

DEPARTMENT OF THE INTERIOR
Hubert Work, Secretary

U. S. GEOLOGICAL SURVEY
George Otis Smith, Director

WATER-SUPPLY PAPER 573

SURFACE WATER SUPPLY OF THE
UNITED STATES

1923

PART XII. NORTH PACIFIC SLOPE DRAINAGE BASINS

B. SNAKE RIVER BASIN

NATHAN C. GROVER, Chief Hydraulic Engineer

G. C. BALDWIN, G. L. PARKER, C. G. PAULSEN

A. B. PURTON, and F. F. HENSHAW

District Engineers

Prepared in cooperation with the States of
IDAHO, OREGON, and NEVADA,



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

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SURFACE WATER SUPPLY OF SNAKE RIVER BASIN, 1923

AUTHORIZATION AND SCOPE OF WORK

This volume is one of a series of 14 reports presenting records of measurements of flow made on streams in the United States during the year ending September 30, 1923.

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

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 relating to irrigation in the arid West. Since the fiscal year ending June 30, 1895, successive appropriation bills passed by Congress have carried the following items:

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 years ending June 30, 1895-1924

1895.....	\$12, 500. 00
1896.....	20, 000. 00
1897 to 1900, inclusive.....	50, 000. 00
1901 to 1902, inclusive.....	100, 000. 00
1903 to 1906, inclusive.....	200, 000. 00
1907.....	150, 000. 00
1908 to 1910, inclusive.....	100, 000. 00
1911 to 1917, inclusive.....	150, 000. 00
1918.....	175, 000. 00
1919.....	148, 244. 10
1920.....	175, 000. 00
1921 to 1923, inclusive.....	180, 000. 00
1924.....	170, 000. 00

In the execution of the work many private and State organizations have cooperated, either by furnishing data or by assisting in collecting data. Acknowledgments for cooperation of the first kind are made in connection with the description of each station affected; cooperation of the second kind is acknowledged on pages 5 and 6.

Measurements of stream flow have been made at about 5,600 points in the United States and also at many points in Alaska and the Hawaiian Islands. In July, 1923, 1,590 gaging stations were being maintained by the Survey and the cooperating organizations. Many miscellaneous 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 water-supply papers from time to time. Information in regard to publications relating to water resources is presented in the appendix to this report.

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 that represent a rate of flow, as second-feet, gallons per minute, miners’ inches, and discharge in second-feet per square mile, and (2) those that represent the actual quantity of water as run-off in inches, acre-feet, and millions of cubic feet. The principal terms used in this series of reports are second-feet, second-feet per square mile, run-off in inches, and acre-feet. They may be defined as follows:

“Second-feet” is an abbreviation for “cubic feet per second.” A second-foot is the rate of discharge of water flowing in a channel of rectangular cross section 1 foot wide and 1 foot deep at an average velocity of 1 foot per second. It is generally used as a fundamental unit from which others are computed.

“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 in inches” is the depth to which an area would be covered if all the water flowing from it in a given period were 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,” equivalent to 43,560 cubic feet, 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.

The following terms not in common use are here defined:

“Stage-discharge relation,” an abbreviation for the term “relation of gage height to discharge.”

“Control,” a term used to designate the section or sections of the stream channel below the gage which determine the stage-discharge

relation at the gage. It should be noted that the control may not be the same section or sections at all stages.

The "point of zero flow" for a gaging station is that point on the gage—the gage height—at which water ceases to flow over the control.

EXPLANATION OF DATA

The data presented in this report cover the year beginning October 1, 1922, and ending September 30, 1923. At the beginning of January in most parts of the United States much of the precipitation in the preceding three months is stored as ground water, in the form of snow or ice, or in ponds, lakes, and swamps, and this stored water

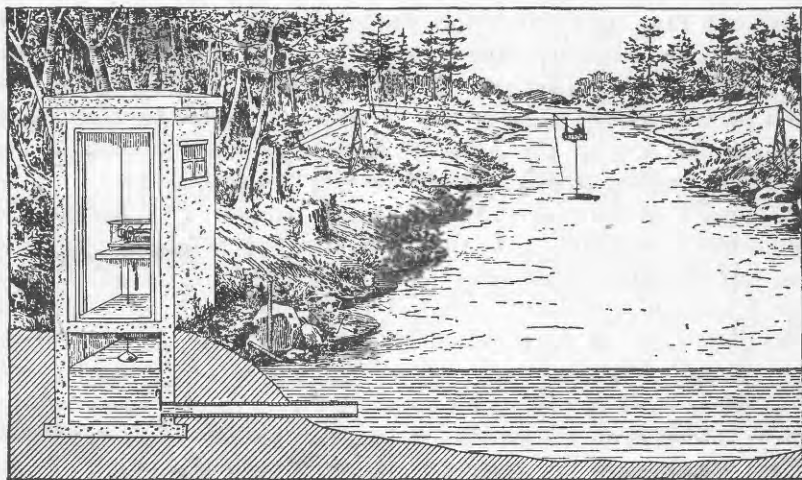


FIGURE 1.—Typical gaging station

passes off in the streams during the spring break-up. At the end of September, on the other hand, the only stored water available for run-off is possibly a small quantity in the ground; therefore the run-off for the year beginning October 1 is practically all derived from precipitation within that year.

The base data collected at gaging stations consist of records of stage, measurements of discharge, and general information used to supplement the gage heights and discharge measurements in determining the daily flow. The records of stage are obtained either from direct readings on a staff or chain gage or from a water-stage recorder that gives a continuous record of the fluctuations. Measurements of discharge are made with a current meter. The general methods are outlined in standard textbooks on the measurement of river discharge. A typical gaging station equipped with water-stage recorder and measuring cable and car is shown in Figure 1.

From the discharge measurements rating tables are prepared that give the discharge for any stage. The application of the daily gage

heights to these rating tables gives the daily discharge from which the monthly and yearly mean discharge is computed.

The data presented for each gaging station in the area covered by this report comprise a description of the station, a table giving records of discharge measurements, a table showing the daily discharge of the stream, and a table of monthly and yearly discharge and run-off.

If the base data are insufficient to determine the daily discharge, tables giving daily gage height and records of discharge measurements are published.

The description of the station gives, in addition to statements regarding location and equipment, information in regard to any conditions that may affect the permanence of the stage-discharge relation, covering such subjects as the occurrence of ice, the use of the stream for log driving, shifting of control, and the cause and effect of backwater; it gives also information as to diversions that decrease the flow at the gage, artificial regulation, maximum and minimum recorded stages, and the accuracy of the records.

The table of daily discharge gives, in general, the discharge in second-feet corresponding to the mean of the gage heights read each day. At stations on streams subject to sudden or rapid diurnal fluctuations the discharge obtained from the rating table and the mean daily gage height may not be the true mean discharge for the day. If such stations are equipped with water-stage recorders, the mean daily discharge may be obtained by averaging discharge at regular intervals during the day or by using the discharge integrator, an instrument operating on the principle of the planimeter and containing as an essential element the rating curve of the station.

In the table of monthly discharge the column headed "Maximum" gives the mean flow 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 headed "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 per second during the month. On this average flow computations recorded in the remaining columns, which are defined on page 2, are based.

ACCURACY OF FIELD DATA AND COMPUTED RESULTS

The accuracy of stream-flow data depends primarily (1) on the permanency of the stage-discharge relation and (2) on the accuracy of observation of stage, measurements of flow, and interpretation of records.

A paragraph in the description of the station gives information regarding the (1) permanence of the stage-discharge relation, (2) precision with which the discharge rating curve is defined, (3) refinement of gage readings, (4) frequency of gage readings, and (5) methods of applying daily gage height to the rating table to obtain the daily discharge.

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," 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 monthly means for any station may represent with high accuracy the quantity of water flowing past the gage, but the figures showing discharge per square mile and run-off in inches may be subject to gross errors caused by the inclusion of large noncontributing districts in the measured drainage area, by lack of information concerning water diverted for irrigation or other use, or by inability to interpret the effect of artificial regulation of the flow of the river above the station. "Second-feet per square mile" and "run-off in inches" are therefore not computed if such errors appear probable. The computations are also omitted for stations on streams draining areas in which the annual rainfall is less than 20 inches. All figures representing "second-feet per square mile" and "run-off in inches" published in the earlier reports by the Survey should be used with caution because of possible inherent sources of error not known to the Survey.

Many gaging stations on streams in the irrigated areas of the United States are situated above most of the diversions from those streams, and the discharge recorded does not show the water supply available for further development, as prior appropriations below the stations must first be satisfied. To give an idea of the amount of prior appropriations, a paragraph on diversions is presented in each station description. The figures given can not be considered exact, but represent the best information available.

The tables of monthly discharge give only a general idea of the flow at the station and should not be used for other than preliminary estimates; the tables of daily discharge allow more detailed studies of the variation in flow. It should be borne in mind, however, that the observations in each succeeding year may be expected to throw new light on data previously published.

COOPERATION

During the year ending September 30, 1923, work in the Snake River basin was carried on in cooperation with the States of Idaho, Oregon, Nevada, and Washington, effected under contracts made

between the director of the Federal Survey and the State engineers or other officials and authorized by legislative acts appropriating money.

Special acknowledgments are due to W. G. Swendsen, commissioner of reclamation of Idaho; Percy A. Cupper and Rhea Luper, State engineers of Oregon; and Robert A. Allen, State engineer of Nevada, for the efficient manner in which they represented their States in the investigations.

Acknowledgments are due also to the United States Bureau of Reclamation, the United States Forest Service, and the United States Office of Indian Affairs, which permitted free use of data gathered exclusively for them or paid for by them.

The following cities, private companies, and individuals have aided in the collection of records by paying the expense of work or otherwise assisting: Water District No. 36, city of Boise; city of Pocatello; Idaho Power Co.; Salmon River Canal Co. (Ltd.); Utah Construction Co.; Succor Creek Irrigation District; Weiser Irrigation District; Little Wood Reservoir Association; Camas Mutual Irrigation District; Owsley Canal Co.; Murtaugh Irrigation District; Big Wood Canal Co. (Ltd.); Love & von Brecht; Lynn Crandall, water commissioner under the Federal court for Big Lost River and tributaries; S. H. Chapman, water master for Big Wood and Little Wood Rivers; water master for Boise River; the Empire Irrigation District; water master for Malheur County, Oreg.; Jordan Valley Irrigation District; Warm Springs Irrigation District; Westfall Irrigation District; Malheur Land Co.; and Grangeville Electric Light & Power Co.

Acknowledgments for gage-height records and discharge measurements furnished by cooperating parties is made in the descriptions of gaging stations.

DIVISION OF WORK

Data for stations in Wyoming and on Snake River above Milner, Idaho, for those tributaries entering the river above Idaho Falls, and for a few stations on the lower Blackfoot River and tributaries, were collected and prepared for publication under the direction of G. C. Baldwin, district engineer, assisted by T. R. Newell, C. A. McClelland, L. L. Bryan, F. A. Backman, R. B. Johnson, W. F. Dawson, and Mrs. E. M. Cure.

For stations in Idaho (except in the Clearwater, upper Columbia, upper Snake, lower Salmon, and Palouse Basins) and in the Salmon Falls Creek basin in Nevada, the data were collected and prepared for publication under the direction of C. G. Paulsen, district engineer, assisted by A. G. Fiedler, L. L. Bryan, Berkeley Johnson, Miss E. H. Hauge, C. W. Kief, F. M. Veatch, and C. L. Batchelder.

The data for stations in Nevada were collected and prepared for publication under the direction of A. B. Purton, district engineer,

assisted by W. E. Dickinson, R. R. Rowe, J. W. Mangan, M. T. Wilson, D. M. Corbett, and Miss Lysle Christensen.

For stations in Oregon the data were collected and prepared for publication under the direction of F. F. Henshaw, district engineer, assisted by G. H. Canfield, Wendell Dawson, R. J. McKinney, and E. O. Hokanson.

The data for stations on Salmon River at Whitebird, Idaho, and Clearwater River at Kamiah, Idaho, were collected and prepared for publication under the direction of G. L. Parker, district engineer, assisted by D. J. F. Calkins, R. B. Kilgore, J. S. Gatewood, A. C. Baldwin, C. C. Osborne, and J. M. Rogers.

The manuscript was reviewed and assembled by J. W. Mangan.

GAGING-STATION RECORDS

SNAKE RIVER

SNAKE RIVER AT SOUTH BOUNDARY OF YELLOWSTONE NATIONAL PARK

LOCATION.—A quarter of a mile below junction of Lewis and Snake Rivers, half a mile north of Snake River Park ranger station and south boundary of Yellowstone National Park, and 25 miles north of Moran, Wyo.

DRAINAGE AREA.—490 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 19, 1913, to September 30, 1923.

GAGE.—Stevens 8-day water-stage recorder on right bank referred to auxiliary chain gage on bridge. Overhanging chain gage on right bank $2\frac{1}{2}$ miles above used only as reference gage. Read by Markham, Elder, and Peters.

DISCHARGE MEASUREMENTS.—Made from cable 225 feet below upper reference gage or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel; clean except for occasional lodgment of drift. Control probably permanent at ordinary stages. One channel at gage but divided by an island into two channels at control. Conditions at auxiliary location similar except that the stream is in one channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period June 3 to September 30, 7.45 feet at 9 p. m. June 12 (discharge, 6,280 second-feet); minimum stage, 2.70 feet September 22 and 23 (discharge, 287 second-feet).

1913–1923: Maximum discharge occurred in 1923; minimum stage, 1.4 feet October 26–31, 1915 (discharge, 160 second-feet).

ICE.—Stage-discharge relation not affected by ice, formation of which is evidently prevented by hot springs above gage. No winter records obtained.

DIVERSIONS.—None above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Standard rating curve well defined. Operation of water-stage recorder satisfactory. Daily discharge obtained by applying mean daily gage height to rating table. Records good.

COOPERATION.—Gage-height record and discharge measurements furnished by United States Bureau of Reclamation.

Discharge measurements of Snake River at south boundary of Yellowstone National Park during the year ending September 30, 1923

Date	Made by—	Park gage height ^a	Bridge gage height ^b	Dis- charge	Date	Made by—	Park gage height ^a	Bridge gage height ^b	Dis- charge
		<i>Feet</i>	<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Feet</i>	<i>Sec.-ft.</i>
June 20	Elder and Snell.	5.50	5.52	2,820	Aug. 1	H. S. Peters	3.20	3.41	611
July 5	C. C. Elder	4.85	4.86	1,780	8	do.	2.91	3.20	510
13	do.	3.95	4.10	1,040	22	do.	2.70	3.05	414
19	Peters and Elder				29	do.	2.60	2.97	389
		3.53	3.70	781	Sept. 5	do.	2.52	2.90	358
27	H. S. Peters	3.33	3.59	693	12	do.	2.41	2.80	317

^a Park gage is overhanging chain gage $2\frac{1}{2}$ miles upstream from recorder.

^b Bridge gage is auxiliary chain gage on bridge by recorder.

NOTE.—All measurements made by employees of U. S. Bureau of Reclamation. Measurements are all made at cable $2\frac{1}{2}$ miles upstream from recorder and referred to both upper and lower gages. Some tributary inflow between two gages.

Daily discharge, in second-feet, of Snake River at south boundary of Yellowstone National Park, for the year ending September 30, 1923

Day	June	July	Aug.	Sept.	Day	June	July	Aug.	Sept.
1		2,560	622	404	16	4,100	990	442	312
2		2,440	576	387	17	3,660	909	428	318
3	2,960	2,240	571	374	18	3,070	845	423	304
4	3,150	2,030	565	365	19	3,020	790	423	301
5	3,320	1,980	533	361	20	2,940	771	528	294
6	3,870	1,830	522	357	21	3,150	751	466	294
7	4,380	1,670	517	353	22	3,020	751	432	287
8	4,240	1,540	496	345	23	2,750	888	442	290
9	4,440	1,430	481	342	24	2,560	983	428	349
10	4,830	1,370	466	330	25	2,440	852	418	370
11	5,230	1,300	456	326	26	2,490	852	423	326
12	5,520	1,210	442	322	27	2,370	725	437	353
13	5,050	1,090	437	318	28	2,400	681	409	345
14	4,220	1,050	442	318	29	2,550	651	391	326
15	4,200	1,010	471	312	30	2,580	645	409	318
					31		706	413	

NOTE.—No record obtained Oct. 1 to June 2; discharge record does not include small amount of tributary inflow between cable and recorder $2\frac{1}{2}$ miles below.

Monthly discharge of Snake River at south boundary of Yellowstone National Park, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
June 3-30	5,520	2,370	3,520	195,000
July	2,560	645	1,210	74,400
August	622	391	468	28,800
September	404	287	333	19,800
The period				318,000

NOTE.—See footnote to table of daily discharge.

JACKSON LAKE AT MORAN, WYO.

LOCATION.—In sec. 18, T. 45 N., R. 114 W., a short distance above gates at outlet of lake at Moran, Teton County.

RECORDS AVAILABLE.—June 1, 1909, to September 30, 1923. Records for years 1909 and 1910 fragmentary.

GAGE.—Inclined staff on right shore just below engineer's cottage; read by Joseph Markham. Zero of gage, 6,700 feet above sea level.

COOPERATION.—Gage-height record and table showing storage capacity of lake furnished by United States Bureau of Reclamation.

Jackson Lake impounds water for the irrigation of land in the Upper Snake River Valley and in the Minidoka and Twin Falls tracts. It has a capacity of 847,000 acre-feet between the elevations 6,730 and 6,769 feet, sea-level datum.

Daily contents, in acre-feet, of Jackson Lake at Moran, Wyo., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	255, 440	266, 650	286, 570	315, 530	345, 780	367, 680	394, 690	425, 640	427, 960	847, 000	572, 740	303, 330
2.....	255, 650	267, 900	287, 420	316, 820	346, 430	368, 340	395, 580	427, 210	635, 420	847, 000	559, 550	303, 110
3.....	255, 650	268, 740	288, 060	318, 110	347, 080	369, 000	396, 480	429, 020	642, 870	847, 000	546, 170	298, 660
4.....	255, 650	269, 580	288, 690	319, 390	347, 740	369, 650	397, 370	430, 820	651, 550	846, 720	532, 130	289, 750
5.....	255, 650	270, 210	289, 540	320, 680	348, 600	370, 530	398, 270	432, 630	660, 510	846, 720	517, 240	278, 790
6.....	255, 650	270, 840	290, 390	321, 970	349, 260	371, 410	399, 160	435, 560	671, 170	848, 000	499, 860	267, 900
7.....	255, 650	271, 690	291, 450	323, 260	349, 920	372, 300	400, 060	438, 720	683, 590	847, 480	482, 550	256, 890
8.....	255, 650	272, 510	292, 510	324, 330	350, 570	373, 190	401, 170	441, 910	697, 250	847, 000	465, 370	246, 140
9.....	255, 650	273, 350	293, 570	325, 400	351, 230	374, 070	402, 290	445, 090	710, 020	841, 880	446, 680	235, 690
10.....	255, 650	274, 190	294, 630	326, 260	351, 890	374, 960	403, 410	448, 500	723, 540	835, 520	426, 760	224, 880
11.....	255, 650	274, 820	295, 690	327, 120	352, 330	375, 840	404, 530	452, 370	738, 620	826, 610	409, 670	213, 790
12.....	255, 650	275, 440	296, 750	327, 990	353, 210	376, 730	405, 640	456, 230	754, 750	819, 250	392, 460	202, 730
13.....	255, 650	276, 070	297, 810	328, 860	354, 080	377, 620	406, 760	459, 420	772, 440	811, 670	374, 960	191, 640
14.....	255, 650	276, 700	298, 870	329, 750	354, 960	378, 720	407, 880	462, 620	785, 980	801, 060	360, 220	180, 580
15.....	256, 060	277, 120	299, 720	330, 590	355, 840	379, 610	409, 000	466, 280	798, 030	790, 750	348, 820	169, 270
16.....	256, 680	277, 750	300, 570	331, 460	356, 710	380, 500	410, 120	469, 490	809, 650	780, 720	339, 270	162, 460
17.....	257, 300	278, 380	301, 420	332, 110	357, 590	381, 380	411, 240	473, 620	822, 800	771, 690	330, 370	155, 750
18.....	257, 920	278, 790	302, 270	332, 760	358, 470	382, 270	412, 350	478, 660	832, 980	762, 470	322, 400	151, 150
19.....	258, 540	279, 420	303, 110	333, 410	359, 350	383, 150	413, 470	483, 010	840, 350	752, 010	315, 320	147, 890
20.....	259, 160	279, 840	303, 960	334, 060	360, 440	384, 040	414, 590	488, 320	843, 410	740, 100	310, 810	144, 820
21.....	259, 780	280, 470	304, 810	335, 150	361, 320	384, 930	415, 710	496, 860	845, 700	725, 760	307, 160	143, 480
22.....	260, 400	280, 890	305, 660	336, 230	362, 200	385, 810	416, 610	504, 930	847, 480	710, 260	305, 240	143, 100
23.....	261, 020	281, 520	306, 520	337, 540	363, 070	386, 700	417, 520	516, 730	847, 000	693, 830	303, 540	143, 100
24.....	261, 640	281, 940	307, 380	338, 840	363, 950	387, 580	418, 420	529, 320	846, 460	679, 690	303, 330	143, 480
25.....	262, 260	282, 560	308, 450	339, 920	364, 830	388, 470	419, 320	543, 360	847, 000	666, 320	303, 330	143, 100
26.....	262, 880	283, 190	309, 520	341, 010	365, 710	389, 360	420, 220	560, 260	847, 000	655, 190	303, 330	143, 290
27.....	263, 500	283, 820	310, 600	342, 090	366, 360	390, 240	421, 350	574, 390	847, 000	644, 800	303, 330	142, 920
28.....	264, 130	284, 450	311, 450	342, 960	367, 020	391, 130	422, 480	588, 850	847, 480	632, 290	302, 480	143, 670
29.....	264, 550	285, 090	312, 530	343, 830	-----	392, 010	423, 600	599, 280	847, 000	616, 710	302, 480	144, 440
30.....	265, 180	285, 930	313, 390	344, 480	-----	392, 900	424, 510	608, 830	847, 480	601, 660	303, 110	145, 200
31.....	265, 600	-----	314, 240	345, 130	-----	393, 790	-----	618, 380	-----	586, 240	303, 330	-----

SNAKE RIVER NEAR MORAN, WYO.

LOCATION.—In sec. 17, T. 45 N., R. 114 W., 1½ miles below Moran post office, Teton County, and United States Bureau of Reclamation dam at outlet of Jackson Lake. No important tributaries between dam and station.

