.:	
description.....	292
discharge.....	292
discharge, daily.....	293
discharge, monthly.....	294
gage height.....	292-293
Julesburg, Colo.:	
description.....	297-298
discharge.....	298
discharge, daily.....	299
discharge, monthly.....	299
gage height.....	298
Kersey, Colo.:	
description.....	294
discharge.....	294
discharge, daily.....	296-297
discharge, monthly.....	297
gage height.....	295
South Platte, Colo.:	
description.....	288-289
discharge.....	289
discharge, daily.....	290-291
discharge, monthly.....	291
gage height.....	289-290
South Platte River, Middle Fork, at—	
Fairplay, Colo.:	
description.....	283
discharge.....	283
gage height.....	283

South Platte River, North Fork, at—		Strabane, Mont.—Continued.	
Cassells, Colo.:	Page.	Teton River at—Continued.	Page.
description.....	306-307	discharge, monthly.....	99
discharge.....	307	gage height.....	98
discharge, daily.....	308	Stream-flow data, publications on, by U. S.	
discharge, monthly.....	308	Geological Survey.....	9, 10-12
gage height.....	307	Sun River at—	
Grant, Colo.:		Sun River, Mont.:	
description.....	305	discharge.....	74
discharge.....	305	discharge, daily.....	75
discharge, daily.....	306	discharge, monthly.....	75
discharge, monthly.....	306	gage height.....	74
gage height.....	305	Sun River basin:	
South Platte, Colo.:		miscellaneous measurements.....	346
discharge.....	348	stream flow.....	71-83
South Platte River, South Fork, at—		Sun River, North Fork, near—	
Lake George, Colo.:		Augusta, Mont.:	
description.....	284	discharge.....	71-72
discharge.....	284	discharge.....	72, 346
gage height.....	284-285	discharge, daily.....	73
South Platte, Colo.:		discharge, monthly.....	73
description.....	285	gage height.....	72
discharge.....	285	Sun River, North Fork, North Fork of, near—	
discharge, daily.....	287	Augusta, Mont.:	
discharge, monthly.....	288	discharge.....	346
gage height.....	286	Sun River, North Fork, South Fork of, near—	
Spohn ditch at—		Warm Springs, Mont.:	
Oshkosh, Nebr.:		discharge.....	346
discharge.....	349	Sun River, South Fork, at—	
Spring Creek at—		Augusta, Mont.:	
Le Moyne, Nebr.:		discharge.....	77
discharge.....	349	discharge.....	77
Spring Creek near—		discharge, daily.....	78
Saratoga, Wyo.:		discharge, monthly.....	79
description.....	258	gage height.....	77-78
discharge.....	258	Sweetgrass Creek near—	
discharge, daily.....	259	(above) Melville, Mont.:	
discharge, monthly.....	259	discharge.....	165
gage height.....	259	discharge.....	165
Steamboat ditch at—		discharge, daily.....	166
Minatare, Nebr.:		discharge, monthly.....	166
discharge.....	349	gage height.....	165
Stearns, Mont.,		(below) Melville, Mont.:	
Middle Fork of Dearborn River at:		discharge.....	166
discharge.....	346	discharge.....	167
Stevenson, N. Dak.:		discharge, daily.....	167
Cannonball River near:		discharge, monthly.....	168
description.....	228	gage height.....	167
discharge.....	229	T.	
gage height.....	229	Tarryall Creek near—	
Stillwater River near—		Como, Colo.:	
Absarokee, Mont.:		discharge.....	299-300
description.....	168	discharge.....	300
discharge.....	168	gage height.....	300
discharge, daily.....	169	Hayman, Colo.:	
discharge, monthly.....	169	discharge.....	301
gage height.....	169	discharge.....	302
Nye, Mont.:		gage height.....	302
description.....	168	Jefferson, Colo.:	
discharge.....	168	discharge.....	300
Strabane, Mont.,		discharge.....	301, 348
Teton ditch near:		gage height.....	301
discharge.....	346	Tenmile Creek near—	
Teton River at:		Helena, Mont.:	
description.....	97	discharge.....	55-56
discharge.....	98	discharge.....	56
discharge, daily.....	99		