DRAINAGE AREA.—820 square miles.

RECORDS AVAILABLE.—September 21, 1903, to September 30, 1923.

GAGE.—Vertical staff in two sections on left bank. Datum lowered 1.0 foot July 26, 1915. Stevens water-stage recorder installed June 14, 1917, on bank to rear of staff gage. Gage read by employees of United States Bureau of Reclamation. For gages used see Water-Supply Paper 513.

DISCHARGE MEASUREMENTS.—Made from cable 100 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed of gravel and boulders. Control practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.53 feet at 1 p. m. on August 10 (discharge, 10,700 second-feet; minimum stage, 0.12 foot April 15-30 (discharge, 12 second-feet); a lower discharge may have occurred during estimated periods in January, February, and March.

1903-1923: Maximum stage recorded, 10.41 feet at 8 p. m. June 12, 1918 (discharge, 15,100 second-feet); practically no flow during a few days in 1907 and 1909 as a result of closing of gates in dam at Jackson Lake.

ICE.—Stage-discharge relation affected by ice. Gates in dam at Jackson Lake are closed during winter. Flow past gage represents leakage through dam and inflow from springs.

DIVERSIONS.—None between dam and station and practically none above Jackson Lake.

REGULATION.—Flow controlled by operation of gates in dam at Jackson Lake. Storage capacity of reservoir, 847,000 acre-feet.

ACCURACY.—Stage-discharge relation practically permanent throughout year. Rating curve well defined for medium and high stages. Gage read to hundredths once daily October 17 to June 8. Operation of water-stage recorder satisfactory for remainder of year. Daily discharge obtained by applying mean daily staff or recorder gage height to rating table, or for days having considerable range in stage by averaging the hourly discharge. Records good.

COOPERATION.—Gage-height records and discharge measurements furnished by United States Bureau of Reclamation.

Discharge measurements of Snake River near Moran, Wyo., during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
June 2	C. C. Elder.....	0.41	45.0	Aug. 10	H. S. Peters.....	8.46	10,700
14	do.....	.61	95.1	14	do.....	7.51	8,450
18	do.....	.60	85.0	18	do.....	5.41	4,540
19	do.....	4.22	2,890	21	do.....	3.69	2,250
21	do.....	4.92	3,810	22	Peters and Markham..	2.89	1,370
27	do.....	4.72	3,530	25	H. S. Peters.....	2.18	799
July 3	do.....	5.37	4,440	Sept. 2	do.....	3.81	2,330
9	do.....	6.15	5,830	3	do.....	5.13	4,160
11	do.....	6.66	6,780	3	do.....	4.50	3,240
18	do.....	6.48	6,440	3	do.....	5.75	5,130
22	Peters and Elder.....	8.15	9,760	4	do.....	6.27	6,040
25	H. S. Peters.....	7.37	8,260	19	do.....	3.35	1,810
30	do.....	7.89	9,320	20	do.....	2.56	1,130
Aug. 4	do.....	7.11	7,600	22	do.....	1.71	536
7	do.....	8.25	9,990				

NOTE.—All discharge measurements made by employees of U. S. Bureau of Reclamation.

Daily discharge, in second-feet, of Snake River near Moran, Wyo., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	257	23	19					20	43	5,040	8,310	357
2.....	309	23	19					35	48	4,160	7,930	1,740
3.....	309	23	15					43	48	4,470	7,830	4,150
4.....	309	23	15					52	48	3,680	8,110	5,990
5.....	305	22	15				28	60	65	2,490	9,340	5,990
6.....	305	22	15					65	65	3,480	9,660	6,060
7.....	305	19	15					65	86	3,590	10,060	6,050
8.....	305	19	15				16	57	86	4,330	10,200	6,050
9.....	305	19	15				16	46	71	5,970	10,600	5,970
10.....	305	19	15				12	43	80	6,580	10,600	5,970
11.....	305	19	15				12	43	82	6,580	10,100	6,050
12.....	322	19	15				12	43	98	6,200	9,680	5,990
13.....	641	19	15				12	40	103	6,900	8,880	6,010
14.....	518	19	15				12	40	88	7,690	7,750	6,030
15.....	25	19	15		13		12	36	84	7,310	6,630	5,370
16.....	23	19	15	14		18	12	36	88	6,920	5,900	3,880
17.....	23	19	15				12	36	91	6,520	5,060	3,190
18.....	23	19	15				12	36	266	6,690	4,420	2,370
19.....	23	19	15				12	36	1,930	7,610	3,970	1,900
20.....	23	19	15				12	36	2,940	8,440	3,430	1,680
21.....	23	19	15				12	46	3,450	9,430	2,110	757
22.....	23	19	15				12	61	4,840	9,960	1,620	496
23.....	23	19	15				12	73	5,190	10,200	1,090	444
24.....	23	19	15				12	80	3,500	9,080	757	659
25.....	23	19	15				12	80	3,370	7,910	806	764
26.....	23	19	15				12	80	3,910	7,290	806	778
27.....	23	19	15				12	65	3,540	7,470	806	442
28.....	23	19	15				12	56	4,040	8,730	641	54
29.....	23	19	15				12	52	4,420	9,320	331	50
30.....	23	19	15				12	43	4,120	9,300	193	46
31.....	23		15					43		8,920	395	

NOTE.—Stage-discharge relation affected by ice Jan. 1 to Apr. 7. Gates in dam at Jackson Lake remained closed and daily discharge during period estimated.

Monthly discharge of Snake River near Moran, Wyo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	641	23	168	10,300
November.....	23	19	19.7	1,170
December.....	19	15	15.3	941
January.....			* 14.0	861
February.....			* 13.0	722
March.....			* 18.0	1,110
April.....	28	12	16.0	952
May.....	80	20	50.2	3,090
June.....	5,190	43	156	92,800
July.....	10,200	2,490	6,850	421,000
August.....	10,600	193	5,420	333,000
September.....	6,060	46	3,180	189,000
The year.....	10,600		1,460	1,050,000

* Estimated.

SNAKE RIVER NEAR HEISE, IDAHO

LOCATION.—In sec. 5, T. 3 N., R. 41 E., 600 feet above Anderson Dam, Bonneville County, 3 miles above Heise, Jefferson County, and 25 miles below site of station formerly maintained near Lyon. Several small creeks enter between old site and present station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 25, 1910, to September 30, 1923.

GAGE.—Friez water-stage recorder on left bank; installed September 30, 1922; inspected by Ira Moore.

DISCHARGE MEASUREMENTS.—Made from cable 150 feet above gage.

CHANNEL AND CONTROL.—Bed composed of rock ledge, coarse gravel, and cobblestones. One channel at all stages. Control formed by Anderson Dam, parts of which washed out during high water in 1917 and 1918.

EXTREMES OF DISCHARGE.—Maximum stage recorded during periods October 1-15 and April 7 to September 30, 6.23 feet at 7 a. m. May 27 (discharge, 24,500 second-feet); minimum stage, 0.64 foot at 2 a. m. April 11 (discharge, 2,860 second-feet). Even lower discharge may have occurred during period of no record.

1910-1923: Maximum discharge, about 52,000 second-feet, June 16, 1918; minimum discharge, 2,180 second-feet, March 10, 1915.

ICE.—Stage-discharge relation seriously affected by ice. Observations discontinued during winter.

DIVERSIONS.—No large diversions above station. A small ditch that has a capacity of about 25 second-feet diverts just above station.

REGULATION.—Flow controlled to a large extent by storage in Jackson Lake reservoir.

ACCURACY.—Stage-discharge relation permanent during period. Rating curve well defined. Operation of water-stage recorder satisfactory. Daily discharge obtained by applying to rating table mean daily gage height determined from recorder graph. Records good.

Discharge measurements of Snake River near Heise, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 11	C. A. McClelland	0.66	2,880	July 7	L. L. Bryan	4.44	15,500
25	T. R. Newell	1.57	4,790	Aug. 15	do	3.67	11,900
May 16	L. L. Bryan	3.38	10,200	31	do	1.41	4,410
June 3	do	4.02	13,600	Sept. 19	do	2.02	6,010
14	do	5.54	20,900				

Daily discharge, in second-feet, of Snake River near Heise, Idaho, for the year ending September 30, 1923

Day	Oct	Apr.	May	June	July	Aug.	Sept.
1	3,910		7,530	16,000	17,200	14,800	4,360
2	3,800		6,880	14,100	18,200	13,900	4,360
3	3,700		7,040	13,500	17,400	13,200	4,480
4	3,700		8,400	14,100	17,200	13,200	6,880
5	3,700		10,300	15,100	16,200	13,200	9,140
6	3,700		11,300	15,100	14,600	14,100	9,510
7	3,700	3,310	12,400	15,500	15,100	14,600	9,510
8		3,130	13,000	16,500	15,100	14,800	9,510
9		2,960	13,700	16,700	15,100	14,800	9,510
10		2,880	14,600	17,700	16,000	15,100	9,510
11		2,880	15,300	18,900	16,200	15,100	9,510
12		2,960	13,500	20,400	16,000	14,600	9,510
13		3,130	11,900	21,500	15,100	14,100	9,510
14		3,220	11,500	21,000	15,500	13,500	9,320
15	2,960	3,220	10,900	18,900	16,700	12,600	9,510
16		3,400	10,700	17,700	16,200	11,300	8,950
17		3,800	11,700	18,200	15,500	10,300	7,530
18		4,480	13,200	17,400	14,600	9,700	6,880
19		5,240	14,400	14,800	14,400	8,950	5,950
20		5,380	14,600	14,800	14,800	8,580	5,380
21		5,110	15,800	15,500	15,300	8,220	5,380
22		4,850	16,700	16,500	16,200	6,720	4,600
23		4,720	17,900	17,700	17,000	6,100	4,130
24		4,600	19,900	17,000	17,400	5,660	4,130
25		4,720	21,700	15,100	17,400	5,240	4,240
26		5,110	23,300	14,400	16,000	5,110	4,600
27		5,950	24,100	15,300	14,600	4,980	4,480
28		7,200	22,300	15,100	14,400	4,850	4,720
29		8,040	19,200	15,800	15,100	4,720	4,240
30		8,220	17,200	17,000	15,500	4,600	4,020
31			17,000		15,300	4,480	

NOTE.—No record obtained Oct. 16 to Apr. 6. Discharge Oct. 8-14 estimated for days of no gage height record. Staff reading only Oct. 15.

Monthly discharge of Snake River near Heise, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October 1-15.....	3,910	-----	3,620	108,000
April 7-30.....	8,220	2,880	4,520	214,000
May.....	24,100	6,880	14,400	885,000
June.....	21,500	13,500	16,600	988,000
July.....	18,200	14,400	15,800	972,000
August.....	15,100	4,480	10,400	640,000
September.....	9,510	4,020	6,780	403,000

GREAT FEEDER CANAL NEAR RIRIE, IDAHO

LOCATION.—In sec. 36, T. 4 N., R. 40 E., 700 feet below head of canal, 4 miles east of Ririe, and 14 miles southeast of Rigby, Jefferson County. Diversion gates 2 miles below Heise gaging station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 31 to September 30, 1923.

GAGE.—Friez water-stage recorder on left bank; inspected by Ira Moore.

DISCHARGE MEASUREMENTS.—Made from cable 500 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of cobbles and gravel drift. Banks fairly clean. One channel for all stages. Control fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period May 31 to September 30, 6.99 feet at 11 a. m. July 2 (discharge, 3,830 second-feet); minimum stage, 2.67 feet at 8 a. m. September 25 (discharge, 591 second-feet).

ICE.—Stage-discharge relation seriously affected by ice. No winter observations made.

DIVERSIONS.—None above nor below gage of sufficient importance to affect stage-discharge relation.

REGULATION.—Flow is regulated by head gates of canal.

ACCURACY.—Stage-discharge relation practically permanent during period. Rating curve well defined. Operation of water-stage recorder satisfactory except June 28 and 29. Discharge for those days interpolated. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Great feeder canal near Ririe, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
June 1	L. L. Bryan.....	6.45	3,430	Aug. 16	F. A. Backman.....	6.23	3,300
11	do.....	6.64	3,440	18	L. L. Bryan.....	5.89	2,870
21	F. A. Backman.....	6.54	3,390	27	F. A. Backman.....	4.67	1,870
July 3	do.....	6.95	3,810	Sept. 16	do.....	4.65	1,790
20	do.....	6.62	3,520	27	Bryan and Backman...	4.75	1,920
Aug. 8	do.....	6.52	3,330				

Daily discharge, in second-feet, of Great feeder canal near Ririe, Idaho, for the year ending September 30, 1923

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1.....		3,350	3,730	3,420	1,970	16.....		3,520	3,610	3,090	1,850
2.....		3,340	3,800	3,400	1,970	17.....		3,560	3,540	2,960	1,850
3.....		3,310	3,780	3,370	1,980	18.....		3,540	3,460	2,860	1,850
4.....		3,330	3,800	3,370	2,140	19.....		3,350	3,450	2,760	1,790
5.....		3,340	3,730	3,390	2,090	20.....		3,390	3,490	2,710	1,780
6.....		3,340	3,620	3,470	1,990	21.....		3,430	3,520	2,620	1,760
7.....		3,390	3,660	3,510	1,860	22.....		3,440	3,560	2,420	1,600
8.....		3,410	3,680	3,480	1,860	23.....		3,540	3,550	2,320	1,570
9.....		3,440	3,670	3,430	1,860	24.....		3,490	3,540	2,250	1,220
10.....		3,550	3,730	3,450	1,860	25.....		3,390	3,620	1,940	1,370
11.....		3,510	3,760	3,460	1,870	26.....		3,340	3,540	1,780	1,940
12.....		3,340	3,730	3,440	1,870	27.....		3,460	3,430	1,880	1,940
13.....		3,560	3,670	3,410	1,860	28.....		3,540	3,400	2,170	1,970
14.....		3,540	3,700	3,350	1,850	29.....		3,620	3,460	2,240	1,930
15.....		3,490	3,710	3,260	1,860	30.....		3,700	3,490	2,100	1,860
						31.....	3,280		3,460	1,990	

NOTE.—No gage-height record June 28 and 29; discharge interpolated.

Monthly discharge of Great feeder canal near Ririe, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 31.....			3,280	6,510
June.....	3,700	3,310	3,450	205,000
July.....	3,800	3,400	3,610	222,000
August.....	3,510	1,780	2,880	177,000
September.....	2,140	1,220	1,840	109,000
The period.....				720,000

Snake River near Menan, Idaho

LOCATION.—In sec. 21, T. 5 N., R. 38 E., 4 miles north of Menan post office, Jefferson County, and 1 mile below mouth of Henrys Fork.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 9 to November 15, 1923, when station was discontinued.

GAGE.—Friez water-stage recorder on right bank 200 feet above Oregon Short Line Railroad bridge; installed May 15, 1923; inspected by T. M. Tanner.

DISCHARGE MEASUREMENTS.—Made from railroad bridge or from highway bridge 100 yards above gage.

CHANNEL AND CONTROL.—Stream bed composed of gravel drift. Control not determined. Banks fairly clean; left bank probably subject to overflow above and below gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period of record, 6.70 feet May 27 (discharge, 24,700 second-feet); minimum stage, 0.90 foot at noon October 4 (discharge, 2,500 second-feet).

ICE.—Stage-discharge relation seriously affected by ice. Observations discontinued during winter.

DIVERSIONS.—Numerous canal diversions above and below gage.

REGULATION.—Flow controlled to a large extent by storage in Jackson Lake and by inflow from Henrys Fork 1 mile above station.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined below 15,000 second-feet and extended above. Water-stage recorder operation satisfactory except for short periods in May and June. Daily discharge obtained by applying mean daily gage height to rating table except as noted. Records good.

SNAKE RIVER

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Discharge measurements of Snake River near Menan, Idaho, during the period May 9 to November 15, 1923

[Made by L. L. Bryan]

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>
May 15.....	3.90	11,100	July 28.....	3.49	9,950	Sept. 10.....	2.68	6,990
June 2.....	4.28	13,600	Aug. 14.....	3.36	9,310	Sept. 25.....	1.09	2,880
June 9.....	4.73	15,200	Aug. 17.....	2.82	7,460	Nov. 15.....	1.26	3,140
July 2.....	4.46	14,000	Aug. 22.....	2.10	5,090			
July 19.....	3.42	9,920	Aug. 29.....	1.18	2,980			

Daily discharge, in second-feet, of Snake River near Menan, Idaho, for the period May 9 to November 15, 1923

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1.....		15,300	12,800	10,300	2,750	2,680	3,330
2.....		13,500	13,700	9,540	2,770	2,650	3,360
3.....		12,000	12,800	8,770	2,770	2,570	3,380
4.....		12,000	12,400	8,770	3,570	2,520	
5.....		12,400	11,800	8,400	5,730	2,570	
6.....		12,800	10,300	8,960	6,500	2,750	
7.....		13,300	9,740	9,340	6,820	2,720	
8.....		14,400	10,300	9,740	6,990	2,720	
9.....	20,500	15,100	9,930	9,740	6,990	2,750	3,300
10.....	15,500	15,800	10,900	9,930	6,990	2,790	
11.....	16,900	17,200	10,900	10,100	6,820	2,860	
12.....	16,500	18,100	10,900	10,100	6,820	2,860	
13.....	14,800	19,100	10,100	9,740	6,820	2,900	
14.....	13,200	19,100	10,100	9,340	6,660	2,920	
15.....	11,600	16,900	10,100	8,770	6,660	2,840	3,170
16.....	10,900	14,600	11,600	8,040	6,660	2,960	
17.....	11,200	14,900	10,700	7,500	5,580	2,980	
18.....	12,800	15,500	9,930	6,990	4,890	3,010	
19.....	14,400	13,700	9,540	6,340	4,260	3,030	
20.....	15,300	12,800	9,540	6,030	3,770	3,030	
21.....	17,200	13,500	10,100	5,880	3,550	3,030	
22.....	17,600	14,400	10,700	5,300	3,190	2,960	
23.....	18,300	16,700	11,600	4,560	2,900	2,970	
24.....	20,300	17,200	12,200	4,090	2,750	2,960	
25.....	21,700	15,500	12,600	3,590	3,380	2,960	
26.....	22,900	14,000	12,200	3,500	2,660	2,920	
27.....	23,900	14,000	10,900	3,500	2,720	2,860	
28.....	23,200	13,500	9,930	3,290	2,790	2,860	
29.....	20,300	12,800	10,300	3,030	2,900	2,860	
30.....	17,200	13,100	10,700	2,900	2,790	2,940	
31.....	16,200		10,700	2,810		3,330	

NOTE.—Discharge interpolated May 13, 14, and Oct. 14-17 for days of no gage height. May 9-12 daily staff readings only. Discharge estimated Nov. 4-14 on basis of flow at Heise gaging station. Discharge Nov. 15 by meter measurement.

Monthly discharge of Snake River near Menan, Idaho, for the period May 9 to November 15, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 9-31.....	23,900	10,900	17,100	780,000
June.....	19,100	12,000	14,800	881,000
July.....	13,700	9,540	11,000	676,000
August.....	10,300	2,810	7,060	434,000
September.....	6,990	2,660	4,680	278,000
October.....	3,330	2,520	2,870	176,000
November 1-15.....			3,300	98,200
The period.....				3,320,000

DIVERSIONS FROM SNAKE RIVER BETWEEN HEISE AND SHELLEY GAGING STATIONS, IDAHO

Between Heise and Shelley gaging stations 47 separate canals divert water from Snake River for irrigation. More than one-third of these head in the Great feeder, an old channel of the river, which has been equipped with head gates. Gaging stations are maintained at heading of each canal by the United States Geological Survey for the Idaho State Department of Reclamation to facilitate distribution of the water. Records are available from June 1, 1919, to September 30, 1923.

Stage-discharge relation on most of the canals affected by growth of aquatic plants or by operation of check gates. Rating curves well defined. Gages read to hundredths daily except during September, when occasional readings were made. Records good.

Combined daily discharge, in second-feet, of canals diverting from Snake River between Heise and Shelley gaging stations for the irrigation season of 1923

Day	June	July	Aug.	Sept.	Day	June	July	Aug.	Sept.
1.....	5,030	8,710	7,840	4,970	16.....	8,720	7,910	6,960	5,620
2.....	4,740	9,330	7,760	4,940	17.....	8,430	7,800	6,540	5,180
3.....	4,780	9,300	7,740	4,920	18.....	8,080	7,880	6,360	5,040
4.....	4,960	9,340	7,700	5,790	19.....	8,040	7,820	6,100	4,730
5.....	4,950	9,430	7,670	6,210	20.....	7,280	7,950	5,880	4,540
6.....	5,100	9,220	7,880	5,970	21.....	7,160	8,020	5,600	4,510
7.....	5,280	9,440	7,910	5,830	22.....	6,920	8,130	5,180	4,190
8.....	5,490	8,650	7,930	5,780	23.....	5,910	8,130	5,040	4,110
9.....	5,740	8,000	7,840	5,730	24.....	5,610	8,220	4,980	4,020
10.....	5,900	8,110	7,860	5,670	25.....	5,150	8,060	5,020	3,820
11.....	6,450	8,250	7,860	5,670	26.....	5,050	7,930	4,740	4,140
12.....	7,450	8,260	7,580	5,530	27.....	5,540	7,810	4,690	4,140
13.....	8,430	8,000	7,580	5,590	28.....	6,340	7,730	4,950	3,940
14.....	8,540	8,010	7,460	5,540	29.....	7,580	7,790	5,000	3,760
15.....	8,400	8,080	7,420	5,590	30.....	8,560	7,920	5,080	3,710
					31.....		7,860	4,940	

NOTE.—No record obtained Oct. 1 to May 31. Discharge interpolated for days of no gage-height record during September; 37 diversions are above entrance of Henrys Fork and 10 are below.

Combined monthly discharge of canals diverting from Snake River between Heise and Shelley gaging stations for the irrigation season of 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
June.....	8,720	4,740	6,520	388,000
July.....	9,440	7,730	8,290	510,000
August.....	7,930	4,690	6,550	403,000
September.....	6,210	3,710	4,970	296,000
The period.....				1,600,000

NOTE.—Riley Canal does not divert in this section and is not included in summary.

SNAKE RIVER NEAR SHELLEY, IDAHO

LOCATION.—In sec. 17, T. 1 N., R. 37 E., a quarter of a mile above Woodville highway bridge and 3 miles north of Shelley, Bingham County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 18, 1915, to September 30, 1923.

GAGE.—Water-stage recorder on right bank; inspected by R. S. Wilson.

DISCHARGE MEASUREMENTS.—Made from cable 600 feet above gage or by wading.

CHANNEL AND CONTROL.—Control formed by lava-rock reef extending across channel 500 feet below gage. Banks high and clean at gage and control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during periods of record during year, 11.50 feet at 1 a. m. May 28 (discharge, 23,200 second-feet); minimum stage, 4.51 feet at 5 p. m. October 4 (discharge, 1,220 second-feet).

1915-1923: Maximum stage recorded, 16.97 feet at 1.30 p. m. June 17, 1918 (discharge, 47,200 second-feet); minimum stage, 3.68 feet at 9.15 a. m. August 29, 1919 (discharge, 702 second-feet).

ICE.—Stage-discharge relation probably seriously affected by ice; observations discontinued during winter.

DIVERSIONS.—Practically the entire normal summer flow of river above station is appropriated by numerous diversions in the Idaho Falls district.

REGULATION.—Normal flow during the irrigation season is augmented by release of stored flood waters in Jackson Lake for use on the Minidoka project and Twin Falls tracts.

ACCURACY.—Stage-discharge relation changed during the period of no record. Rating curves well defined. Operation of water-stage recorder satisfactory except May 9-25. Daily discharge obtained by applying to rating table mean daily gage height determined by inspecting recorder graph, except for estimated period May 9-25. Records excellent.

Discharge measurements of Snake River near Shelley, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 29	T. R. Newell	5.95	3,390	July 5	L. L. Bryan	8.06	9,860
Apr. 9	McClelland and Newell	6.24	4,130	Aug. 4	do	7.32	7,230
May 2	L. L. Bryan	7.52	7,880	27	do	5.64	2,680
29	do	10.92	20,800	Sept. 11	do	6.83	5,620

Daily discharge, in second-feet, of Snake River near Shelley, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,240	2,950		3,860	8,350	15,600	11,000	9,400	1,800
2	1,240	3,150		4,120	7,840	15,200	11,000	8,700	1,780
3	1,230	3,420		4,250	7,510	13,300	11,000	7,840	1,760
4	1,230	3,530		4,250	7,680	12,500	10,300	7,340	1,750
5	1,230	3,530		4,250	9,040	12,900	9,940	7,180	2,990
6	1,240	3,650		4,250	10,900	13,300	8,870	7,180	4,780
7	1,200	3,650		4,380	12,200	13,300	7,840	7,680	5,480
8	1,250	3,530		4,510	13,300	14,000	8,180	8,010	5,780
9	1,260	3,530		4,120		14,400	8,520	8,350	5,780
10	1,300	3,650		3,990		14,800	9,220	8,520	5,930
11	1,340	3,770		3,860	14,800		9,580	8,700	5,780
12	1,320	3,770		3,740		15,600	9,940	8,040	5,780
13	1,340	3,770		3,860		16,000	9,580	8,870	5,780
14	1,470	3,770		3,990		16,400	9,220	8,700	5,630
15	1,720	3,650		3,990	12,900	15,600	9,580	8,180	5,630
16	2,150	3,530		3,990		13,700	10,700	7,680	5,630
17	2,080	3,420		3,990		12,500	10,300	7,180	5,340
18	2,040	3,420		4,510		13,700	9,220	6,540	4,640
19	2,040	3,650		4,920		13,300	8,350	5,930	4,120
20	2,040	3,650		5,780		12,200	8,010	5,630	3,500
21	2,200			6,060	14,900		15,480	5,480	3,030
22	2,280	3,530		5,780		13,300	8,700	5,340	2,700
23	2,300			5,340		15,600	9,580	4,510	2,350
24	2,490			5,060		17,200	10,300	3,860	1,990
25	2,930			4,780		17,200	11,400	3,330	2,060
26	2,620			4,780	21,500	15,200	11,400	2,830	2,220
27	2,620			5,200	22,800	14,400	10,700	2,700	1,950
28	2,710			5,930	23,200	13,700	9,220	2,440	2,080
29	2,730		3,380	7,020	21,100	12,500	9,040	2,120	2,400
30	2,620		3,500	8,180	17,900	11,400	9,580	2,020	2,500
31	2,780		3,740		16,000		9,580	1,840	

NOTE.—No record obtained Nov. 22 to Mar. 28. No gage-height record May 9-25; discharge estimated.

Monthly discharge of Snake River near Shelley, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	2,930	1,230	1,880	116,000
November 1-21.....	3,770	2,950	3,550	148,000
March 29-31.....	3,740	3,380	3,540	21,100
April.....	8,180	3,740	4,760	283,000
May.....	23,200	7,510	14,300	879,000
June.....	17,200	11,400	14,300	851,000
July.....	11,400	7,840	9,610	591,000
August.....	9,400	1,840	6,230	383,000
September.....	5,930	1,750	3,760	224,000

DIVERSIONS FROM SNAKE RIVER BETWEEN SHELLEY AND PORTERVILLE GAGING STATIONS, IDAHO

Between the Shelley and Porterville gaging stations nine separate canals divert water from Snake River for irrigation. Gaging stations are maintained at heading of each canal by the United States Geological Survey for the Idaho State Department of Reclamation to facilitate distribution of the water. Records are available from June 1, 1919, to September 30, 1923.

Stage-discharge relation on most of the canals affected by growth of aquatic plants or by operation of check gates. Rating curves well defined. Gages read to hundredths daily except during September, when occasional readings were made. Records good.

Combined daily discharge, in second-feet, of canals diverting from Snake River between Shelley and Porterville gaging stations for the irrigation season of 1923

Day	June	July	Aug.	Sept.	Day	June	July	Aug.	Sept.
1.....	1,750	2,380	2,360	1,240	16.....	2,550	2,420	2,060	1,670
2.....	1,610	2,360	2,370	1,270	17.....	2,540	2,400	2,080	1,670
3.....	1,540	1,540	2,340	1,290	18.....	2,560	2,340	2,040	1,790
4.....	1,530	1,170	2,290	1,320	19.....	2,560	1,950	1,970	1,640
5.....	1,540	1,590	2,070	1,680	20.....	2,530	2,130	2,000	1,480
6.....	1,620	2,340	2,110	1,770	21.....	2,530	2,300	1,950	1,550
7.....	1,710	2,280	2,360	1,650	22.....	2,200	2,200	1,950	1,580
8.....	1,800	2,160	2,340	1,660	23.....	1,970	2,300	1,730	1,480
9.....	1,680	2,340	2,300	1,640	24.....	2,040	2,370	1,570	1,450
10.....	1,680	2,200	2,290	1,640	25.....	2,010	2,490	1,610	1,400
11.....	1,580	1,360	2,190	1,790	26.....	2,050	2,470	1,510	1,500
12.....	1,800	1,360	1,920	1,840	27.....	2,020	2,510	1,480	1,370
13.....	2,400	1,360	1,930	1,830	28.....	2,070	2,430	1,450	1,270
14.....	2,470	1,320	2,140	1,850	29.....	2,070	2,410	1,360	1,200
15.....	2,550	1,870	2,080	1,850	30.....	2,170	2,380	1,220	1,140
					31.....		2,360	1,190	

NOTE.—No record obtained Oct. 1 to May 31; discharge interpolated for days of no gage-height record during September.

Combined monthly discharge of canals diverting from Snake River between the Shelley and Porterville gaging stations for the irrigation season of 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
June.....	2,560	1,530	2,040	121,000
July.....	2,510	1,170	2,100	129,000
August.....	2,370	1,190	1,940	119,000
September.....	1,850	1,140	1,550	92,200
The period.....				461,000

SNAKE RIVER AT PORTERVILLE BRIDGE, NEAR BLACKFOOT, IDAHO

LOCATION.—In sec. 26, T. 2 S., R. 35 E., $3\frac{1}{2}$ miles north of Blackfoot, Bingham County, a quarter of a mile below Porterville Bridge and immediately below heading of Danskin Canal. Station was formerly maintained at Porterville Bridge, above heading of Danskin Canal.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 13, 1918, to October 16, 1923, when station was discontinued. June 12 to September 30, 1916, at Porterville Bridge site.

GAGE.—Friez water-stage recorder on left bank; installed October 27, 1918; inspected by L. A. Johnson. An auxiliary low-water gage on left bank 100 yards upstream used during extremely low stages.

DISCHARGE MEASUREMENTS.—Made from cables over two channels about a quarter of a mile below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of cobble in gravel drift; clean except for occasional lodgment of drift. Control shifts at high stages. One channel at gage but divided by an island into two channels at control, except at low stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period May 3 to October 16, 8.23 feet at 5 a. m. May 28 (discharge, 21,600 second-feet); minimum stage, about 2.78 feet September 4 (discharge, 445 second-feet).

1916; 1918–1923; Maximum stage from inclined gage, 13.5 feet June 17–18, 1918 (discharge, 46,900 second-feet); minimum stage from auxiliary low-water gage, 2.07 feet at 9 a. m. September 16, 1919 (discharge, 30 second-feet).

ICE.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

DIVERSIONS.—Practically the entire normal summer flow of the river is diverted above station.

REGULATION.—Normal flow during the irrigation season is augmented by the release of stored flood waters in Jackson Lake for use on the Minidoka and Twin Falls tracts.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curves well defined. Operation of water-stage recorder satisfactory except for short periods in May, August, and September. Daily discharge obtained by applying to rating table mean daily gage height determined by inspecting recorder graph or by shifting-control method. Records good.

Discharge measurements of Snake River at Porterville Bridge, near Blackfoot, Idaho, during the period October 1, 1922, to October 16, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
May 5	L. L. Bryan.....	5.42	7,970	Aug. 7	L. L. Bryan.....	4.68	5,190
19	do.....	6.26	11,000	20	Bryan and Backman...	4.16	3,600
June 16	do.....	6.36	11,200	28	L. L. Bryan.....	3.17	940
July 3	do.....	5.96	9,990	Sept. 22	do.....	3.32	1,170
21	do.....	4.84	5,780				

Daily discharge, in second-feet, of Snake River at Porterville Bridge, near Blackfoot, Idaho, for the period October 1, 1922, to October 16, 1923

Day	May	June	July	Aug.	Sept.	Oct.	Day	May	June	July	Aug.	Sept.	Oct.
1		13,900	8,860	7,010	560	1,380	16	9,640	11,300	8,110	5,280	3,610	2,890
2		13,400	8,480	6,480	522	1,660	17	9,060	10,200	7,920	4,960	3,660	
3	6,650	12,100	9,450	5,610	453	1,620	18	9,640	10,800	6,480	4,330	2,890	
4	6,830	11,300	9,060	4,960	445	1,620	19	11,100	11,100	6,120	3,930	2,410	
5	7,740	11,300	8,670	4,800	796	1,640	20	12,100	10,000	5,780	3,640	2,000	
6	9,450	11,300	6,830	4,800	2,980	1,800	21	12,500	9,840	5,610	3,490	1,570	
7	11,300	11,500	5,610	4,960	3,690	2,330	22	13,400	11,100	6,120	3,370	1,240	
8	12,000	12,100	5,610	5,450	3,930	2,380	23	14,300	13,000	6,830	2,870	1,090	
9	12,800	12,500	6,120	5,950	4,020	2,460	24	15,400	14,800	7,550	2,280	768	
10	13,600	13,000	6,480	6,120	3,930	2,490	25	17,000	14,800	8,290	1,800	640	
11	14,300	13,400	8,110	6,300	3,810	2,570	26	18,800	13,400	8,860	1,510	944	
12	14,800	13,400	8,290	6,830	3,750	2,680	27	20,800	12,100	8,110	1,220	690	
13	13,400	13,400	8,290	6,650	3,690	2,760	28	21,400	11,700	6,830	928	945	
14	11,900	13,900	7,740	6,300	3,660	2,760	29	19,500	10,400	6,480	810	1,200	
15	10,600	13,400	7,550	5,950	3,610	2,870	30	16,400	9,250	7,010	728	1,380	
							31	14,300		7,190	690		

NOTE.—No record obtained Oct. 1 to May 2 except staff gage reading Oct. 18, 1922 (discharge, 1,090 second-feet). No gage-height record obtained May 8-10, Aug. 26, 27, Sept. 2, 3, and 28; discharge interpolated. Staff reading only Oct. 18, 1922.

Monthly discharge of Snake River at Porterville Bridge, near Blackfoot Idaho, for the period October 1, 1922, to October 16, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 3-31	21,400	6,650	13,100	754,000
June	14,800	9,250	12,100	720,000
July	9,450	5,610	7,370	453,000
August	7,010	690	4,190	258,000
September	4,020	445	2,160	129,000
October 1-16	2,890	1,380	2,240	71,100
The period				2,390,000

DIVERSIONS FROM SNAKE RIVER BETWEEN PORTERVILLE AND BLACKFOOT GAGING STATIONS, IDAHO

Between Porterville and Blackfoot gaging stations six separate canals divert water from Snake River for irrigation. Gaging stations are maintained at heading of each canal by the United States Geological Survey for the Idaho State Department of Reclamation to facilitate distribution of the water. Records are available from June 1, 1919, to September 30, 1923.

Stage-discharge relation on most of the canals affected by growth of aquatic plants or by operation of check gates. Rating curves are well defined. Gages read to hundredths daily except during September when occasional readings were made. Records good.

Combined daily discharge, in second-feet, of canals diverting from Snake River between Porterville and Blackfoot gaging stations for the irrigation season of 1923

Day	June	July	Aug.	Sept.	Day	June	July	Aug.	Sept.
1.....	250	262	231	142	16.....	280	246	212	220
2.....	250	285	232	140	17.....	255	245	208	224
3.....	237	309	221	140	18.....	267	240	212	218
4.....	227	296	202	139	19.....	299	225	205	185
5.....	232	313	211	146	20.....	291	233	190	169
6.....	232	263	218	184	21.....	289	233	191	160
7.....	234	241	225	204	22.....	317	236	203	164
8.....	236	248	240	202	23.....	309	245	191	141
9.....	240	228	235	220	24.....	284	250	156	146
10.....	255	250	236	223	25.....	274	234	150	149
11.....	283	259	234	220	26.....	256	236	138	154
12.....	298	255	242	219	27.....	254	228	125	155
13.....	313	250	241	219	28.....	187	230	143	156
14.....	301	247	231	210	29.....	239	231	148	157
15.....	296	247	218	207	30.....	266	233	142	156
					31.....		235	143	

NOTE.—No record obtained Oct. 1 to May 31. Discharge interpolated for days of no gage-height record during September. All diversions are above entrance of Blackfoot River.

Combined monthly discharge of canals diverting from Snake River between Porterville and Blackfoot gaging stations for the irrigation season of 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
June.....	317	187	265	15,800
July.....	313	225	249	15,300
August.....	242	125	199	12,200
September.....	224	139	179	10,700
The period.....				54,000

SNAKE RIVER NEAR BLACKFOOT, IDAHO

LOCATION.—In sec. 31, T. 3. S., R. 34 E., a quarter of a mile below mouth of Blackfoot River and 14 miles southwest of Blackfoot, Bingham County. Blackfoot River is only large tributary between station and mouth of Henrys Fork, 60 miles above. Portneuf and Bannock Rivers and 2,500 second-feet of spring water enter between this station and station at Neeley.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 6, 1910, to September 30, 1923.

GAGE.—Friez water-stage recorder on right bank; installed July 6, 1913; inspected by J. A. Clough.

DISCHARGE MEASUREMENTS.—Made from cable 50 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of very coarse gravel. Two channels at low and medium stages. Control shifts slightly during high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 9.72 feet at midnight May 28 (discharge, 20,500 second-feet); minimum stage, 2.08 feet at 2 p. m. October 3 (discharge, 432 second-feet).

1910-1923: Maximum stage recorded, approximately 14.8 feet at 5 p. m. June 18, 1918 (discharge, about 46,200 second-feet; exact discharge uncertain because of probable shift in stage-discharge relation at about this time). Minimum stage, 1.93 feet at 6 p. m. August 25, 1919 (discharge, 118 second-feet).

ICE.—Floating ice sometimes present for short periods; stage-discharge relation apparently not affected.

DIVERSIONS.—Practically entire normal summer flow of the river is diverted above station.

REGULATION.—Flow regulated by storage in Jackson Lake reservoir and in Blackfoot Marsh reservoir on Blackfoot River. Practically entire summer flow is released water from these reservoirs.

ACCURACY.—Stage-discharge relation not permanent. Rating curves well defined. Operation of water-stage recorder satisfactory except during short periods when clock stopped. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph; shifting-control method used May 5-27, June 28 to July 5, and Aug. 18-24. Records good.

Discharge measurements of Snake River near Blackfoot, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 22	T. R. Newell	4.56	3,460	June 27	L. L. Bryan	7.74	12,600
Mar. 27	C. A. McClelland	4.33	3,000	July 21	do	5.40	5,290
May 4	L. L. Bryan	6.14	7,200	Aug. 8	do	5.50	5,490
June 6	do	7.51	11,600	25	do	3.92	2,380
23	do	8.01	13,700	Sept. 1	do	2.42	643

Daily discharge, in second-feet, of Snake River near Blackfoot, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	443	2,660	3,460	3,180	2,420	2,740	3,360	7,790	14,100	8,850	6,880	651
2	443	2,920	3,460	3,090	2,190	2,740	3,460	7,650	13,700	8,550	6,490	537
3	443	3,090	3,180	3,180	1,960	2,740	3,640	7,230	12,600	9,120	5,630	506
4	519	3,270	2,660	3,180	1,900	2,740	3,690	7,100	11,600	8,490	4,820	453
5	519	3,460	3,090	3,180	1,900	2,740	3,740	7,680	11,200	8,460	4,710	519
6	562	3,550	3,740	3,460	1,790	2,740	3,790	9,310	11,600	6,880	4,710	1,800
7	609	3,640	3,270	3,360	1,900	2,740	3,840	10,600	11,600	5,630	4,990	3,230
8	622	3,640	3,000	3,460	1,930	2,740	3,940	11,600	11,900	5,280	5,390	3,640
9	596	3,550	2,920	3,460	1,750	2,740	3,940	12,700	12,600	5,750	5,630	3,740
10	596	3,640	3,180	3,360	2,100	2,740	3,740	13,100	13,000	5,990	5,870	3,740
11	616	3,640	2,740	3,090	2,120	2,660	3,550	13,800	13,400	7,710	6,240	3,640
12	622	3,740	2,920	3,090	1,760	2,580	3,360	14,600	13,400	7,990	6,750	3,550
13	629	3,740	2,500	3,180	1,460	2,830	3,360	13,900	13,000	8,140	6,750	3,550
14	680	3,740	2,360	2,920	1,820	2,830	3,550	12,100	13,400	7,570	6,360	3,550
15	742	3,640	2,210	3,090	1,820	2,740	3,640	10,700	13,400	7,290	6,120	3,460
16	930	3,460	2,070	3,090	1,930	2,830	3,550	9,750	11,600	7,710	5,750	3,550
17	1,270	3,460	2,100	3,180	2,120	2,830	3,550	9,120	9,910	7,570	5,160	3,640
18	1,220	3,360	2,420	2,740	2,320	2,740	3,840	9,470	10,600	6,750	4,580	3,180
19	1,230	3,460	2,740	3,000	2,480	2,830	4,240	10,400	11,200	5,990	4,270	2,660
20	1,530	3,460	2,920	3,000	2,580	2,830	4,670	11,700	10,200	5,510	3,860	2,200
21	1,630	3,640	3,090	2,740	2,660	2,830	5,460	12,200	9,910	5,390	3,760	1,720
22	1,790	3,460	3,140	2,740	2,740	3,090	5,460	12,900	11,200	5,750	3,760	1,310
23	1,890	3,460	3,180	2,830	2,830	3,090	5,000	14,000	13,000	6,360	3,470	1,100
24	1,890	3,460	3,550	2,920	2,830	3,180	4,780	14,800	14,900	7,010	2,680	806
25	2,300	3,460	3,920	3,180	2,920	3,180	4,560	16,400	15,700	7,990	2,260	651
26	2,320	3,460	3,550	3,270	2,740	3,090	4,350	17,700	14,100	8,730	1,750	773
27	2,260	3,460	3,140	3,000	2,830	3,090	4,460	19,000	12,600	8,140	1,480	781
28	2,340	3,460	3,550	3,000	2,830	3,000	5,000	20,400	11,900	7,010	1,230	967
29	2,440	3,460	3,550	2,740	-----	3,000	5,940	19,500	10,500	6,490	976	1,280
30	2,450	3,360	3,180	2,810	-----	3,000	6,960	16,500	9,500	6,880	840	1,750
31	2,500	3,550	2,580	2,580	-----	3,180	-----	14,500	-----	7,150	790	-----

NOTE.—No gage-height record Dec. 14, 15, 22, Apr. 4-6; discharge interpolated.

Monthly discharge of Snake River near Blackfoot, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	2,500	443	1,250	76,900
November.....	3,740	2,660	3,470	206,000
December.....	3,740	2,070	3,030	186,000
January.....	3,460	2,310	3,040	187,000
February.....	2,920	1,460	2,240	124,000
March.....	3,180	2,580	2,860	176,000
April.....	6,960	3,360	4,210	251,000
May.....	20,400	7,100	12,500	769,000
June.....	15,700	9,910	12,200	726,000
July.....	9,120	5,280	7,170	441,000
August.....	6,880	790	4,320	266,000
September.....	3,740	483	2,100	125,000
The year.....	20,400	443	4,890	3,530,000

SNAKE RIVER AT NEELEY, IDAHO

LOCATION.—In sec. 11, T. 8 S., R. 30 E., half a mile north of Neeley post office; Power County, 4 miles southwest of American Falls, and 32 miles above Minidoka Dam. Portneuf and Bannock Rivers and 2,500 second-feet of spring water enter Snake River between this station and station near Blackfoot. Raft River enters 18 miles below Neeley.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 17, 1906, to September 30, 1923.

GAGE.—Friez water-stage recorder on left bank; installed August 8, 1910; inspected by A. J. Ayers.

DISCHARGE MEASUREMENTS.—Made from cable at gage.

CHANNEL AND CONTROL.—Bed at measuring section rough, especially near right bank. One channel at all stages. Control composed of lava rock, probably partly overlain with coarse gravel; shifts slightly.

EXTREMES OF DISCHARGE.—Maximum stage during year, 9.32 feet at 1 p. m. May 29 (discharge, 23,000 second-feet); minimum stage, 4.00 feet at 3 a. m. October 1 (discharge, 2,700 second-feet).