Tenmile Creek near—Continued.		Tri-State ditch at—	
Helena, Mont.—Continued.	Page.	Henry, Nebr.:	Page.
discharge, daily.....	57	discharge.....	349
discharge, monthly.....	57	Morrill, Nebr.:	
gage height.....	56	discharge.....	349
Tensleep Creek near—		Turkey Creek at—	
Tensleep, Wyo.:		Pine Grove, Colo.:	
description.....	197	discharge.....	348
discharge.....	197	Tuttle, A. H., work of.....	18
discharge, daily.....	198	Twin Creek at—	
discharge, monthly.....	198	Lake George, Colo.:	
gage height.....	197	discharge.....	348
Terms used, definitions of.....	12	Two Medicine River at—	
Teton canal near—		Family, Mont.:	
Strabane, Mont.:		description.....	85
discharge.....	346	discharge.....	85
Teton River at—		discharge, daily.....	86
Strabane, Mont.:		discharge, monthly.....	87
description.....	97	gage height.....	86
discharge.....	98	Two Rivers, Wyo.,	
discharge, daily.....	99	Laramie River at:	
discharge, monthly.....	99	description.....	276
gage height.....	98	discharge.....	276
Thermopolis, Wyo.,		discharge, daily.....	277
Bighorn River at:		discharge, monthly.....	277
description.....	180	gage height.....	276
discharge.....	180	Little Laramie River at:	
discharge, daily.....	181	description.....	278-279
discharge, monthly.....	182	discharge.....	279
gage height.....	181	gage height.....	279
Owl Creek near:		U.	
description.....	192	United States, map of, showing precipitation.....	14
discharge.....	193	map of, showing run-off.....	14
discharge, daily.....	194	Uva, Wyo.,	
discharge, monthly.....	194	Laramie River at:	
gage height.....	193	discharge.....	347
Threemile Creek near—		North Laramie River at:	
Grant, Colo.:		description.....	279-280
discharge.....	348	discharge.....	280
Tongue River at or near—		gage height.....	280
Carneyville, Wyo.:		V.	
description.....	212	Valier, Mont.,	
discharge.....	212	Dry Fork of Marias River near:	
discharge, daily.....	213	description.....	95
discharge, monthly.....	213	discharge.....	95
gage height.....	212	discharge, daily.....	96
Dayton, Wyo.:		discharge, monthly.....	97
description.....	211	gage height.....	96
discharge.....	211	Dupuyer ditch near:	
gage height.....	212	discharge.....	346
Tongue River basin:		Vance-Orr ditch at—	
stream flow.....	211-216	Lewellen, Nebr.:	
Torrey Creek at—		discharge.....	350
Dubois, Wyo.:		W.	
discharge.....	347	Waha, H. B., work of.....	18
Toston, Mont.,		Wakpala, S. Dak.,	
Missouri River at:		Grand River near:	
description.....	34	description.....	230
discharge.....	34	discharge.....	230
discharge, daily.....	35	Walcott, Wyo.,	
discharge, monthly.....	35	Pass Creek near:	
gage height.....	34-35	description.....	262
Townsend, Mont.,		discharge.....	262
Deep Creek near:		discharge, daily.....	262
description.....	48-49	discharge, monthly.....	263
discharge.....	49	gage height.....	262
gage height.....	49		