1906–1923: Actual maximum stage doubtful; maximum mean daily stage, 13.5 feet June 20, 1918 (discharge, 48,400 second-feet); minimum stage, 3.65 feet August 20–22, 1906 (discharge, 2,220 second-feet).

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Numerous canals near Blackfoot and Idaho Falls divert practically the entire natural summer flow of Snake River.

REGULATION.—Summer flow augmented by stored water from Jackson Lake for use on Minidoka project and Twin Falls tracts. Diurnal fluctuations sometimes result from operation of power plant 4 miles upstream.

ACCURACY.—Stage-discharge relation changed slightly February 18–23, affected by ice January 29–30 and February 4–16. Standard rating curve well-defined. Operation of water-stage recorder satisfactory except for periods in winter when well was frozen. Daily discharge ascertained by application of mean daily gage height to rating table, except as noted in footnote to table of daily discharge. Records excellent except for February and March, for which they are good.

*Discharge measurements of Snake River at Neeley, Idaho, during the year ending
September 30, 1923*

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 28	C. A. McClelland.....	5.30	6,220	Aug. 9	L. L. Bryan.....	5.95	8,280
June 18	L. L. Bryan.....	7.10	12,600	11	do.....	6.09	8,620
23	do.....	7.55	14,500				

*Daily discharge, in second-feet, of Snake River at Neeley, Idaho, for the year ending
September 30, 1923*

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	3,110	5,240	6,080	6,550	5,050	5,690	6,450	10,600	17,750	12,150	9,870	3,550
2.....	3,180	5,480	6,080	6,080	4,910	5,690	6,770	11,200	17,470	11,670	9,620	3,430
3.....	3,110	5,780	6,080	6,240	4,770	5,690	7,100	10,800	16,810	11,550	8,900	3,340
4.....	3,130	5,930	5,780	6,390	4,500	5,690	7,260	10,400	15,410	12,190	8,060	3,270
5.....	3,110	6,080	5,480	6,390	4,460	5,690	7,260	10,600	14,660	11,790	7,390	3,220
6.....	3,180	6,240	6,240	6,390	4,440	5,690	7,590	11,800	14,580	10,820	7,590	3,360
7.....	3,200	6,240	6,390	6,550	4,420	5,690	7,590	13,400	14,660	9,250	7,490	5,020
8.....	3,200	6,390	5,780	6,550	4,410	5,690	7,430	14,700	14,800	8,230	7,830	6,080
9.....	3,270	6,240	5,480	6,710	4,400	5,690	7,430	15,600	15,370	8,200	8,270	6,330
10.....	3,290	6,390	5,930	6,550	4,400	5,690	7,260	16,500	15,720	8,480	8,540	6,420
11.....	3,240	6,550	5,630	6,240	4,400	5,710	6,930	17,000	15,950	9,500	8,790	6,390
12.....	3,290	6,550	4,770	6,080	4,400	5,730	6,770	17,900	16,360	10,550	9,140	6,360
13.....	3,340	6,550	4,740	6,080	4,400	5,750	6,610	17,900	15,770	10,970	9,650	6,330
14.....	3,310	6,550	4,700	5,780	4,400	5,780	6,610	16,500	15,720	10,820	9,500	6,330
15.....	3,410	6,390	4,660	5,780	4,400	5,800	6,770	15,100	16,130	10,550	9,180	6,300
16.....	3,600	6,390	4,630	5,780	4,530	5,820	6,770	13,800	15,150	10,400	8,900	6,240
17.....	3,820	6,240	4,700	5,930	4,770	5,840	6,770	13,000	13,590	10,590	8,480	6,240
18.....	4,050	6,390	4,770	5,630	4,900	5,880	6,770	12,200	12,800	10,130	7,930	6,360
19.....	4,020	6,240	4,840	5,630	5,030	5,930	7,260	13,000	13,760	9,250	7,460	5,750
20.....	4,100	6,390	4,910	5,780	5,160	5,970	7,590	13,800	13,510	8,580	7,060	5,340
21.....	4,310	6,390	5,250	5,480	5,300	6,010	8,270	15,100	12,630	8,100	6,740	4,890
22.....	4,440	6,240	5,590	5,340	5,430	6,050	8,620	15,100	13,300	8,060	6,740	4,440
23.....	4,580	6,210	5,930	5,630	5,560	6,100	8,440	16,500	14,750	8,680	6,710	4,130
24.....	4,630	6,080	6,040	5,630	5,690	6,140	8,100	17,000	16,860	9,390	6,020	3,920
25.....	4,710	6,080	6,160	5,930	5,690	6,140	7,930	18,400	18,420	10,280	5,390	3,650
26.....	5,110	6,080	6,280	6,240	5,690	6,300	7,590	19,300	18,330	11,400	4,880	3,500
27.....	4,880	6,080	6,390	6,080	5,690	6,300	7,430	20,800	16,580	11,670	4,470	3,700
28.....	5,050	6,080	6,390	5,780	5,690	6,140	7,760	22,400	15,590	10,780	4,200	3,880
29.....	5,190	6,080	6,550	5,360	-----	6,300	8,620	22,900	14,710	9,760	3,920	4,100
30.....	5,190	6,080	6,240	5,100	-----	6,300	9,690	21,900	13,260	9,430	3,750	4,440
31.....	5,190	-----	6,390	5,190	-----	6,140	-----	19,300	-----	9,950	3,600	-----

NOTE.—No gage-height record Dec. 13-15, 17-19, 21-22, 24-26, Jan. 29-30, Feb. 1-2, 4-9, 11-16, 18-23, 25-28, Mar. 1-2, 4-9, 11-16, 18-23; discharge interpolated except Jan. 29-30 and Feb. 4-16, when it was estimated on basis of flow at Blackfoot gaging station and weather records.

*Monthly discharge of Snake River at Neeley, Idaho, for the year ending September 30,
1923*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	5,190	3,110	3,910	240,000
November.....	6,550	5,340	6,190	368,000
December.....	6,550	4,630	5,640	347,000
January.....	6,710	5,100	5,970	367,000
February.....	5,690	4,400	4,890	272,000
March.....	6,300	5,690	5,900	363,000
April.....	9,690	6,450	7,450	443,000
May.....	22,900	10,400	15,600	959,000
June.....	18,400	12,600	15,300	910,000
July.....	12,200	8,060	10,100	621,000
August.....	9,870	3,600	7,230	448,000
September.....	6,420	3,220	4,880	290,000
The year.....	22,900	3,110	7,780	5,630,000

LAKE WALCOTT NEAR MINIDOKA, IDAHO

LOCATION.—In sec. 1, T. 9 S., R. 25 E., in backwater of United States Bureau of Reclamation dam, 6 miles southeast of Minidoka post office, Minidoka County.

RECORDS AVAILABLE.—April 1, 1909, to September 30, 1923; gage-heights only prior to October 1, 1918.

GAGE.—Hook gage in wooden stilling well on face of dam at entrance to power house. Zero of gage, 4,200 feet above sea level.

ACCURACY.—Gage-height readings occasionally affected by wind.

COOPERATION.—Gage-height record and table of contents furnished by United States Bureau of Reclamation.

Lake Walcott impounds water for the irrigation of lands in the North Side Minidoka project and the South Side Minidoka project of the United States Bureau of Reclamation. It has a capacity of 107,240 acre-feet between elevations 4,236 and 4,246 feet; elevation of spillway, 4,240 feet, sea-level datum.

Daily contents, in acre-feet, of Lake Walcott near Minidoka, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	43,240	89,010	89,940	88,900	88,080	89,010	90,060	93,550	104,580	109,110	109,610	75,080
2.....	43,130	88,900	89,710	89,710	87,850	88,780	90,530	94,490	103,980	107,860	108,740	68,750
3.....	46,620	88,900	89,600	89,830	89,010	89,010	89,830	94,950	103,860	107,240	109,240	62,160
4.....	45,030	89,130	89,600	88,900	87,150	88,900	91,230	94,950	103,380	108,360	108,490	55,790
5.....	44,930	89,830	90,180	89,130	87,030	88,780	91,690	93,790	101,690	105,790	106,510	49,360
6.....	44,290	89,830	90,180	89,360	87,150	88,780	91,690	94,490	102,780	108,240	103,740	42,920
7.....	44,710	89,610	90,180	90,180	87,030	88,660	91,920	96,030	103,980	106,510	101,330	38,400
8.....	45,240	90,060	89,360	89,600	87,270	89,010	92,160	97,350	104,460	106,150	98,920	35,600
9.....	46,190	90,180	89,360	90,180	87,270	89,010	91,920	98,080	105,310	103,860	97,960	35,190
10.....	46,720	89,600	89,250	90,180	86,920	89,010	91,340	97,470	105,550	102,410	97,350	35,090
11.....	47,360	90,290	88,900	90,060	86,800	88,200	91,230	99,280	105,910	101,810	97,470	35,290
12.....	47,140	90,530	88,900	89,600	86,800	89,360	90,990	99,280	105,550	102,780	98,320	35,190
13.....	48,200	90,290	88,310	89,480	87,150	88,780	90,990	99,400	105,670	105,550	100,250	35,190
14.....	49,470	90,530	88,780	89,940	86,680	89,130	90,530	99,160	105,790	108,610	102,780	35,810
15.....	50,420	90,410	87,500	89,130	86,450	88,900	90,060	98,560	105,910	109,110	104,700	37,370
16.....	52,680	90,290	87,030	88,900	86,920	88,900	90,290	96,750	105,190	109,360	106,630	38,920
17.....	54,180	90,180	87,030	88,900	87,030	89,360	90,290	96,750	103,500	109,240	107,860	41,330
18.....	55,790	89,600	87,500	89,130	87,270	88,780	90,060	94,950	103,260	109,490	107,860	42,810
19.....	59,990	89,940	87,620	89,010	87,500	88,430	87,960	96,870	102,900	109,490	107,240	44,820
20.....	62,380	89,830	87,850	88,900	87,960	88,200	91,690	100,730	106,390	109,490	107,740	46,300
21.....	66,880	90,180	88,200	89,010	88,200	88,780	91,230	102,780	106,390	108,860	107,240	47,250
22.....	71,280	90,180	88,310	88,660	88,200	88,780	92,390	104,340	106,150	106,630	106,030	47,990
23.....	74,620	89,940	88,780	88,200	88,200	89,010	92,970	105,310	106,510	104,940	106,030	48,410
24.....	78,350	89,940	88,900	88,900	89,010	87,960	93,320	106,870	108,240	104,820	106,270	47,570
25.....	81,960	89,940	89,360	88,900	88,900	89,360	92,390	107,240	107,240	105,190	105,430	48,100
26.....	84,240	89,830	89,360	89,360	89,130	89,600	92,040	104,940	105,310	107,860	104,220	45,450
27.....	86,680	89,830	89,360	89,360	88,780	89,130	91,460	108,490	105,430	109,990	101,930	47,360
28.....	87,630	89,830	89,360	89,130	88,900	89,360	91,460	107,990	105,910	108,740	99,040	45,560
29.....	87,850	89,830	89,830	88,780	-----	89,360	91,460	109,240	107,860	109,360	93,900	51,920
30.....	89,010	89,930	90,060	87,960	-----	89,600	92,160	107,490	106,870	109,740	87,730	55,040
31.....	88,900	-----	89,830	88,080	-----	89,360	-----	106,030	-----	108,740	82,410	-----

SNAKE RIVER NEAR MINIDOKA, IDAHO

LOCATION.—In sec. 2, T. 9 S., R. 25 E., 100 yards below Howells Ferry, 1 mile below United States Bureau of Reclamation dam, 6 miles southeast of Minidoka post office, Minidoka County, nearest railroad point, and 6 miles above Montgomerys Ferry gaging station, which was discontinued December 31, 1910. Raft River enters between this station and station at Neeley.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 21, 1910, to September 30, 1923.

GAGE.—Friez water-stage recorder on right bank; inspected by employees of United States Bureau of Reclamation.

DISCHARGE MEASUREMENTS.—Made from cable 50 feet below gage.

CHANNEL AND CONTROL.—Bed composed of coarse gravel. One channel at all stages. Control shifts slightly.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 10.92 feet at 6 p. m. May 29 (discharge, 21,600 second-feet); minimum stage, 4.05 feet at 5 p. m. October 15 (discharge, 1,360 second-feet).

1910-1923: Maximum stage recorded, 16.02 feet at 1 a. m. June 21, 1918 (discharge, 45,900 second-feet); minimum stage, 4.05 feet from 11 a. m. to 3 p. m. October 13, 1914 (discharge, 960 second-feet).

ICE.—Some shore ice forms near gage and river closes farther down; stage-discharge relation slightly affected at times.

DIVERSIONS.—The North Side and South Side (Minidoka) Canals divert water between the Neeley and Minidoka stations. The nearest diversions below the station are Twin Falls North Side and South Side Canals at Milner.

REGULATION.—Flow partly regulated by storage in Lake Walcott above Minidoka Dam (storage capacity about 67,000 acre-feet above spillway).

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve well defined between 3,000 and 20,000 second-feet; one parallel curve used. Operation of water-stage recorder satisfactory except January 18, 19, and February 25 to March 2, when clock stopped. Daily discharge ascertained by applying to rating table mean daily gage height. Records good.

COOPERATION.—Gage-height record and one discharge measurement furnished by United States Bureau of Reclamation.

Discharge measurement of Snake River near Minidoka, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 29	C. A. McClelland.....	6.58	5,940	Aug. 10	L. L. Bryan.....	6.61	5,780
June 19	L. L. Bryan.....	8.23	10,400	Sept. 19	H. L. Crawford.....	5.48	3,410

* Employee of U. S. Bureau of Reclamation.

Daily discharge, in second-feet, of Snake River near Minidoka, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	2,580	5,460	6,200	6,580	5,340	5,880	5,950	9,020	16,560	9,740	8,130	4,890
2.....	2,580	5,700	6,320	6,450	5,340	5,910	6,320	9,640	15,540	9,480	6,700	4,690
3.....	2,510	5,830	6,200	6,080	5,220	5,950	6,450	9,960	15,210	8,520	6,550	4,660
4.....	2,510	5,950	6,320	6,200	4,980	5,700	7,090	9,320	14,460	10,130	6,150	4,640
5.....	2,280	6,320	5,950	6,200	4,870	5,830	6,830	9,020	12,760	8,810	6,100	4,640
6.....	2,070	6,450	5,830	6,320	4,870	5,830	7,350	9,640	12,000	8,810	6,180	4,620
7.....	2,000	6,450	6,450	6,450	4,870	5,830	7,350	10,600	12,110	6,680	6,150	4,600
8.....	1,940	6,320	6,320	6,700	4,980	5,830	7,090	12,100	12,300	6,600	5,930	4,640
9.....	2,000	6,580	6,080	6,580	4,980	5,830	7,090	12,900	12,760	6,400	5,830	4,640
10.....	1,940	6,450	6,080	6,580	4,760	5,700	7,090	13,700	13,190	6,150	5,550	4,620
11.....	2,000	6,580	6,080	6,580	4,870	5,580	6,450	14,900	13,420	6,020	5,830	4,600
12.....	2,210	6,700	5,830	6,450	5,340	5,830	6,080	14,900	13,110	6,080	5,660	4,600
13.....	2,000	6,580	5,700	6,320	4,980	5,580	6,450	15,700	13,580	6,350	5,660	4,330
14.....	2,000	6,830	5,700	6,200	4,530	5,700	6,200	14,900	13,230	7,380	5,730	3,460
15.....	1,760	6,830	5,220	6,080	4,640	5,700	6,080	14,100	13,260	7,350	5,530	3,580
16.....	2,140	6,580	4,870	5,950	4,760	5,580	6,080	11,400	12,950	7,350	5,480	3,480
17.....	2,210	6,450	4,870	6,080	4,870	6,200	5,950	10,600	11,770	7,480	5,560	3,400
18.....	2,210	6,320	5,100	6,040	4,870	5,700	5,950	9,320	10,540	7,400	5,580	3,440
19.....	2,210	6,580	5,100	5,990	5,100	5,580	5,700	8,720	9,140	6,350	5,230	3,380
20.....	2,280	6,320	5,340	5,950	5,220	5,700	6,830	9,320	10,640	6,000	5,320	3,230
21.....	2,430	6,580	5,460	5,950	5,460	5,830	7,350	11,400	10,750	6,000	5,440	2,990
22.....	2,750	6,450	5,700	5,830	5,580	5,700	7,880	12,500	10,930	6,200	5,100	2,730
23.....	2,840	6,320	5,830	5,700	5,700	5,830	7,880	13,300	11,880	6,220	4,850	2,550
24.....	2,840	6,320	6,080	5,950	5,700	5,580	7,620	14,100	14,880	6,400	4,690	2,580
25.....	3,280	6,320	6,320	6,080	5,740	6,080	7,350	14,900	17,000	6,450	4,510	2,430
26.....	3,780	6,320	6,200	6,200	5,770	6,080	6,830	16,100	17,350	7,040	4,420	2,400
27.....	3,990	6,320	6,320	6,450	5,810	5,950	6,700	18,300	15,920	9,050	4,620	2,150
28.....	4,760	6,200	6,580	6,080	5,840	5,950	6,830	19,200	13,150	8,190	4,940	2,000
29.....	5,100	6,200	7,090	5,830	-----	5,830	7,090	20,600	13,150	6,280	5,150	1,920
30.....	5,340	6,200	6,700	5,460	-----	5,830	8,160	20,600	11,330	6,530	5,030	1,740
31.....	5,340	-----	6,450	5,460	-----	5,700	-----	18,800	-----	6,780	4,960	-----

NOTE.—Discharge interpolated Jan. 18, 19, and Feb. 25 to Mar. 2.

Monthly discharge of Snake River near Minidoka, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	5,340	1,760	2,770	170,000
November.....	6,830	5,460	6,350	378,000
December.....	7,090	4,870	5,940	365,000
January.....	6,700	5,460	6,150	378,000
February.....	5,840	4,580	5,180	288,000
March.....	6,200	5,580	5,800	357,000
April.....	8,160	5,700	6,800	405,000
May.....	20,600	8,720	13,200	812,000
June.....	17,350	9,140	13,200	786,000
July.....	10,130	6,000	7,240	445,000
August.....	8,130	4,420	5,580	343,000
September.....	4,890	1,740	3,590	214,000
The year.....	20,600	1,740	6,820	4,940,000

LAKE MILNER AT MILNER, IDAHO

LOCATION.—In sec. 29, T. 10 S., R. 21 E., in backwater of Twin Falls Co.'s dam at Milner, Cassia County.

RECORDS AVAILABLE.—April 10, 1911, to September 30, 1923.

GAGE.—Hook gage supplemented by float gage in same well at dam; latter installed June 1, 1920, consists of target which moves directly with large float in well and automatically indicates stage on graduated scale above gage-house floor. A Lietz and a Friez water-stage recorder have also been used for short periods. All gages have same datum.

ACCURACY.—Gage heights occasionally seriously affected by wind.

COOPERATION.—Gage-height record furnished by North Side Canal Co. (Ltd.) and Twin Falls Canal Co.

Daily gage height, in feet, of Lake Milner, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	10.04	9.42	9.56	7.90	7.64	7.80	8.29	9.94	10.88	10.92	11.10	10.09
2.....	9.90	9.66	9.46	7.87	7.69	7.70	8.34	10.14	10.90	10.92	11.10	10.05
3.....	9.86	9.68	9.30	7.74	7.74	7.82	8.28	10.29	10.90	10.88	11.09	9.96
4.....	9.85	9.49	9.21	7.70	7.72	7.72	8.39	10.27	10.90	10.92	11.00	10.02
5.....	10.10	9.56	9.14	7.82	7.64	7.85	8.30	10.36	10.90	10.92	10.82	10.00
6.....	10.22	9.70	8.56	7.70	7.69	7.80	8.33	10.50	10.92	10.89	10.82	10.03
7.....	10.24	9.41	8.54	7.89	7.81	7.80	8.36	10.69	10.92	10.88	10.82	10.00
8.....	10.16	9.60	8.65	7.77	7.88	7.70	8.23	10.72	10.92	10.89	10.76	10.00
9.....	10.06	9.70	8.40	7.79	7.79	7.90	8.33	10.76	10.91	10.99	10.72	9.94
10.....	9.98	9.68	8.06	7.79	7.70	7.74	8.32	10.88	10.92	10.92	10.74	10.01
11.....	9.82	9.68	8.10	7.86	7.66	7.55	8.28	10.90	10.94	10.92	10.76	10.01
12.....	9.68	9.74	8.00	7.74	7.58	7.85	8.07	10.86	10.82	10.72	10.74	10.01
13.....	9.68	9.51	7.78	7.75	7.59	7.70	8.28	10.84	10.90	10.80	10.64	10.01
14.....	9.68	9.54	7.96	7.82	7.83	7.72	8.27	10.79	10.90	10.90	10.70	9.92
15.....	9.61	9.58	8.00	7.80	7.70	7.73	8.38	10.86	10.92	11.05	10.90	9.77
16.....	9.53	9.58	7.58	7.80	7.63	7.52	8.41	10.88	10.90	10.98	10.80	9.93
17.....	9.58	9.54	7.76	7.77	7.66	7.78	8.48	10.90	10.92	11.04	10.79	10.14
18.....	9.60	9.51	7.90	7.88	7.78	7.77	8.64	10.88	10.92	11.02	10.82	10.06
19.....	9.50	9.71	7.92	7.82	7.82	7.70	8.68	10.88	10.92	11.03	10.84	10.18
20.....	9.10	9.46	7.90	7.79	7.84	7.72	9.32	10.88	10.93	10.91	10.88	10.26
21.....	9.26	9.56	7.86	7.84	7.82	7.76	9.16	10.92	10.96	10.72	10.87	10.25
22.....	9.43	9.50	7.84	7.82	7.82	7.64	9.29	10.90	10.92	10.78	10.90	10.20
23.....	9.62	9.46	7.88	7.74	7.84	7.80	9.28	10.90	10.89	10.82	10.74	10.05
24.....	9.64	9.48	7.86	7.86	7.81	7.52	9.31	10.92	10.96	10.90	10.64	9.72
25.....	9.65	9.56	7.82	7.82	7.84	7.88	9.34	10.89	10.92	11.02	10.48	9.64
26.....	9.68	9.48	7.86	7.66	7.94	7.83	9.34	10.76	10.79	11.02	10.22	9.38
27.....	9.44	9.46	7.82	7.84	7.77	7.99	9.65	10.90	10.85	11.04	10.06	9.52
28.....	9.70	9.44	7.82	7.74	7.75	8.31	9.88	10.92	10.92	11.05	10.02	9.38
29.....	9.55	9.63	7.52	7.78	-----	8.34	9.74	10.91	10.91	10.98	10.08	9.13
30.....	9.57	6.63	7.34	7.54	-----	8.30	9.76	10.89	10.91	11.06	10.14	8.97
31.....	9.52	-----	7.64	7.62	-----	8.30	-----	10.78	-----	10.88	10.10	-----

NOTE.—Gage-height record is mean of two daily observations.

SNAKE RIVER AT MILNER, IDAHO

LOCATION.—In sec. 29, T. 10 S., R. 21 E., 500 yards below Milner Dam, at Milner, Twin Falls County. No tributaries enter Snake River between Minidoka station and Milner, and no noteworthy inflow between Milner and station near Twin Falls except seepage and spring water.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 10, 1909, to September 30, 1923.

GAGE.—Friez water-stage recorder on left bank below highway bridge; installed May 28, 1919; inspected by Messrs. McConnel and Gilham.

DISCHARGE MEASUREMENTS.—Made from cable 400 yards above gage, from foot planks midway between gage and cable, or by wading.

CHANNEL AND CONTROL.—Bed at gage composed of lava rock, overlain with very slight gravel deposits and occasional loose rock. Left bank high and steep; right bank confines flow in narrow gorge below elevation 15 feet gage datum; full river width above that point. Control practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 17.80 feet at 1 p. m. June 26 (discharge, 17,500 second-feet); minimum stage, 1.53 feet September 29 and 30 (discharge, 9.2 second-feet).

1909–1923: Maximum stage recorded, 20.1 feet (original gage) June 12, 1909 (discharge, 44,400 second-feet); minimum stage, –1.08 feet (old datum auxiliary gage) August 17–18, 1915 (discharge, 9 second-feet).

ICE.—Stage-discharge relation not seriously affected by ice.

DIVERSIONS.—Twin Falls canals divert water at Milner Dam, just above the station. During part of the season practically entire flow of river is taken by these canals.

REGULATION.—Flow past station during the irrigation season is regulated at Milner Dam.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well-defined below 20,000 second-feet. Operation of water-stage recorder satisfactory except during extreme low stages, when staff gage was read twice daily to hundredths. Daily discharge ascertained by applying mean daily gage-height to rating table except on days when marked changes occurred, when mean of hourly discharge was used. Records good.

COOPERATION.—Gage-height record and eight discharge measurements furnished by Twin Falls Canal Co.

Discharge measurements of Snake River at Milner, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 30	C. A. McClelland.....	9.67	5,140	July 23	W. N. McConnel.....	1.88	24.8
May 17	W. N. McConnel *	8.73	4,120	Aug. 9	do.....	1.71	16.7
June 21	L. L. Bryan.....	10.36	5,720	10	do.....	1.62	13.1
27	W. N. McConnel.....	14.12	10,700	24	do.....	1.59	11.8
July 12	do.....	1.96	32.4	Sept. 29	do.....	1.54	9.26

* Employee of Twin Falls Canal Co.

Daily discharge, in second-feet, of Snake River at Milner, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr	May	June	July	Aug.	Sept.
1	20	4,180	5,550	5,550	4,280	4,600	5,020	3,780	11,400	3,650	1,660	11
2	18	4,280	5,550	5,770	3,980	4,600	5,120	4,180	9,590	3,900	528	12
3	18	5,020	5,340	5,440	4,080	5,020	5,660	4,700	9,450	2,250	322	11
4	18	5,020	5,230	5,120	3,880	4,810	5,340	4,500	8,900	3,490	46	11
5	20	5,020	5,340	5,340	3,680	4,700	4,920	3,180	7,730	3,010	26	11
6	22	5,440	5,340	5,120	3,480	5,340	4,700	3,780	6,610	2,600	16	11
7	22	5,550	5,230	5,880	3,680	5,120	5,230	4,810	6,250	1,230	16	11
8	20	5,550	5,660	5,770	3,780	4,700	5,120	6,320	6,550	99	16	10
9	20	5,550	5,550	5,770	3,880	5,120	4,920	6,760	6,800	52	15	10
10	20	5,550	5,120	5,120	3,580	4,810	5,230	6,980	8,300	36	13	10
11	18	5,550	5,120	5,660	3,580	4,280	4,280	8,300	7,070	33	13	10
12	18	5,990	5,020	5,550	3,480	5,230	3,780	8,540	6,720	29	12	10
13	18	5,880	3,980	5,230	3,480	4,810	3,980	8,900	7,060	30	12	10
14	26	5,770	4,180	5,340	3,680	4,810	3,980	8,900	7,280	41	12	10
15	17	5,990	4,390	5,340	3,880	4,920	3,880	8,660	7,070	1,120	12	10
16	16	5,770	3,580	5,020	3,680	4,600	3,680	6,100	6,730	682	12	12
17	16	5,660	3,780	5,020	3,680	4,500	2,700	5,120	5,910	880	12	12
18	16	5,340	3,680	5,440	3,680	5,660	1,680	3,680	4,890	1,270	14	10
19	16	5,550	3,780	5,340	3,880	4,500	849	3,080	3,800	78	18	10
20	1,370	5,990	4,280	5,230	4,280	3,880	2,980	2,700	4,250	30	12	10
21	1,950	5,550	4,500	5,340	4,280	4,700	3,280	4,600	5,450	26	13	10
22	1,990	5,880	4,700	5,340	4,500	3,880	4,600	6,210	5,530	24	13	10
23	1,590	5,660	4,810	5,120	4,500	3,480	5,020	7,090	6,510	24	13	9.6
24	1,590	5,230	5,120	5,340	4,700	3,980	5,120	7,640	7,720	26	12	9.6
25	2,080	5,440	5,340	5,120	4,700	4,500	4,700	8,190	11,700	254	11	9.6
26	2,460	5,440	5,340	4,500	5,440	4,810	3,980	8,780	15,300	188	11	9.6
27	2,510	5,440	5,550	5,020	5,440	3,980	2,730	11,400	12,400	2,240	11	9.6
28	2,980	5,020	5,550	5,230	4,700	4,280	2,880	12,800	8,100	2,840	11	9.6
29	4,080	4,700	4,920	5,340	-----	4,810	2,790	14,200	7,720	80	12	9.6
30	4,390	5,440	6,100	4,700	-----	5,120	2,880	14,800	7,000	161	12	9.2
31	4,280	-----	5,440	4,390	-----	5,120	-----	13,600	-----	50	11	-----

Monthly discharge of Snake River at Milner, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	4,390	16	1,020	62,700
November	5,990	4,180	5,420	323,000
December	6,100	3,580	4,940	304,000
January	5,880	4,390	5,270	324,000
February	5,440	3,480	4,070	226,000
March	5,660	3,480	4,670	287,000
April	5,660	849	4,030	240,000
May	14,800	2,700	7,170	441,000
June	15,300	3,800	7,660	456,000
July	3,900	24	981	60,300
August	1,660	11	94.1	5,790
September	12	9.2	10.3	613
The year	15,300	9.2	3,770	2,730,000

SNAKE RIVER NEAR KIMBERLY, IDAHO

LOCATION.—In SE. $\frac{1}{4}$ sec. 32, T. 9 S., R. 18 E., above upper outlet of Devil's Corral, half a mile below the Twin Falls, $2\frac{1}{2}$ miles above the Shoshone Falls, 4 miles north of Kimberly, Twin Falls County, and $6\frac{1}{2}$ miles northeast of the city of Twin Falls.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—July 24 to September 30, 1923.

GAGE.—Friez water-stage recorder on left bank; inspected by C. E. Tappan.

DISCHARGE MEASUREMENTS.—Made from cable 300 feet above gage.

CHANNEL AND CONTROL.—Bed composed of lava boulders and solid rock in deep lava canyon; very rough. Control formed by low falls 70 feet below gage; probably permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period from water-stage recorder, 8.0 feet at 1 p. m. July 28 (discharge, about 5,240 second-feet); minimum stage, 1.25 feet from 9.30 a. m. to midnight July 24 (discharge, 448 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—No water diverted from river between this station and station at Milner.

REGULATION.—Flow past station is regulated directly by diversions of the North and South Side Canals at Milner, where practically the entire flow of the river is diverted during large part of the irrigation season; flow at such times consists of inflow and seepage between this station and station at Milner.

ACCURACY.—Stage-discharge relation probably permanent. Rating curve well defined below 700 second-feet; poorly defined above. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspection of recorder graph. Below 700 second-feet records are good; others probably fair.

COOPERATION.—Gage-height record and several discharge measurements furnished by Idaho Power Co.

Discharge measurements of Snake River near Kimberly, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
July 30	Paulsen and Tappan *	1.98	622	Aug. 30	Paulsen and Tappan...	1.49	468
Aug. 6	C. E. Tappan.....	1.49	531	Sept. 4	C. E. Tappan.....	1.49	457
8	do.....	1.36	470	10	do.....	1.55	464
9	do.....	1.35	486	14	do.....	1.58	525
10	do.....	1.35	458	17	do.....	1.60	493
11	do.....	1.36	495	23	do.....	1.64	510
20	do.....	1.56	507	28	do.....	1.82	567
28	do.....	1.47	502				

* Employee of Idaho Power Co.

Daily discharge, in second-feet, of Snake River near Kimberly, Idaho, for the year ending September 30, 1923

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1.....		1,040	490	11.....		462	500	21.....		500	510
2.....		2,300	500	12.....		470	500	22.....		590	522
3.....		850	490	13.....		480	500	23.....		500	522
4.....		772	490	14.....		480	510	24.....	448	490	522
5.....		522	490	15.....		470	510	25.....	500	480	522
6.....		490	490	16.....		480	500	26.....	535	480	560
7.....		470	490	17.....		480	510	27.....	1,540	480	575
8.....		462	490	18.....		470	510	28.....	4,400	480	560
9.....		462	500	19.....		470	510	29.....	2,010	490	560
10.....		462	500	20.....		500	510	30.....	635	490	548
								31.....	702	490	-----

Monthly discharge of Snake River near Kimberly, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
July 24-31.....	4,400	448	1,350	21,400
August.....	2,300	462	583	35,800
September.....	575	490	513	30,500
The period.....				87,700

SNAKE RIVER NEAR TWIN FALLS, IDAHO

LOCATION.—In sec. 33, T. 9 S., R. 17 E., at Perrine Bridge, on Blue Lakes ranch, 4 miles north of Twin Falls, Twin Falls County, and 4 miles below Shoshone Falls. Outlet of Blue Lakes enters Snake River 200 feet below gage, and Salmon Falls Creek enters 18 miles below.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 29, 1911, to June 30, 1917; May 1, 1919, to September 30, 1923.

GAGE.—Combined inclined and vertical staff set in concrete, on left bank 100 feet above bridge; installed August 18, 1921; read by employees on Blue Lakes ranch.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge.

CHANNEL AND CONTROL.—Bed at measuring section very rough. Banks high; not subject to overflow. Control composed of lava boulders and solid rock; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 9.6 feet at 7.30 p. m. June 27 (discharge, 16,800 second-feet); minimum stage, 2.2 feet at 7.45 p. m. July 15 (discharge, 570 second-feet).

1911-1917; 1919-1923: Maximum stage recorded, 13.3 feet at 6 a. m. and 7 p. m. June 10, 1914 (discharge, 32,200 second-feet); minimum stage, 2.05 feet June 27 to July 4, July 9-16, 18-20, 28-29, and 31, August 1-3, 6-7, 1915 (discharge, 468 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—No water is diverted from the river between this station and that at Milner, except by small ranch ditches.

REGULATION.—Flow past station regulated directly by diversions of North Side and South Side Canals at Milner, where practically entire flow of river is diverted during latter part of irrigation season; flow at such times consists of inflow and seepage between this station and the one at Milner.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Gage read to quarter-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Snake River near Twin Falls, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>
May 4	A. G. Fiedler.....	5.81	5,810
June 9	C. G. Paulsen.....	6.56	7,570
July 23	A. G. Fiedler.....	2.30	615

Daily discharge, in second-feet, of Snake River near Twin Falls, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	750	5,520	6,940	6,690	5,290	5,740	5,740	4,220	13,200	4,220	895	685
2	750	5,290	6,690	6,940	5,290	6,210	5,740	4,850	11,100	4,850	2,010	685
3	750	6,210	6,450	6,690	5,290	5,520	6,690	5,520	10,800	3,100	1,180	685
4	750	6,690	6,210	6,450	4,850	5,980	5,980	5,520	10,500	2,920	895	685
5	750	6,450	6,210	6,450	4,850	5,520	5,980	4,020	9,060	4,420	785	685
6	750	6,940	6,690	6,210	4,850	6,210	5,740	4,850	7,700	3,640	750	685
7	750	6,690	6,210	6,690	4,640	5,980	5,740	4,850	7,440	2,920	685	685
8	750	6,940	6,690	6,690	4,640	5,740	5,980	7,180	7,700	1,370	685	685
9	750	6,940	6,690	6,690	4,850	5,980	5,740	7,440	7,700	858	625	685
10	750	6,940	6,690	6,690	4,640	5,740	6,210	6,210	10,500	685	625	685
11	750	7,180	6,210	6,210	4,640	5,070	5,520	9,060	7,440	655	625	750
12	750	7,180	5,980	6,210	4,220	6,210	4,850	10,200	7,440	625	655	685
13	750	7,440	5,980	6,210	4,220	5,740	4,420	9,940	8,240	625	655	685
14	750	7,180	5,290	6,210	4,640	5,520	5,290	10,500	8,510	625	625	685
15	785	7,180	5,290	6,210	4,850	5,740	4,850	9,940	7,960	570	685	685
16	820	6,940	5,070	6,210	4,640	5,520	4,420	7,700	8,510	1,420	655	718
17	785	6,940	4,850	6,210	4,850	5,290	4,020	5,740	6,940	1,320	685	750
18	785	6,450	4,850	6,210	4,640	6,210	2,600	4,640	6,210	1,580	685	750
19	785	6,690	5,290	6,210	4,850	5,520	1,880	4,020	5,520	1,750	655	750
20	820	7,180	5,290	6,210	5,070	4,420	2,150	2,920	4,220	895	685	750
21	2,150	6,450	5,520	6,210	5,070	5,520	4,220	4,850	6,210	685	685	718
22	2,600	7,440	5,520	6,210	5,290	4,850	5,290	7,180	5,980	625	685	718
23	2,600	6,940	5,290	6,210	5,290	4,020	5,980	8,240	7,180	655	685	750
24	2,150	6,690	5,740	6,210	5,520	5,070	5,740	8,510	8,240	625	718	750
25	2,600	6,690	6,210	6,450	5,520	4,850	5,980	9,350	12,900	655	685	750
26	3,100	6,690	6,450	5,290	6,210	4,640	5,070	9,940	16,500	685	685	858
27	3,640	6,450	6,690	5,740	6,690	4,850	3,640	12,300	14,200	1,140	685	858
28	3,270	6,210	6,690	6,210	5,980	5,290	4,220	13,600	9,940	3,820	685	820
29	5,290	5,740	6,210	6,450	-----	5,740	4,640	14,800	8,780	2,010	750	820
30	5,520	6,690	7,440	5,980	-----	5,980	3,270	15,800	8,240	1,010	655	820
31	5,980	-----	6,690	5,290	-----	5,740	-----	14,800	-----	785	685	-----

Monthly discharge of Snake River near Twin Falls, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	5,980	750	1,750	108,000
November	7,440	5,290	6,700	399,000
December	7,440	4,850	6,070	373,000
January	6,940	5,290	6,280	386,000
February	6,690	4,220	5,050	280,000
March	6,210	4,020	5,500	338,000
April	6,690	1,880	4,920	293,000
May	15,800	2,920	8,020	493,000
June	16,500	4,220	8,830	525,000
July	4,850	570	1,670	103,000
August	2,010	625	753	46,300
September	858	685	731	43,500
The year	16,500	570	4,680	3,390,000

Snake River near Hagerman, Idaho

LOCATION.—In sec. 2, T. 8 S., R. 13 E., one-eighth mile above Owsley Bridge, just above Upper Salmon Falls, and 4 miles south of Hagerman, Gooding County. Big Wood River enters 10 miles below.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 24, 1912, to June 18, 1917; July 25, 1919, to September 30, 1923.

GAGE.—Friez water-stage recorder on right bank; installed April 20, 1921; inspected by F. M. Gregg.

DISCHARGE MEASUREMENTS.—Made from cable 100 feet below gage.

CHANNEL AND CONTROL.—Control rocky; permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 6.05 feet at 10 p. m. June 26 (discharge, 21,800 second-feet); minimum stage, 3.29 feet at 7 p. m. July 15 (discharge, 4,920 second-feet).

1912-1917; 1919-1923: Maximum stage recorded, 7.75 feet at 6 p. m. June 10, 1914 (discharge, 35,100 second-feet); minimum stage, 3.1 feet July 15 to August 2, 1915 (discharge, 4,030 second-feet). Data insufficient in 1916 and 1917 for determination of maximum and minimum stages.

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—No important diversions between this station and one at Milner. Practically entire flow of river is diverted at Milner during part of irrigation season by the Twin Falls Canals, and flow at Owsley Bridge is maintained largely by springs and waste water from irrigation above.

REGULATION.—Flow regulated by diversions of the Twin Falls canals at Milner.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Some difficulty experienced with operation of water-stage recorder, as indicated by breaks in record as noted in footnote to table of daily discharge. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting recorder graph, except as indicated in footnote to table of daily discharge. Records excellent except for estimated periods, for which they are good.

Discharge measurements of Snake River near Hagerman, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 8	A. G. Fiedler	4.43	10,900	Aug. 29	C. G. Paulsen	3.42	5,300
20	L. L. Bryan	3.62	6,210	Sept. 27	F. M. Veatch	3.56	5,970
June 26	Berkeley Johnson	5.64	19,800				

Daily discharge, in second-feet, of Snake River near Hagerman, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1-----	5,540	9,950	10,900	10,300	9,340	10,000	9,640	8,600	16,500	11,200	5,540	5,540
2-----	5,540	9,640	11,200	10,900	9,340		9,640		15,600	9,640	5,970	5,540
3-----	5,540	9,950	10,900	10,900	9,040	9,640	9,950		15,300	8,750	6,650	5,330
4-----	5,540	10,300	10,600	10,600	9,040	10,300	9,950		14,900	7,640	6,650	5,330
5-----	5,540		10,600	10,300	9,040	9,640	10,300	9,040	13,900	8,750	5,970	5,330
6-----	5,540	10,800	10,900	10,900	9,040	10,300	9,640	8,750	12,200	7,910	5,330	5,330
7-----	5,540		10,600	10,900	9,040	10,300	9,640	8,750	12,200	7,640	5,330	5,330
8-----	5,540		10,900	10,900	9,040	10,300	10,600	10,300	12,600	6,890	5,330	5,330
9-----	5,540		10,900	10,900	9,040	9,640	9,950	11,600	12,600		5,330	5,330
10-----	5,540			10,600	9,040	9,950	10,300	11,600	12,900		5,330	5,330
11-----	5,540	11,200	10,100	10,300	8,750	9,640	10,300	12,600	13,600	5,500	5,330	5,540
12-----	5,540	10,900		10,600	9,040	9,640	9,340	13,600	12,600		5,330	5,540
13-----	5,540	11,200		10,300	8,750	9,950	8,750	13,900	11,900		5,330	5,540
14-----	5,540	10,900	9,040		8,750	9,640	9,640	14,600	12,900	5,120	5,330	5,540
15-----	5,540	10,900	9,340		9,040	9,950	9,340	14,200	12,600	5,120	5,330	5,540
16-----	5,540	10,900	9,340	10,400	8,750	9,640	9,040	12,600	12,600	5,330	5,330	5,330
17-----	5,540	11,200	9,340		8,750	9,340	8,750	10,300	11,900	5,750	5,330	5,540
18-----	5,540	10,900	9,040			9,950	7,380	9,640	11,200	5,750	5,330	5,540
19-----	5,540	10,600	9,340			9,950	6,890	8,750	10,300	5,970		5,540
20-----	5,540	10,900	9,640	10,600		9,040	6,190	7,910	9,340	5,750		5,540
21-----	5,970	10,900	9,640	10,600		9,040	8,180	8,460	10,900	5,330	5,590	5,540
22-----	6,890	10,900	9,950	10,600		9,340	9,040	10,600	11,600	5,330		5,540
23-----	6,890	11,200	9,950	10,600	9,500	8,460	9,950	11,900	11,900	5,330		5,540
24-----	6,650	10,600	10,300	10,600		8,460	9,950	12,600	12,900	5,540		5,540
25-----	6,650	10,600	10,600	10,900			10,300	12,900	17,000	5,540	5,750	5,540
26-----	7,130	10,600	10,600	9,950			9,340	13,900	19,600	5,540	5,540	5,970
27-----	7,640	10,600	10,900	9,640		9,050	8,460		20,300	5,540	5,540	6,190
28-----	8,180	10,600	10,900	9,950			7,130		15,600	7,130	5,540	5,970
29-----	8,750	10,300	10,600	10,300			7,800	17,000	13,900	7,640	5,540	5,750
30-----	9,640	10,300	11,600	10,300					13,600	6,190	5,540	5,970
31-----	9,950		11,200	9,640		9,640				5,750	5,330	

NOTE.—Discharge interpolated May 11 and Sept. 28. Recorder not operating Nov. 5-10, Dec. 10-12, Jan. 14-19, Feb. 18 to Mar. 2, Mar. 25-30, Apr. 29 to May 4, May 27 to June 1, July 9-13, and Aug. 19-24; discharge ascertained by comparison with flow at stations near Twin Falls and at King Hill. Braced figures show mean discharge for periods indicated.

*Monthly discharge of Snake River near Hagerman, Idaho, for the year ending
September 30, 1923*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	9,950	5,540	6,290	387,000
November.....		9,640	10,700	637,000
December.....	11,600	9,040	10,300	633,000
January.....	10,900	9,640	10,500	646,000
February.....			9,190	510,000
March.....			9,550	587,000
April.....	10,600	6,190	9,130	543,000
May.....			11,900	732,000
June.....	20,300	9,340	13,500	803,000
July.....	11,200		6,440	396,000
August.....	6,650		5,560	342,000
September.....	6,190	5,330	5,550	330,000
The year.....	20,300		9,030	6,550,000

SNAKE RIVER AT KING HILL, IDAHO

LOCATION.—In sec. 7, T. 5 S., R. 11 E., 300 feet east of Oregon Short Line Railroad station at King Hill, Elmore County. Big Wood River enters from north 20 miles above station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 13, 1909, to September 30, 1923.