	Page.		Page.
Walters, M. I., work of.....	18	White River basin:	
Warm Springs, Mont.,		miscellaneous measurements.....	347
North Fork of Sun River near:		stream flow.....	231-232
discharge.....	346	Whitetail Creek at or near—	
Warm Springs Creek near—		Keystone, Nebr.:	
Dubois, Wyo.:		discharge.....	349
description.....	184	Whitehall, Mont.:	
discharge.....	184	description.....	44
gage height.....	185	discharge.....	44
Waterloo, Nebr.:		discharge, daily.....	44
Elkhorn River at:		discharge, monthly.....	45
description.....	338	gage height.....	44
discharge.....	338	Whitetail Creek basin:	
discharge, daily.....	339	stream flow.....	44-46
discharge, monthly.....	339	Wilcox ditch at—	
gage height.....	338	Lisco, Nebr.:	
West Boulder River at—		discharge.....	349
Bruffeys, Mont.:		Willow Creek near—	
discharge.....	347	Augusta, Mont.:	
West Gallatin River near—		description.....	75-76
Salesville, Mont.:		discharge.....	76
description.....	46	discharge, daily.....	76
discharge.....	46	discharge, monthly.....	77
discharge, daily.....	47-48	gage height.....	76
discharge, monthly.....	48	Wimmer, O. M., work of.....	18
gage height.....	47-48	Wind River at—	
Westover, S. Dak.,		Dubois, Wyo.:	
White River at:		description.....	177
description.....	232	discharge.....	177
discharge.....	232	gage height.....	177-178
Whalen, Wyo.:		Riverton, Wyo.:	
Interstate canal at:		description.....	178
discharge, daily.....	242	discharge.....	179
discharge, monthly.....	243	discharge, daily.....	179
North Platte River and Interstate canal		discharge, monthly.....	180
at:		gage height.....	179
description.....	240	Winters Creek ditch at—	
discharge.....	241	Scottsbluff, Nebr.:	
discharge, daily.....	241	discharge.....	349
discharge, monthly.....	242	Wolf Creek ditch near—	
Whitehall, Mont.,		Wolf Point, Mont.:	
Little Whitetail Creek near:		discharge.....	347
description.....	45	Wolf Creek near—	
discharge.....	45	Wolf Point, Mont.:	
discharge, daily.....	46	description.....	144
discharge, monthly.....	46	discharge.....	144
gage height.....	45	discharge, daily.....	145
Pipestone Creek near:		discharge, monthly.....	145
description.....	42	gage height.....	144
discharge.....	42	Wolf Point, Mont.,	
discharge, daily.....	42-43	Wolf Creek ditch near:	
discharge, monthly.....	43	discharge.....	347
gage height.....	42-43	Wolf Creek near:	
Whitetail Creek near:		description.....	144
description.....	44	discharge.....	144
discharge.....	44	discharge, daily.....	145
discharge, daily.....	44	discharge, monthly.....	145
discharge, monthly.....	45	gage height.....	144
gage height.....	44	Wood, Mrs. B. D., work of.....	18
White River at or near—		Woodbine Creek near—	
Interior, S. Dak.:		Nye, Mont.:	
description.....	231	description.....	170
discharge.....	231	discharge.....	170
gage height.....	231	Wood River near—	
Westover, S. Dak.:		Mecteetse, Wyo.:	
description.....	232	description.....	204
discharge.....	232	discharge.....	204

Wood River near—Continued.

Mecteeze, Wyo.—Continued.	Page.
discharge, daily.....	205
discharge, monthly.....	206
gage height.....	204-205

Woods Landing, Wyo.,

Laramie River at:	
description.....	274
discharge.....	274
discharge, daily.....	275
discharge, monthly.....	275
gage height.....	274-275

Work, division of..... 18-19

Wyola, Mont.,

Little Bighorn River near:	
description.....	206
discharge.....	206
gage height.....	206

Wyoming, corporation of..... 18

water laws of.....	22
--------------------	----

Y.

Yellowstone River at—

Corwin Springs, Mont.:	
description.....	150
discharge.....	150
discharge, daily.....	150, 151

Yellowstone River at—Continued.

Corwin Springs, Mont.—Continued.	Page.
discharge, monthly.....	152
gage height.....	150-151

Huntley, Mont.:

description.....	152
discharge.....	152
discharge, daily.....	153
discharge, monthly.....	154
gage height.....	153

Intake, Mont. (Lower Yellowstone dam):

description.....	154
discharge, daily.....	155
discharge, monthly.....	156
gage height.....	155

Yellowstone River basin:

miscellaneous measurements.....	347
stream flow.....	150-211

Z.

Zurich, Mont.,

Harlem Canal near:

description.....	138
discharge.....	139
discharge, daily.....	139
discharge, monthly.....	139
gage height.....	139