GAGE.—Inclined staff on right bank; installed August 24, 1922; read by employees of United States Bureau of Reclamation.

DISCHARGE MEASUREMENTS.—Made from cable 100 feet below gage.

CHANNEL AND CONTROL.—Bed composed largely of gravel. Control is lava reef partly overlain with gravel; shifts slightly.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 10.83 feet June 27 (discharge, 23,300 second-feet); minimum stage, 5.36 feet July 13 (discharge, 6,280 second-feet).

1909–1923: Maximum stage recorded, 16.3 feet June 22, 1918 (discharge, 47,200 second-feet); minimum stage, 4.5 feet July 7–9 and August 15 and 16, 1910 (discharge, 4,760 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—No noteworthy diversions for irrigation are made between this station and the one at Milner.

REGULATION.—Flow regulated by diversions at Milner. During certain parts of irrigation season practically the entire flow of river is appropriated, and flow at King Hill is derived largely from springs and seepage water from the Twin Falls tracts.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table. Records good.

COOPERATION.—Gage-height record furnished by United States Bureau of Reclamation.

*Discharge measurements of Snake River at King Hill, Idaho, during the year ending
September 30, 1923*

Date	Made by—	Gage height	Dis- charge	Date	Made by—	Gage height	Dis- charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Dec. 1	C. G. Paulsen.....	7.90	12,900	June 26	Berkeley Johnson.....	10.04	20,600
Feb. 26	L. L. Bryan.....	7.75	12,700	Aug. 4	A. G. Fiedler.....	5.95	7,560
Apr. 7	A. G. Fiedler.....	7.82	12,500	Sept. 13	C. G. Paulsen.....	5.79	7,070
17	C. G. Paulsen.....	7.19	10,300	25	F. M. Veatch.....	5.90	7,470
June 11	do.....	9.45	18,200				

Daily discharge, in second-feet, of Snake River at King Hill, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	7,610	11,900	13,200	12,800	11,600	13,200	12,200	9,080	20,200	14,100	7,150	7,150
2.....	7,610	11,600	13,200	12,800	11,600	12,800	12,200	10,400	18,400	10,200	7,150	7,150
3.....	7,610	11,600	12,800	12,800	11,000	12,200	11,900	10,400	17,300	10,700	8,080	7,150
4.....	7,610	12,500	12,500	12,500	11,300	12,500	12,500	11,300	16,900	9,080	7,610	7,150
5.....	7,610	12,500	12,800	12,200	11,000	11,900	12,500	11,300	16,200	10,200	7,380	6,930
6.....	7,610	12,200	13,200	12,800	11,000	12,200	12,500	10,700	14,100	10,200	7,150	6,930
7.....	7,610	12,800	12,800	13,500	11,000	12,500	12,500	10,200	13,800	9,340	7,150	6,930
8.....	7,610	12,800	12,500	13,500	11,000	12,500	12,800	11,000	13,800	8,570	6,710	6,930
9.....	7,380	12,800	12,800	13,200	11,000	11,900	12,500	12,800	13,800	7,840	6,930	6,930
10.....	7,380	12,800	12,800	12,800	11,000	12,500	12,200	13,200	16,100	7,150	6,710	6,930
11.....	7,380	13,200	12,500	12,200	11,000	12,200	12,500	13,200	18,400	6,710	6,930	6,930
12.....	7,380	12,800	12,200	13,200	14,000	11,300	11,600	15,800	14,100	6,710	7,040	7,150
13.....	7,610	13,200	12,200	12,500	11,000	12,500	11,000	15,200	13,200	6,280	7,150	7,150
14.....	7,610	12,500	10,700	12,500	10,700	12,200	11,300	16,500	14,500	6,710	7,150	7,150
15.....	7,610	12,800	11,300	12,500	10,700	12,200	11,300	14,800	14,500	6,710	6,930	7,150
16.....	7,610	12,800	11,300	12,500	11,000	12,500	11,300	14,800	14,100	6,710	6,930	7,150
17.....	7,610	13,200	11,300	12,500	11,000	12,200	10,700	12,500	13,800	7,380	6,930	7,150
18.....	7,610	13,200	11,000	12,200	11,000	12,500	9,880	11,000	13,200	7,380	6,930	7,150
19.....	7,610	12,500	11,300	12,500	11,000	13,500	9,080	10,400	12,500	7,610	7,040	7,150
20.....	7,840	12,800	11,600	12,500	11,300	12,200	8,080	11,000	11,900	7,610	7,150	7,380
21.....	7,840	13,200	11,600	12,500	11,600	11,300	9,080	11,900	12,200	6,930	6,930	7,380
22.....	8,320	12,800	11,600	12,500	11,900	11,300	10,200	10,700	13,500	6,930	7,150	7,380
23.....	9,080	13,200	11,900	12,500	11,900	11,300	11,600	12,800	13,200	6,710	7,380	7,380
24.....	9,080	13,200	11,900	12,500	11,900	10,700	12,200	14,100	15,000	7,380	7,380	7,380
25.....	8,320	13,500	12,500	12,500	11,900	11,300	12,500	14,500	16,900	7,150	7,150	7,610
26.....	9,610	12,800	12,500	12,500	12,200	11,900	11,300	15,200	20,200	6,930	7,150	7,610
27.....	9,880	12,800	12,800	12,500	12,800	12,200	10,700	17,300	23,300	7,150	7,150	8,080
28.....	10,200	12,800	12,800	12,500	13,200	11,000	8,820	18,400	18,700	6,930	6,930	8,080
29.....	10,200	12,500	13,200	12,200	-----	11,900	9,080	19,500	16,200	7,840	6,930	8,080
30.....	11,300	12,800	12,500	12,200	-----	12,500	9,340	21,400	15,500	8,080	6,930	8,080
31.....	11,600	-----	12,500	11,900	-----	12,500	-----	21,400	-----	7,150	6,930	-----

* Discharge interpolated.

Monthly discharge of Snake River at King Hill, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	11,600	7,380	8,320	512,000
November.....	13,500	11,600	12,700	756,000
December.....	13,200	10,700	12,300	756,000
January.....	13,500	11,900	12,600	775,000
February.....	13,200	10,700	11,400	693,000
March.....	13,500	10,700	12,100	744,000
April.....	12,800	8,080	11,200	666,000
May.....	21,400	9,080	13,700	842,000
June.....	23,300	11,900	15,500	922,000
July.....	14,100	6,280	7,950	480,000
August.....	8,080	6,710	7,100	437,000
September.....	8,080	6,930	7,290	434,000
The year.....	23,300	6,280	11,000	7,970,000

SNAKE RIVER NEAR MURPHY, IDAHO

LOCATION.—In NW. $\frac{1}{4}$ sec. 18, T. 2 S., R. 1 E., Ada County, three-fourths mile below Swan Falls power plant, 12 miles east of Murphy, Owyhee County, and 38 miles below mouth of Bruneau River.

DRAINAGE AREA.—41,900 square miles (measured on United States Land Office maps).

RECORDS AVAILABLE.—August 29 to October 31, 1912; August 21, 1913, to September 30, 1923.

GAGE.—Friez water-stage recorder on right bank a quarter of a mile below house on ranch of S. N. Glass; installed September 7, 1914; inspected by George Bahler.

DISCHARGE MEASUREMENTS.—Made from boat at ferry cable $1\frac{1}{4}$ miles above gage.

CHANNEL AND CONTROL.—Bed composed of lava rock overlain with deposits of sand, silt, and gravel, where not scoured out by current. Banks not subject to overflow. Control practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 9.00 feet at noon June 28 (discharge, 27,300 second-feet); minimum mean daily stage, -0.43 foot July 15 (discharge, 6,670 second-feet); absolute minimum not definitely known because water fell below intake at times of minimum load at power plant above.

1912-1923: Maximum stage recorded, 13.95 feet at 10 p. m. June 22, 1918 (discharge, 47,300 second-feet); minimum stage, about -2.25 feet at 6 a. m. August 6, 1917 (discharge, about 5,000 second-feet). Stage probably fell equally low at times of minimum load at power plant above during low-water periods from 1919 to 1923, inclusive.

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—A number of small pumping plants divert water for irrigation between this station and the one at King Hill.

REGULATION.—Large diurnal fluctuations in stage are caused by operation of gates at dam above and by variation in load at power plant, but because of small relative amount of storage obtained the changes are of short duration.

ACCURACY.—Stage-discharge relation permanent. Rating curve fairly well defined. Operation of water-stage recorder satisfactory, except as indicated in footnote to table of daily discharge. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph. Records fair.

Discharge measurements of Snake River near Murphy, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 30	Fiedler and Johnson.....	3.77	12,600
July 18	Berkeley Johnson.....	.40	* 8,230
24	do.....	.74	7,960

* Change of $+0.92$ foot in stage during measurement; result not accurate.

Daily discharge, in second-feet, of Snake River near Murphy, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	7, 670	12, 400	12, 400	13, 600	12, 000	13, 600	13, 100	9, 930	21, 900	16, 500	7, 770	7, 090
2	7, 990	12, 900	13, 300	13, 100	11, 600	12, 600	13, 100	10, 100	20, 700	15, 000	7, 270	7, 090
3	7, 870	12, 900	13, 600	13, 100	11, 600	12, 900	12, 900	11, 400	18, 400	12, 000	7, 180	7, 270
4	7, 990	12, 900	13, 300	13, 300	11, 200	12, 400	12, 900	10, 800	18, 100	12, 000	7, 990	7, 180
5	8, 320	13, 800	12, 900	13, 100	11, 600	12, 600	12, 900	11, 800	17, 900	10, 100	7, 470	7, 180
6	7, 670	13, 100	12, 900	12, 900	11, 200	12, 400	13, 100	11, 600	17, 100	11, 200	7, 370	7, 180
7	7, 270	13, 100	13, 600	13, 300	11, 200	12, 400	13, 100	10, 400	15, 500	10, 800	7, 370	7, 270
8	7, 880	13, 600	13, 100	13, 800	11, 000	12, 900	13, 300	11, 200	15, 500	10, 100	7, 570	7, 270
9	8, 210	13, 800	12, 900	14, 000	11, 400	12, 400	13, 600	12, 400	14, 800	9, 470	7, 090	6, 910
10	7, 570	13, 300	12, 900	13, 600	11, 200	12, 200	12, 300	13, 300	15, 000	8, 440	7, 270	7, 370
11	7, 990	13, 100	12, 900	13, 600	11, 200	12, 200	13, 100	13, 800	15, 800	7, 670	7, 000	7, 370
12	7, 880	13, 800	12, 400	13, 100	10, 800	12, 200	13, 100	14, 300	17, 300	7, 470	7, 370	7, 180
13	8, 680	13, 100	12, 200	13, 300	11, 200	11, 800	12, 400	16, 000	15, 300	7, 180	7, 180	7, 370
14	7, 180	13, 800	11, 800	12, 900	11, 000	12, 200	11, 800	16, 000	15, 300	7, 990	7, 670	7, 370
15	8, 100	13, 800	11, 200	12, 900	10, 600	12, 000	11, 600	16, 800	15, 500	6, 670	7, 000	7, 270
16	8, 100	13, 300	11, 000	12, 900	10, 800	12, 200	11, 800	16, 300	15, 800	7, 270	7, 180	7, 180
17	7, 880	13, 800	11, 200	12, 600	10, 800	12, 400	11, 400	15, 500	15, 500	7, 370	6, 910	7, 370
18	8, 210	13, 600	10, 800	12, 400	11, 000	12, 000	11, 600	13, 800	15, 300	7, 270	7, 180	7, 570
19	8, 210	13, 800	10, 800	12, 600	11, 200	12, 200	10, 400	13, 100	14, 300	7, 370	7, 470	7, 570
20	8, 100	13, 100	11, 000	12, 900	11, 400	12, 900	9, 190	11, 800	13, 800	7, 570	7, 180	7, 470
21	7, 880	13, 300	11, 400	12, 600	11, 400	12, 200	8, 680	11, 600	12, 900	7, 990	7, 090	7, 470
22	7, 990	13, 800	11, 400	12, 600	11, 800	11, 600	8, 930	10, 400	13, 300	7, 000	7, 470	7, 670
23	9, 060	13, 100	11, 600	12, 900	11, 800	12, 000		12, 900	15, 000	7, 000	7, 180	7, 370
24	9, 190	13, 800		12, 600	12, 600	10, 800		14, 300	15, 300	7, 180	7, 270	7, 880
25	9, 330	13, 300	12, 500	12, 900	12, 000	10, 600	12, 000	15, 300	16, 300	7, 000	7, 470	7, 670
26	8, 680	13, 100		12, 600	12, 900	11, 600		15, 500	19, 500	7, 370	7, 000	7, 570
27	8, 930	13, 300	13, 300	12, 600	12, 900	11, 800	11, 600	16, 300	22, 200	7, 090	7, 270	8, 320
28	9, 190	13, 100	13, 300	11, 600	13, 300	12, 200	10, 600	17, 100	23, 800	7, 000	7, 270	8, 320
29	10, 400	13, 100	13, 600	12, 200			12, 000	9, 770	19, 000	18, 700	7, 270	8, 320
30	10, 600	12, 900	13, 100	12, 400			12, 000	9, 930	20, 100	17, 300	8, 100	7, 180
31	12, 200		13, 100	12, 400			12, 900		21, 900		8, 320	7, 090

NOTE.—Because of missing gage height record, discharge estimated by comparison with flow at King Hill and at Weiser Dec. 24–26 and Apr. 23–26. Braced figures show mean discharge for periods indicated.

Monthly discharge of Snake River near Murphy, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	12, 200	7, 180	8, 440	519, 000
November	13, 800	12, 400	13, 300	791, 000
December	13, 600	10, 800	12, 400	762, 000
January	14, 000	11, 600	12, 900	793, 000
February	13, 300	10, 600	11, 500	639, 000
March	13, 600	10, 600	12, 200	750, 000
April	13, 600	8, 680	11, 800	702, 000
May	21, 900	9, 930	14, 000	861, 000
June	23, 800	12, 900	16, 800	1, 000, 000
July	16, 500	6, 670	8, 730	537, 000
August	7, 990	6, 910	7, 280	448, 000
September	8, 320	6, 910	7, 480	445, 000
The year	23, 800	6, 670	11, 400	8, 250, 000

SNAKE RIVER AT WEISER, IDAHO

LOCATION.—In sec. 31, T. 11 N., R. 5 W., a third of a mile above wagon bridge at Weiser, Washington County. Between this station and station near Murphy Sucker Creek and Owyhee and Malheur Rivers enter Snake River from left and Boise, Payette, and Weiser Rivers from right.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 8, 1910, to September 30, 1923. Fragmentary gage-height record obtained by United States Weather Bureau since 1895.

GAUGE.—Inclined concrete gage on right bank; installed by United States Weather Bureau; read by J. W. Lapish. Elevation of zero of gage is at 2,087.22 feet above sea level.

DISCHARGE MEASUREMENTS.—Made from cable 200 yards below bridge.

CHANNEL AND CONTROL.—Bed composed of rocks and coarse gravel. One channel at all stages. Control fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.44 feet June 13 (discharge, 41,500 second-feet); minimum stage, 2.1 feet August 13, 14, 18, 19, 21, and September 11 (discharge, 7,480 second-feet).

1910-1923: Maximum stage recorded, 13.60 feet May 23, 1921 (discharge, 83,100 second-feet); minimum stage, 1.5 feet August 28 and 29, 1915, and August 1, 1919 (discharge, 5,550 second-feet). A stage of 15.7 feet was observed March 3, 1910, on old Weather Bureau gage (discharge, about 100,000 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—Some water is diverted between Weiser and the station near Murphy by pumping.

REGULATIONS.—Diurnal fluctuations during periods of low water due to operations at Swan Falls power plant above.

ACCURACY.—Stage-discharge relation changed somewhat prior to high water. Rating curves well defined. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table. Records fair.

COOPERATION.—Gage-height record furnished by United States Weather Bureau.

Discharge measurements of Snake River at Weiser, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Feb. 15	Berkeley Johnson	4.18	14,600	July 5	Berkeley Johnson	5.20	21,300
Apr. 14	do.	6.00	24,200	11	do.	3.52	13,300
May 13	do.	6.54	27,700	28	Veatch and Johnson	2.52	9,510
June 1	do.	7.99	38,900	Aug. 26	F. M. Veatch	2.22	7,870
17	C. G. Paulsen	6.84	30,100				

Daily discharge, in second-feet, of Snake River at Weiser, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	9,990	15,000	17,000	19,000	16,000	18,000	25,300	21,000	38,400	30,100	9,660	7,830
2	10,400	16,000	17,000	19,600	15,000	18,500	26,500	19,500	40,000	28,900	8,910	7,830
3	9,990	16,000	17,000	19,000	15,000	19,000	27,100	19,000	36,200	27,100	8,180	7,830
4	9,990	16,000	16,000	18,000	15,000	18,000	26,500	19,000	32,700	22,100	7,830	7,830
5	9,610	16,500	17,000	19,000	15,000	17,400	26,500	19,000	33,400	21,600	8,180	7,830
6	9,990	17,000	17,400	19,600	15,000	17,400	25,900	19,000	32,100	19,500	8,540	7,830
7	10,400	16,500	16,500	22,400	15,000	18,000	26,500	22,600	32,100	17,500	7,830	7,830
8	9,990	16,500	18,000	23,000	15,000	17,400	27,100	22,100	32,700	18,000	7,830	7,830
9	9,610	17,400	18,000	21,800	15,500	18,500	28,200	23,100	34,100	18,000	7,830	7,830
10	9,990	18,500	17,400	21,800	15,500	17,400	26,500	25,900	34,100	15,200	7,830	7,830
11	9,610	18,000	17,400	20,100	15,500	17,400	25,900	31,400	35,500	13,400	7,830	7,480
12	9,610	18,000	17,000	19,000	15,500	17,000	25,900	30,100	38,400	12,100	7,830	7,830
13	10,400	18,000	16,000	18,000	15,000	17,000	25,900	27,100	41,500	11,200	7,480	7,830
14	9,990	18,000	15,500	18,500	15,500	16,000	25,300	25,900	38,400	10,800	7,480	7,830
15	10,400	18,000	15,500	18,500	16,000	16,000	24,200	28,900	35,500	9,660	7,830	7,830
16	10,800	17,400	15,000	18,500	15,500	16,000	23,100	28,900	35,500	10,400	7,830	7,830
17	9,990	17,400	15,000	18,000	14,600	17,400	24,200	28,900	30,100	10,100	7,830	7,830
18	10,800	18,000	15,000	18,000	15,000	17,400	25,300	28,900	28,200	11,200	7,480	7,830
19	10,400	18,000	15,500	18,000	15,500	17,000	25,300	29,500	28,200	10,800	7,480	8,180
20	10,400	18,000	15,000	17,400	16,000	17,400	23,700	28,900	27,600	10,400	7,830	8,180
21	10,400	18,000	14,600	17,400	15,500	18,000	22,100	28,200	26,500	9,660	7,480	8,540
22	10,400	18,000	15,000	17,400	16,000	18,000	20,000	27,600	26,500	9,660	8,180	8,540
23	10,400	18,000	15,500	17,400	16,500	18,000	17,500	25,900	28,200	10,000	8,180	8,910
24	11,200	17,400	16,000	17,400	17,000	18,500	19,500	27,100	32,100	8,910	8,180	8,910
25	12,800	17,400	16,000	17,400	17,400	19,600	19,500	30,100	30,800	8,910	7,830	8,910
26	12,400	17,400	16,500	17,400	16,500	18,500	20,500	34,100	31,400	9,280	7,830	9,280
27	11,600	17,400	17,000	17,400	18,000	20,100	20,500	37,700	33,400	9,280	7,830	9,280
28	12,000	17,400	17,400	17,000	18,000	21,200	21,000	38,400	37,000	8,910	7,830	10,000
29	13,700	17,400	19,000	16,500	-----	22,400	21,600	35,500	40,000	8,910	7,830	10,800
30	14,100	17,400	20,100	16,500	-----	23,600	22,100	37,700	31,400	8,540	7,830	10,800
31	13,300	-----	19,600	16,000	-----	24,800	-----	37,000	-----	9,280	7,830	-----

Monthly discharge of Snake River at Weiser, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	14, 100	9, 610	10, 800	664, 000
November.....	18, 500	15, 000	17, 300	1, 030, 000
December.....	20, 100	14, 600	16, 700	1, 030, 000
January.....	23, 000	16, 000	18, 500	1, 140, 000
February.....	18, 000	14, 600	15, 800	878, 000
March.....	24, 800	16, 000	18, 400	1, 130, 000
April.....	28, 200	17, 500	24, 000	1, 430, 000
May.....	38, 400	19, 000	27, 700	1, 700, 000
June.....	41, 500	26, 500	33, 400	1, 990, 000
July.....	30, 100	8, 540	13, 900	855, 000
August.....	9, 660	7, 480	7, 950	489, 000
September.....	10, 800	7, 480	8, 360	497, 000
The year.....	41, 500	7, 480	17, 700	12, 800, 000

Snake River at Oxbow, Oreg.

LOCATION.—In NW. $\frac{1}{4}$ sec. 16, T. 7 S., R. 48 E. Willamette meridian, at Oxbow station on Homestead branch of Oregon Short Line Railroad, Baker County, five-eighths mile above intake of diversion tunnel for Oxbow power plant and $1\frac{1}{4}$ miles southeast of Copperfield post office.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 22 to September 30, 1923.

GAGE.—Inclined staff on left bank; read by William T. Kingsley.

DISCHARGE MEASUREMENTS.—Made from cable at gage.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders. Banks high; not subject to overflow. One channel at all stages. Control fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 15.5 feet June 12 (discharge, 42,900 second-feet); minimum stage, 7.7 feet August 14, 15, and 17 (discharge, 7,700 second-feet).

ICE.—Stage-discharge relation seldom affected by ice.

DIVERSIONS.—A number of small pumping plants divert water for irrigation between this station and station at Weiser.

REGULATION.—Diurnal fluctuations during periods of low water due to operations at Swan Falls power plant above.

ACCURACY.—Stage-discharge relation permanent during period. Rating curve well defined. Gage read to hundredths once daily. Daily discharge determined by applying daily gage height to rating table. Records good.

COOPERATION.—Station maintained in cooperation with Idaho Power Co.

Discharge measurements of Snake River at Oxbow, Oreg., during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>
June 19	C. G. Paulsen.....	13.30	29, 500
July 9	Berkeley Johnson.....	10.79	18, 400
30	Johnson and Veatch.....	8.24	9, 180

Daily discharge, in second-feet, of Snake River at Oxbow, Oreg., for the year ending September 30, 1923

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1.....	-----	37,700	33,000	10,800	8,230	16.....	-----	34,700	12,500	8,510	8,230
2.....	-----	40,300	30,800	10,100	8,230	17.....	-----	32,400	11,800	7,700	7,960
3.....	-----	37,700	29,200	9,430	7,960	18.....	-----	30,800	13,200	7,960	8,230
4.....	-----	35,300	25,600	9,110	7,960	19.....	-----	29,800	12,200	8,230	8,510
5.....	-----	35,300	23,800	8,800	7,960	20.....	-----	29,200	12,200	7,960	8,510
6.....	-----	34,100	21,700	9,110	7,960	21.....	-----	28,800	11,400	8,510	8,800
7.....	-----	34,700	19,200	9,110	7,960	22.....	29,800	28,800	12,500	8,800	8,800
8.....	-----	35,300	20,000	10,800	7,960	23.....	29,200	29,200	12,200	8,800	9,110
9.....	-----	34,700	18,800	8,510	7,960	24.....	28,800	31,300	10,100	8,800	9,750
10.....	-----	35,900	17,200	8,800	8,230	25.....	31,300	32,400	9,750	8,800	9,430
11.....	-----	37,700	16,000	8,230	7,960	26.....	34,100	33,000	12,200	8,230	10,100
12.....	-----	42,900	14,400	8,230	8,230	27.....	36,500	33,000	9,750	8,800	10,100
13.....	-----	42,200	13,200	7,960	8,510	28.....	39,600	39,000	10,400	7,960	10,100
14.....	-----	39,600	13,200	7,700	7,960	29.....	37,700	40,300	9,430	8,230	10,800
15.....	-----	37,700	12,200	7,700	9,510	30.....	37,100	36,500	9,110	8,510	10,800
						31.....	37,700	-----	9,110	7,960	-----

Monthly discharge of Snake River at Oxbow, Oreg., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 22-31.....	39,600	28,800	34,200	678,000
June.....	42,900	28,800	35,000	2,080,000
July.....	33,060	9,110	15,700	965,000
August.....	10,800	7,700	8,650	532,000
September.....	10,800	7,960	8,690	517,000
The period.....	-----	-----	-----	4,770,000

TRIBUTARY BASINS

HENRYS FORK NEAR LAKE, IDAHO

LOCATION.—In SW. $\frac{1}{4}$ sec. 26, T. 95 N., R. 43 E., one-fourth mile below Henrys Lake reservoir dam, and 4 miles south of Lake post office, Fremont County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 21, 1922, to September 30, 1923. May 17, 1920, to September 20, 1922, at a site 3 miles downstream, just below mouth of Dry Creek.

GAGE.—Stevens 8-day water-stage recorder on left bank; read by J. M. McGinn.

DISCHARGE MEASUREMENTS.—Made from footbridge just above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of small cobbles and gravel; fairly permanent. One channel at low and intermediate stages. Right bank is overflowed at extremely high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 3.32 feet at 7 p. m. August 8 (discharge, 347 second-feet); minimum discharge estimated, 1 second-foot July 1-8 (leakage from reservoir; gates closed).

1920-1923: Maximum stage recorded, 3.05 feet at 4 p. m. on May 16, 1922 (discharge, 569 second-feet); minimum, same as given above.

ICE.—Stage-discharge relation seriously affected by ice. Records discontinued during winter.

DIVERSIONS.—None between Henrys Lake reservoir dam and gaging station and practically no diversions above.

REGULATION.—Flow controlled by operation of gates in Henrys Lake reservoir dam.

ACCURACY.—Stage-discharge relation changed during high water in July. Standard rating curve fairly well defined for low and medium stages but poorly defined for high stages. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used July 22–24. Records good.

COOPERATION.—Gage-height record and several discharge measurements furnished by North Fork Reservoir Co.

Discharge measurements of Henrys Fork near Lake, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
July 9	C. A. McClelland	1.68	80.4	July 25	D. G. Martin *	3.18	320
9	do	2.34	161	26	do	3.22	328
9	do	1.99	123*	Aug. 8	C. A. McClelland	3.30	345
10	do	1.81	102	Sept. 4	C. G. Paulsen	1.24	49.6
21	C. G. Paulsen	1.58	73.5				

* Engineer, North Fork Reservoir Co.

Daily discharge, in second-feet, of Henrys Fork near Lake, Idaho, for the year ending September 30, 1923

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1	1	157	51	11	97	323	38	21	95	87	8
2	1	224	51	12	93	321	38	22	154	86	8
3	1	218	51	13	87	320	37	23	210	85	8
4	1	216	50	14	84	316	37	24	253	84	8
5	1	214	50	15	84	316	38	25	332	80	8
6	1	213	48	16	84	240	39	26	318	78	8
7	1	204	47	17	76	174	37	27	112	76	8
8	1	250	46	18	72	145	38	28	83	75	11
9	71	318	46	19	73	99	18	29	85	61	11
10	103	316	42	20	73	87	8	30	88	52	9
								31	92	52	-----

NOTE.—Discharge estimated July 1–8. Discharge July 9 determined by averaging the hourly discharge. Reservoir gates closed Sept. 20 for storage and flow reduced to leakage through dam.

Monthly discharge of Henrys Fork near Lake, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
July	332	* 1	91.2	5,610
August	323	52	177	10,900
September	51	8	29.9	1,780
The period	-----	-----	-----	18,300

* Estimated.

HENRYS FORK AT WARM RIVER, IDAHO

LOCATION.—In sec. 12, T. 9 N., R. 43 E., 300 yards above mouth of Warm River and half a mile above Warm River railroad station, Fremont County; above all main tributaries.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 3, 1910, to March 22, 1915; April 3, 1918, to September 30, 1923.

GAGE.—Au water-stage recorder on left bank used June 29 to September 30; prior to June 29 daily vertical staff readings only; read daily by H. E. Sheppard.

DISCHARGE MEASUREMENTS.—Made from cable at gage.

CHANNEL AND CONTROL.—Bed composed of cobbles, gravel, and sand. Stage-discharge relation at times affected by growth of moss; otherwise conditions are reasonably permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.35 feet at 1 p. m. May 11 (discharge, 2,490 second-feet); minimum discharge, estimated, 780 second-feet (occurred during ice periods in January and February).

1910-1915; 1918-1923: Maximum discharge, 3,390 second-feet May 16, 1920; minimum discharge, 623 second-feet January 10 and 11, 1921.

ICE.—Stage-discharge relation somewhat affected by ice. Mush ice also reported as present in the channel at various times for short periods.

DIVERSIONS.—Practically none above station.

REGULATIONS.—None.

ACCURACY.—Stage-discharge relation changed during July. Standard rating curve well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying mean daily gage height to rating table. Records good except for ice periods, for which they are fair.

Discharge measurements of Henrys Fork at Warm River, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 23	C. A. McClelland.....	4. 14	819	June 29	C. A. McClelland.....	4. 56	1, 150
May 5	do.....	5. 28	1, 620	Aug. 4	do.....	4. 62	1, 080
25	Baldwin and McClelland.....			28	do.....	4. 40	916
		5. 65	1, 920	Sept. 27	W. F. Dawson.....	4. 28	857

Daily discharge, in second-feet, of Henrys Fork at Warm River, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	888	918	886	886			855	1, 190	1, 680	1, 090	1, 000	924
2.....	888	950	886	886			855	1, 190	1, 680	1, 070	996	938
3.....	888	950	886	886			855	1, 300	1, 450	1, 060	1, 070	931
4.....	888	950	886	886			855	1, 410	1, 410	1, 040	1, 070	924
5.....	888	950	918	886			886	1, 600	1, 410	1, 020	1, 070	912
6.....	888	950	950	886		820	886	1, 720	1, 410	1, 010	1, 060	912
7.....	888	950	950	886			886	1, 960	1, 410	1, 010	1, 070	912
8.....	888	950	886	886			855	2, 040	1, 490	1, 000	1, 060	912
9.....	888	950	886	886			855	2, 200	1, 490	1, 000	1, 060	912
10.....	888	950	886	855			855	2, 370	1, 490	1, 040	1, 080	905
11.....	888	950		855			855	2, 490	1, 450	1, 060	1, 120	893
12.....	888	950	794	918		824	855	1, 960	1, 410	1, 060	1, 120	886
13.....	920	918		918		824	855	1, 840	1, 340	1, 040	1, 120	893
14.....	920	918		886		824	855	1, 720	1, 300	1, 040	1, 130	886
15.....	918	918		886	780	824	886	1, 720	1, 260	1, 020	1, 180	886
16.....	918	918		886		824	886	1, 800	1, 230	1, 020	1, 150	880
17.....	918	918		824		824	918	1, 880	1, 190	1, 020	1, 130	880
18.....	918	918	790	824		824	918	2, 000	1, 260	1, 010	1, 080	861
19.....	918	918		824		824	918	2, 000	1, 260	990	1, 020	855
20.....	918	918		824		824	950	1, 880	1, 230	983	1, 030	861
21.....	918	918		886		824	983	1, 800	1, 230	983	1, 020	861
22.....	918	918		918		824	950	1, 880	1, 260	983	990	861
23.....	918	918		918		824	950	1, 920	1, 260	1, 000	978	861
24.....	918	918		918		824	950	1, 960	1, 230	1, 080	964	861
25.....	918	918	855	918		824	950	1, 920	1, 190	1, 200	950	861
26.....	918	918	855	950		824	950	1, 960	1, 190	1, 180	957	858
27.....	918	918	855			824	1, 020	1, 920	1, 150	1, 180	950	855
28.....	918	918	855			824	1, 050	1, 920	1, 120	1, 150	950	855
29.....	918	918	918	850		824	1, 080	1, 680	1, 130	1, 030	944	849
30.....	918	886	918			824	1, 230	1, 680	1, 110	1, 000	944	843
31.....	918		918			824		1, 720		1, 010	931	

NOTE.—Discharge estimated Dec. 12-24 and Jan. 27 to Mar. 11 because of ice. Discharge interpolated Sept. 26.

Monthly discharge of Henrys Fork at Warm River, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	920	888	907	55,800
November.....	950	886	929	56,300
December.....	950	-----	847	52,100
January.....	950	-----	878	54,000
February.....	-----	-----	* 780	43,300
March.....	-----	-----	823	50,600
April.....	1,230	855	922	54,900
May.....	2,490	1,190	1,830	113,000
June.....	1,680	1,110	1,320	78,600
July.....	1,200	983	1,040	64,000
August.....	1,180	931	1,040	64,000
September.....	938	843	884	52,600
The year.....	2,490	-----	1,020	738,000

* Estimated.

HENRY'S FORK NEAR ASHTON, IDAHO

LOCATION.—In T. 9 N., R. 42 E., a quarter of a mile below Ora highway bridge, 3 miles below hydroelectric power plant of Warm Springs Power Co., and 5 miles southwest of Ashton, Fremont County. Station was formerly maintained at Ora highway bridge, a quarter of a mile upstream; described in some previous reports as "North Fork of Snake River near Ora, Idaho." Records at old and new stations are comparable.

DRAINAGE AREA.—1,040 square miles.

RECORDS AVAILABLE.—August 20, 1902, to June 30, 1909; April 20, 1920, to September 30, 1923.

GAGE.—Stevens 8-day water-stage recorder on right bank; installed April 25, 1921; inspected by R. H. Fuqua.

DISCHARGE MEASUREMENTS.—Made from cable a quarter of a mile above gage.

CHANNEL AND CONTROL.—Bed composed of coarse gravel. Control not well defined; shifts slightly during high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 1.91 feet at 7 a. m. May 7 (discharge, 3,760 second-feet); minimum discharge, 1,170 second-feet September 30.

1902-1909; 1920-1923: Maximum stage recorded, 4.50 feet (bridge gage) May 20, 1904 (discharge, 5,370 second-feet); minimum discharge, 910 second-feet February 4-7, March 5-20, and March 28 to April 7, 1906.

ICE.—Stage-discharge relation not seriously affected by ice. Observations discontinued during winter.

DIVERSIONS.—None above station.

REGULATION.—None except that due to operation of gates at dam of Warm Springs Power Co.'s power plant 3 miles above station.

ACCURACY.—Stage-discharge relation shifted continually during period. Standard rating curve well defined. Water-stage recorder operated satisfactorily during period. Daily discharge obtained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Henrys Fork near Ashton, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 16	C. A. McClelland.....	0.71	1,290	July 14	C. A. McClelland.....	0.84	1,480
May 19	-----do-----	1.67	3,060	Aug. 20	-----do-----	.85	1,340
June 5	-----do-----	1.16	2,020	31	-----do-----	.81	1,300
July 1	-----do-----	.89	1,500	Sept. 8	W. F. Dawson.....	.77	1,280

Daily discharge, in second-feet, of Henrys Fork near Ashton, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1-----		1,880	2,440	1,460	1,400	1,320	16----	1,290	2,460	1,720	1,440	1,610	1,250
2-----		1,780	2,360	1,460	1,360	1,320	17----	1,320	2,550	1,740	1,460	1,610	1,300
3-----		1,780	2,240	1,400	1,400	1,290	18----	1,400	2,760	1,760	1,440	1,550	1,340
4-----		1,960	2,080	1,400	1,510	1,290	19----	1,480	2,990	1,720	1,460	1,440	1,300
5-----		2,720	2,000	1,460	1,510	1,270	20----	1,780	2,970	1,720	1,440	1,440	1,250
6-----		2,670	2,000	1,510	1,480	1,290	21----	1,440	2,820	1,740	1,460	1,400	1,250
7-----		3,190	2,000	1,460	1,400	1,300	22----	1,510	2,860	1,820	1,400	1,360	1,190
8-----		3,380	2,060	1,360	1,420	1,290	23----	1,460	3,050	1,900	1,440	1,300	1,230
9-----		3,520	2,080	1,300	1,460	1,290	24----	1,230	2,990	1,860	1,510	1,290	1,300
10-----		3,630	2,060	1,270	1,510	1,290	25----	1,270	2,900	1,840	1,670	1,230	1,230
11-----		3,650	2,040	1,420	1,570	1,290	26----	1,320	2,880	1,780	1,680	1,230	1,250
12-----		3,100	2,160	1,500	1,570	1,270	27----	1,530	2,800	1,630	1,630	1,300	1,210
13-----		2,780	2,020	1,500	1,610	1,290	28----	1,630	2,530	1,570	1,570	1,270	1,230
14-----		2,590	1,860	1,480	1,590	1,300	29----	1,900	2,570	1,570	1,420	1,290	1,230
15-----		2,550	1,780	1,400	1,610	1,250	30----	1,880	2,440	1,510	1,360	1,270	1,190
							31----		2,380		1,360	1,300	-----

NOTE.—No records Oct. 1 to Apr. 15.

Monthly discharge of Henrys Fork near Ashton, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 16-30.....	1,900	1,230	1,500	44,600
May.....	3,650	1,780	2,750	169,000
June.....	2,440	1,510	1,900	113,000
July.....	1,680	1,270	1,460	89,800
August.....	1,610	1,230	1,430	87,900
September.....	1,340	1,190	1,270	75,600
The period.....				580,000

DIVERSIONS FROM HENRYS FORK BETWEEN ASHTON AND ST. ANTHONY GAGING STATIONS, IDAHO

Between Ashton and St. Anthony gaging stations six separate canals divert water from Henrys Fork for irrigation. Gaging stations are maintained at headings of each canal by the United States Geological Survey for the Idaho State Department of Reclamation to facilitate distribution of the water. Records are available from June 1, 1919, to September 30, 1923.

Stage-discharge relation on most of the canals affected by growth of aquatic plants or by operation of check gates. Rating curves well defined. Gages read to hundredths daily except during September, when occasional readings were made. Records good.

Combined daily discharge, in second-feet, of canals diverting from Henrys Fork between Ashton and St. Anthony gaging stations for the irrigation season of 1923

Day	June	July	Aug.	Sept.	Day	June	July	Aug.	Sept.
1.....	1,190	1,190	777	472	16.....	1,100	968	590	456
2.....	1,110	1,200	802	472	17.....	1,020	935	588	454
3.....	1,060	1,240	815	470	18.....	846	850	585	439
4.....	1,040	1,240	798	470	19.....	801	817	549	422
5.....	1,010	1,170	829	467	20.....	756	789	564	421
6.....	994	1,130	843	461	21.....	800	850	552	421
7.....	993	1,000	847	453	22.....	711	830	592	421
8.....	1,090	1,060	848	446	23.....	651	908	588	422
9.....	656	976	851	447	24.....	629	903	567	422
10.....	1,120	958	821	447	25.....	601	545	506	424
11.....	1,170	949	798	448	26.....	630	577	502	423
12.....	1,190	983	820	473	27.....	687	661	478	423
13.....	1,310	902	787	468	28.....	784	673	476	413
14.....	1,290	914	744	464	29.....	924	706	473	402
15.....	1,320	921	642	460	30.....	1,140	720	463	401
					31.....		752	468	-----

NOTE.—No record obtained Oct. 1 to May 31; discharge interpolated for days of no gage-height record during September. One diversion is above entrance of Fall River and five are below.

Combined monthly discharge of canals diverting from Henrys Fork between Ashton and St. Anthony gaging stations for the irrigation season of 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
June.....	1,320	601	954	56,800
July.....	1,240	545	913	56,100
August.....	851	463	663	40,800
September.....	473	401	443	26,400
The period.....				180,000

HENRYS FORK AT ST. ANTHONY, IDAHO

LOCATION.—In sec. 1, T. 7 N., R. 40 E., half a mile above bridge on the main street of St. Anthony, Fremont County, and 9 miles below mouth of Fall River.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 26, 1919, to September 30, 1923.

GAGE.—Stevens 8-day water-stage recorder on right bank; installed May 8, 1922; inspected by W. R. Wayman.

DISCHARGE MEASUREMENTS.—Made from cable 600 feet below gage.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and outcrops of lava. One channel at all stages. Control shifts slightly at high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 5.20 feet at noon June 11 (discharge, 4,740 second-feet); minimum stage, 3.00 feet at noon July 16 (discharge, 530 second-feet).

1919-1923: Maximum stage recorded, 6.35 feet June 1, 1921 (discharge, 7,140 second-feet); minimum stage, 3.00 feet July 16, 1923 (discharge, 530 second-feet); also July 23-24, 1920 (discharge, estimated 530 second-feet).

ICE.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

DIVERSIONS.—Numerous diversions both above and below station.

REGULATION.—Flow affected by manipulation of canal head gates above station and by operation of Warm Springs Power Co.'s plant 17 miles upstream.

ACCURACY.—Stage-discharge relation permanent during period. Rating curve well defined for low and medium high stages. Operation of water-stage recorder satisfactory. Daily discharge obtained by applying mean daily gage height to rating table. Records good.

COOPERATION.—One discharge measurement furnished by Utah Power & Light Co.

Discharge measurements of Henrys Fork at St. Anthony, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 7	Newell and McClelland.....	3.38	919	June 7	C. A. McClelland.....	4.43	2,860
Apr. 17	C. A. McClelland.....	3.72	1,440	July 31	do.....	3.15	669
May 1	H. L. Stoner.....	3.90	1,740	Aug. 20	do.....	3.55	1,160
4	C. A. McClelland.....	4.05	2,000	Sept. 23	W. F. Dawson.....	3.40	944

* Engineer, Utah Power & Light Co.

Daily discharge, in second-feet, of Henrys Fork at St. Anthony, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1.....		1,780	2,900	1,610	808	990	16.....	1,480	3,170	2,070	548	1,080	950
2.....		1,650	2,670	1,600	775	1,020	17.....	1,460	3,240	2,670	539	1,130	977
3.....		1,600	2,490	1,530	742	1,030	18.....	1,510	3,670	2,900	575	1,170	990
4.....		1,850	2,210	1,460	797	1,000	19.....	1,650	3,970	2,380	670	1,070	977
5.....		2,870	2,360	1,390	775	1,000	20.....	1,840	3,970	2,300	830	1,130	990
6.....		3,060	2,560	1,440	753	990	21.....	1,560	4,170	2,340	819	1,130	1,000
7.....		3,650	2,780	1,490	690	977	22.....	1,360	4,400	2,740	775	1,020	990
8.....		4,000	2,850	1,220	720	1,000	23.....	1,330	4,510	3,170	731	902	938
9.....		4,350	2,920	1,020	690	1,000	24.....	1,130	4,480	2,850	819	902	950
10.....		4,610	3,190	830	786	990	25.....	1,080	4,350	2,690	1,170	950	950
11.....		4,580	2,990	753	854	1,000	26.....	1,130	4,300	2,300	1,250	977	964
12.....		3,840	3,080	720	854	977	27.....	1,330	4,220	2,070	1,100	1,030	964
13.....		3,310	3,060	650	902	950	28.....	1,540	3,650	1,820	926	1,020	977
14.....	1,510	3,100	2,580	650	926	938	29.....	2,070	3,150	1,740	830	977	977
15.....	1,480	3,080	2,110	602	1,060	938	30.....	1,890	2,830	1,720	764	977	938
							31.....		2,780		753	977	

NOTE.—No record obtained Oct. 1 to Apr. 13.

Monthly discharge of Henrys Fork at St. Anthony, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 14-30.....	2,070	1,080	1,490	50,300
May.....	4,610	1,600	3,490	215,000
June.....	3,190	1,720	2,550	152,000
July.....	1,610	539	970	59,600
August.....	1,170	690	922	56,700
September.....	1,030	938	978	58,200
The period.....				592,000

DIVERSIONS FROM HENRYS FORK BETWEEN ST. ANTHONY AND REXBURG GAGING STATIONS, IDAHO

Between St. Anthony and Rexburg gaging stations four separate canals divert water from Henrys Fork for irrigation. Gaging stations are maintained at heading of each canal by the United States Geological Survey for the Idaho State Department of Reclamation to facilitate distribution of the water. Records are available from June 1, 1919, to September 30, 1923.

Stage-discharge relation on most of the canals affected by the growth of aquatic plants or by the operation of check gates. Rating curves well defined. Gages read to hundredths daily except during September, when occasional readings were made. Records good.

Combined daily discharge, in second-feet, of canals diverting from Henrys Fork between St. Anthony and Rexburg gaging stations for the irrigation season of 1923

Day	June	July	Aug.	Sept.	Day	June	July	Aug.	Sept.
1.....	972	910	673	490	16.....	888	547	665	519
2.....	944	959	684	486	17.....	785	535	670	522
3.....	939	901	661	484	18.....	675	558	657	518
4.....	940	887	682	479	19.....	613	692	596	514
5.....	945	913	702	476	20.....	682	843	534	512
6.....	908	888	697	483	21.....	691	878	512	508
7.....	915	832	640	489	22.....	660	854	448	503
8.....	935	796	702	495	23.....	588	837	439	497
9.....	923	792	700	500	24.....	585	807	441	491
10.....	947	741	772	506	25.....	575	664	449	487
11.....	961	698	749	513	26.....	649	596	447	481
12.....	970	651	764	515	27.....	670	656	449	475
13.....	1,020	592	764	516	28.....	711	665	450	469
14.....	1,010	584	736	517	29.....	713	636	447	464
15.....	910	481	698	518	30.....	841	679	453	464
					31.....		645	492	

NOTE.—No record obtained Oct. 1 to May 31. Discharge interpolated for days of no gage-height record during September.

Combined monthly discharge of canals diverting from Henrys Fork between St. Anthony and Rexburg gaging stations for the irrigation season of 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
June.....	1,020	575	819	48,700
July.....	959	481	733	45,100
August.....	772	439	607	37,300
September.....	522	464	496	29,500
The period.....				161,000

HENRYS FORK NEAR REXBURG, IDAHO

LOCATION.—In sec. 30, T. 6 N., R. 39 E., just below highway bridge, 1 mile below mouth of south channel of Teton River, 7 miles below mouth of main channel of Teton River, and 7 miles west of Rexburg, Madison County. Below all tributaries.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 13, 1909, to September 30, 1923.

GAGE.—Friez water-stage recorder on right bank 250 feet below bridge; installed April 5, 1913; inspected by Hortense Cartier.

DISCHARGE MEASUREMENTS.—Made from cable a quarter of a mile below gage, from highway bridge, or by wading.

CHANNEL AND CONTROL.—Bed composed of mud, sand, and fine gravel; shifting. Except at bridge, left bank is overflowed at high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 7.77 feet from 11 a. m. to 1 p. m. May 28 (discharge, 5,000 second-feet); minimum discharge, 523 second-feet July 23 and 24.

1909-1923: Maximum stage recorded, 10.12 feet at 8 a. m. June 2, 1921 (discharge, 8,300 second-feet); minimum discharge, 355 second-feet June 28 and 29, 1919.

ICE.—Stage-discharge relation seriously affected by ice. Observations discontinued during winter.

DIVERSIONS.—A large percentage of normal summer flow diverted above station.

REGULATION.—None except that due to operation of head gates of irrigation canals.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve well defined. Operation of water-stage recorder satisfactory. Staff gage read to hundredths daily June 1 to August 31. Daily discharge ascertained by applying mean daily gage height to rating table except as noted in footnote to daily-discharge table. Shifting-control methods used during many periods. Records fair.

Discharge measurements of Henrys Fork near Rexburg, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 18	C. A. McClelland.....	4.17	1,790	July 31	McClelland and Dawson.....	2.89	725.
May 3	do.....	3.83	1,460				
18	do.....	5.88	3,170	Aug. 13	L. L. Bryan.....	2.68	709.
June 2	do.....	6.04	3,250	29	C. A. McClelland.....	3.47	1,240.
16	do.....	5.16	2,390	Sept. 15	W. F. Dawson.....	3.04	948.
July 1	do.....	4.46	1,810	28	F. A. Backman.....	3.24	1,120.
14	L. L. Bryan.....	2.90	746				

Daily discharge, in second-feet, of Henrys Fork near Rexburg, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1		1,980	3,410	1,840	740	1,190	16		2,990	2,530	627	945	934
2		1,660	3,210	1,630	735	1,200	17		2,990	2,620	591	1,020	940.
3		1,470	2,810	1,560	696	1,220	18	1,730	3,190	3,510	574	1,070	979.
4		1,470	2,620	1,440	659	1,200	19	1,850	3,680	3,710	557	1,080	985
5		1,890	2,350	1,380	659	1,190	20	1,980	3,870	3,410	544	1,100	1,010.
6		2,410	2,440	1,290	640	1,150	21	1,980	3,860	3,210	596	1,210	1,030.
7		2,820	2,720	1,280	627	1,130	22	1,650	4,250	3,310	548	1,210	1,040
8		3,220	2,910	1,270	632	1,120	23	1,550	4,550	3,910	523	1,160	1,010
9		3,630	3,110	1,110	622	1,100	24	1,360	4,750	4,210	523	1,140	1,020.
10		4,010	3,310	974	609	1,070	25	1,200	4,740	4,010	716	1,140	1,010.
11		4,300	3,410	874	654	1,070	26	1,280	4,830	3,610	1,120	1,170	1,030
12		4,490	3,510	826	687	1,000	27	1,340	4,930	3,110	1,110	1,220	1,060
13		3,890	3,610	775	701	962	28	1,370	4,930	2,620	968	1,240	1,120.
14		3,290	3,510	721	750	945	29	1,560	4,610	2,260	912	1,220	1,180.
15		3,090	3,110	668	852	951	30	2,030	3,910	2,090	826	1,210	1,170.
							31		3,510		760	1,180	

NOTE.—No record obtained Oct. 1 to Apr. 17. No gage-height record May 7 and 8; discharge interpolated.

Monthly discharge of Henrys Fork near Rexburg, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 18-30.....	2,030	1,200	1,610	41,500
May.....	4,930	1,470	3,520	216,000.
June.....	4,210	2,090	3,140	187,000
July.....	1,840	523	940	57,800.
August.....	1,240	609	922	56,700.
September.....	1,220	934	1,070	63,700
The period.....				623,000

WARM RIVER AT WARM RIVER, IDAHO

LOCATION.—In sec. 13, T. 9 N., R. 43 E., at highway bridge half a mile above mouth and half a mile northeast of Warm River, Fremont County. Robinson Creek enters a quarter of a mile below station.

DRAINAGE AREA.—144 square miles (measured on Forest Service maps).

RECORDS AVAILABLE.—January 24, 1912, to March 22, 1915; April 3, 1918, to September 30, 1923.

GAGE.—Vertical staff on downstream side of highway bridge; installed October 19, 1922; read by H. E. Sheppard. Prior gages at approximately same location but at different datum planes.

DISCHARGE MEASUREMENTS.—Made by wading or from highway bridge.

CHANNEL AND CONTROL.—Bed composed of large cobbles or boulders in gravel drift. Control subject to shifts. Stage-discharge relation affected by aquatic growth.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.90 feet at 1 p. m. May 19 (discharge, 404 second-feet); minimum stage, 1.26 feet March 11–18 (discharge, 184 second-feet).

1912–1915; 1918–1923: Maximum stage recorded, 2.3 feet (original gage) June 2, 1912 (discharge, 900 second-feet); minimum stage, 1.4 feet January 10 and 11, 1921 (discharge, 169 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—None above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed slightly during year. Standard rating curve fairly well defined below 360 second-feet. Gage read to half-tenths once daily. Daily discharge obtained by applying mean daily gage height to rating table. Shifting-control method used for several periods during year. Records good.

Discharge measurements of Warm River at Warm River, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 23	C. A. McClelland.....	1.28	192	Aug. 4	C. A. McClelland.....	1.37	219
May 5	-----do-----	1.79	361	Sept. 27	W. F. Dawson.....	1.36	232
July 2	-----do-----	1.46	236				

Daily discharge, in second-feet, of Warm River at Warm River, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	213	219	212	204	198	204	204	233	349	229	222	222
2	213	219	212	204	198	198	204	219	326	233	222	222
3	213	219	212	204	198	198	204	258	318	233	222	222
4	213	219	212	204	198	198	204	326	303	233	219	219
5	213	219	212	204	198	198	198	361	251	237	222	219
6	213	219	212	204	198	198	198	365	251	229	222	219
7	213	219	212	204	198	198	198	365	251	233	222	219
8	213	219	212	204	198	198	190	365	251	233	222	219
9	213	219	212	204	204	190	190	381	251	229	222	219
10	213	219	212	204	204	190	190	381	288	229	222	222
11	213	219	198	204	204	184	190	388	288	229	222	222
12	213	219	198	204	204	184	190	326	273	229	222	222
13	213	219	198	212	204	184	190	326	251	229	222	222
14	213	219	198	212	204	184	190	318	251	229	222	222
15	213	219	198	212	198	184	198	326	251	229	222	222
16	213	219	198	204	198	184	198	357	251	229	222	226
17	213	219	198	204	198	184	198	365	251	229	222	226
18	213	219	198	198	204	184	198	388	251	229	222	226
19	219	219	198	198	204	190	198	404	251	229	222	226
20	219	219	198	198	204	190	204	388	251	229	222	226
21	219	219	198	204	204	190	204	365	251	229	222	226
22	219	219	198	204	198	190	198	349	258	229	222	222
23	219	219	198	204	198	190	198	349	251	229	222	222
24	219	219	198	204	198	190	198	349	251	229	222	222
25	219	219	198	204	204	190	198	349	251	229	222	222
26	219	219	198	212	204	190	198	326	251	237	222	222
27	219	219	198	212	198	190	198	318	244	229	222	226
28	219	219	198	204	198	198	198	318	244	229	222	222
29	219	219	204	198	-----	198	198	311	237	222	222	222
30	219	212	204	198	-----	198	247	311	237	222	222	222
31	219	-----	204	198	-----	198	-----	318	-----	222	222	-----

*Monthly discharge of Warm River at Warm River, Idaho, for the year ending
September 30, 1923*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	219	213	216	13,300
November.....	219	212	219	13,000
December.....	212	198	203	12,500
January.....	212	198	204	12,500
February.....	204	198	201	11,200
March.....	204	184	192	11,800
April.....	247	190	199	11,800
May.....	404	219	339	20,800
June.....	349	237	263	15,600
July.....	237	222	229	14,100
August.....	222	219	222	13,600
September.....	226	219	222	13,200
The year.....	404	184	226	163,000

ROBINSON CREEK AT WARM RIVER, IDAHO

LOCATION.—In sec. 13, T. 9 N., R. 43 E., at Oregon Short Line Railroad bridge, 300 yards above mouth of creek and one-third mile northeast of Warm River, Fremont County.

DRAINAGE AREA.—About 41 square miles (measured on Forest Service map).

RECORDS AVAILABLE.—January 24, 1912, to March 22, 1915; April 4, 1918, to September 30, 1923.

GAGE.—Vertical staff attached to downstream side of pile bent of railroad bridge; read by H. E. Sheppard.

DISCHARGE MEASUREMENTS.—Made from railroad bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of cobbles in gravel drift. Control is a well-defined cobble riffle 150 feet below gage; shifts occasionally.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.45 feet at 11 a. m. May 25 (discharge, 526 second-feet); minimum discharge, estimated, 44 second-feet, during ice period February 1–13.

1912–1915; 1918–1923: Maximum stage recorded, 4.3 feet on May 28, 1912 (discharge, 1,140 second-feet); minimum stage, 1.4 feet on February 7–8, 1921 (discharge, 34 second-feet).

ICE.—Stage-discharge relation affected by ice for short periods.

DIVERSIONS.—None above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve fairly well defined. Gage read to half-tenths daily. Daily discharge obtained by applying mean daily gage height to rating table. Records fair.

*Discharge measurements of Robinson Creek at Warm River, Idaho, during the year
ending September 30, 1923*

Date	Made by—	Gage height	Dis- charge	Date	Made by—	Gage height	Dis- charge
Mar. 23	C. A. McClelland.....	<i>Feet</i> 0.54	<i>Sec.-ft.</i> 54.1	July 2	C. A. McClelland.....	<i>Feet</i> 0.96	<i>Sec.-ft.</i> 117
May 5	—do.....	1.58	269	Aug. 13	—do.....	.71	77.0
May 25	McClelland and Baldwin.....	2.44	523	Sept. 10	W. F. Dawson.....	.69	78.7

Daily discharge, in second-feet, of Robinson Creek at Warm River, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	73	71	69	64	44	56	74	194	359	125	83	74
2.....	73	71	69	64			74	169	347	119	83	74
3.....	73	71	69	64			74	194	319	114	80	74
4.....	73	71	69	64			74	220	258	114	80	74
5.....	73	71	69	74			74	269	247	110	80	74
6.....	71	71	71	106	44	56	74	280	247	106	80	74
7.....	71	71	71	89			74	319	302	106	80	74
8.....	71	71	69	89			71	376	247	106	80	74
9.....	71	71	69	106			69	442	247	103	80	74
10.....	71	74	69	106			74	467	247	103	80	74
11.....	71	74	66	106	56	57	83	485	236	99	77	74
12.....	71	71		106			80	376	225	99	77	74
13.....	77	71		106			74	388	210	96	77	74
14.....	74	71		89			74	400	194	96	77	74
15.....	71	71		74			89	412	194	96	77	74
16.....	71	71	66	74	56	57	106	442	179	96	77	74
17.....	71	71		64			106	473	169	96	77	74
18.....	71	71		64			106	479	210	96	77	74
19.....	71	71		64			114	510	194	92	77	74
20.....	71	71		74			117	491	179	89	77	74
21.....	71	71	64	74	64	57	125	479	184	89	77	71
22.....	71	71		74			64	106	479	194	86	77
23.....	71	71		74			56	106	498	225	86	77
24.....	71	71		74			57	106	510	194	86	77
25.....	71	71		74			57	106	523	189	86	77
26.....	71	71	64	71	64	57	106	510	179	92	77	71
27.....	71	71		64			59	125	448	164	89	77
28.....	71	71		64			61	146	418	155	89	77
29.....	71	71		71			64	169	359	146	83	77
30.....	71	69		71			71	199	359	138	83	74
31.....	71	71	71	71	71	64	371	371	371	83	74	74

NOTE.—Discharge estimated Dec. 11-23 and Jan. 26 to Mar. 18 on account of ice.

Monthly discharge of Robinson Creek at Warm River, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	77	71	71.6	4,400
November.....	74	69	71.1	4,230
December.....	74	64	68.1	4,190
January.....	106	64	77.4	4,760
February.....	56	44	50.4	2,800
March.....	71	56	57.9	3,560
April.....	199	69	99.2	5,900
May.....	523	169	398	24,500
June.....	359	138	219	13,000
July.....	125	83	97.2	5,980
August.....	83	74	78.0	4,800
September.....	74	71	73.0	4,340
The year.....	523	44	114	82,500

DIVERSIONS FROM FALL RIVER ABOVE GAGING STATION NEAR SQUIRREL, IDAHO

Above the gaging station near Squirrel three separate canals divert water from Fall River for irrigation. Gaging stations are maintained at heading of each canal by the United States Geological Survey for the Idaho State Department of Reclamation to facilitate distribution of the water. Records are available from June 1, 1919, to September 30, 1923.

Stage-discharge relation of these canals affected by growth of aquatic plants. Rating curves fairly well defined. Gages read to hundredths daily except during September, when occasional readings were made. Records good.

Combined daily discharge, in second-feet, of canals diverting from Fall River above gaging station near Squirrel, Idaho, for the irrigation season of 1923

Day	June	July	Aug.	Sept.	Day	June	July	Aug.	Sept.
1.....	0	15	119	73	16.....	164	274	32	61
2.....	0	125	134	70	17.....	0	266	32	61
3.....	0	155	126	67	18.....	0	244	91	61
4.....	65	162	126	63	19.....	165	7	102	62
5.....	73	174	148	60	20.....	164	0	114	65
6.....	0	192	149	58	21.....	167	20	106	67
7.....	0	192	0	58	22.....	134	26	105	71
8.....	59	209	0	58	23.....	133	157	65	73
9.....	62	219	0	59	24.....	129	11	94	76
10.....	104	257	0	59	25.....	126	121	91	73
11.....	128	238	30	60	26.....	104	160	73	71
12.....	142	245	30	60	27.....	104	181	64	69
13.....	147	217	30	60	28.....	139	182	70	66
14.....	156	260	30	60	29.....	0	174	69	66
15.....	160	268	30	61	30.....	0	158	100	66
					31.....		148	102	-----

NOTE.—No record obtained Oct. 1 to May 31. Discharge interpolated for days of no gage-height record during September.

Combined monthly discharge of canals diverting from Fall River above gaging station near Squirrel, Idaho, for the irrigation season of 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
June.....	167	0	87.5	5,210
July.....	274	0	163	10,000
August.....	149	0	73.0	4,490
September.....	76	58	64.5	3,840
The period.....				23,500

FALL RIVER NEAR SQUIRREL, IDAHO

LOCATION.—In sec. 35, T. 9 N., R. 44 E., 9 miles southeast of Marysville and 4 miles northeast of Squirrel post office, in Fremont County. Marysville Canal diverts half a mile upstream. This station was formerly known as "Fall River near Fremont."

DRAINAGE AREA.—390 square miles.

RECORDS AVAILABLE.—January 1, 1904, to June 30, 1909; May 2, 1918, to September 30, 1923. Three miles above at Wilson's sawmill, August 24, 1902, to December 31, 1903.

GAGE.—Vertical staff on left bank; installed January 1, 1904; read by Ernest Luetjen.

DISCHARGE MEASUREMENTS.—Made from cable 200 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of boulders in gravel drift. Control formed by riffle below gage; fairly permanent. Banks high, clean, and not subject to overflow. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.00 feet at 10 a. m. June 13 (discharge, 2,630 second-feet); minimum discharge, estimated, 350 second-feet February 1-21. Actual minimum may have occurred at other times during ice periods.

1904-1909; 1918-1923: Maximum stage recorded, 5.6 feet June 14, 15, and 23, 1918 (discharge, 5,380 second-feet); minimum stage, 1.4 feet April 5, 1905 (discharge, 168 second-feet.)

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Three irrigation canals divert above station.

REGULATION.—None except that due to head gate changes on canals above station.

ACCURACY.—Stage-discharge relation practically permanent throughout year. Rating curve fairly well defined between 500 and 1,800 second-feet. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table. Records good.

Discharge measurements of Fall River near Squirrel, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 22	C. A. McClelland.....	1. 97	428	July 29	C. A. McClelland.....	2. 14	552
May 17	.....do.....	3. 37	1810	Aug. 26	.....do.....	2. 07	515
June 28	.....do.....	3. 13	1500	Sept. 19	W. F. Dawson.....	1. 99	478

Daily discharge, in second-feet, of Fall River near Squirrel, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	444	444	419	407	390	407	482	767	1, 510	2, 030	601	516
2	432	457	432	407		419	482	810	1, 620	1, 950	594	523
3	432	457	444	407			496	872	1, 820	1, 920	572	523
4	419	463	438	419			482	992	1, 510	2, 030	572	523
5	419	457	444	432		390	496	1, 120	1, 620	1, 660	558	516
6	419	444	450	444	350		496	1, 260	1, 820	1, 860	543	516
7	419	444	444	432		419	482	1, 350	1, 980	1, 750	677	509
8	419	444		432		419	482	1, 460	2, 020	1, 280	670	509
9	419	444		407		407	496	1, 680	2, 020	1, 120	670	502
10	419	469		407		407	496	1, 820	2, 180	974	670	496
11	419	469		396	370	407	496	1, 850	2, 420	784	616	496
12	419	457		396		419	496	1, 510	2, 420	726	608	496
13	457	444		396		419	496	1, 530	2, 630	662	608	489
14	444	432		396		419	509	1, 590	2, 110	601	616	482
15	432	432		407		407	509	1, 650	2, 110	579	623	482
16	432	432		407	370	407	509	1, 740	2, 020	586	608	482
17	432	457		432		419	509	1, 770	2, 450	594	594	476
18	419	444		419		419	523	2, 140	2, 480	565	523	476
19	419	444		407		432	523	2, 180	1, 700	759	523	469
20	407	419		407		432	565	2, 040	1, 680	784	662	476
21	407	407	396	407	370	444	594	4, 880	1, 800	751	550	476
22	407	407	396	396		444	594	1, 920	2, 110	751	529	469
23	396	407	396	396		457	579	2, 020	2, 050	646	523	469
24	396	407	396	396		457	556	2, 110	1, 740	974	516	496
25	396	407	396			469	509	2, 420	1, 630	837	523	482
26	396	396	396		370	469	523	2, 590	1, 480	685	516	482
27	396	396	396			469	565	2, 560	1, 440	586	516	509
28	419	407	407			469	623	2, 140	1, 500	579	523	502
29	432	419	407			469	685	1, 980	1, 650	565	516	489
30	432	426	407			482	734	1, 920	1, 860	558	496	482
31	432		407			482		1, 820		631	529	

NOTE.—Discharge estimated during periods of ice effect Dec. 8-20, Jan. 25 to Feb. 21, and Mar. 3-6.

Monthly discharge of Fall River near Squirrel, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	457	396	420	25, 800
November.....	469	396	434	25, 800
December.....	450		396	24, 300
January.....	444		401	24, 700
February.....	407		364	20, 200
March.....	482		430	26, 400
April.....	734	482	532	31, 700
May.....	2, 590	767	1, 730	106, 000
June.....	2, 630	1, 440	1, 900	113, 000
July.....	2, 030	558	993	61, 100
August.....	677	496	576	35, 400
September.....	523	469	494	29, 400
The year.....	2, 630		724	524, 000

DIVERSIONS FROM FALL RIVER BETWEEN SQUIRREL AND CHESTER GAGING STATIONS, IDAHO

Between Squirrel and Chester gaging stations nine separate canals divert water from Fall River for irrigation. Gaging stations are maintained at heading of each canal by the United States Geological Survey for the Idaho State Department of Reclamation to facilitate distribution of water. Records are available from June 1, 1919, to September 30, 1923.

Stage-discharge relation on most of the canals affected by growth of aquatic vegetation or by operation of check gates. Rating curves fairly well defined. Gage read to hundredths daily except during September, when occasional readings are made. Records good.

Combined daily discharge, in second-feet, of canals diverting from Fall River between Squirrel and Chester gaging stations for the irrigation season of 1923

Day	June	July	Aug.	Sept.	Day	June	July	Aug.	Sept.
1.....	538	810	532	400	16.....	626	598	475	350
2.....	543	859	581	389	17.....	689	597	470	350
3.....	556	877	555	378	18.....	684	599	384	350
4.....	551	884	570	368	19.....	669	419	364	351
5.....	552	857	570	364	20.....	660	439	390	352
6.....	577	903	540	362	21.....	680	447	410	351
7.....	630	913	495	359	22.....	660	513	417	352
8.....	645	792	561	355	23.....	577	479	413	353
9.....	655	668	540	349	24.....	552	476	396	353
10.....	661	634	523	345	25.....	523	654	412	352
11.....	746	573	446	344	26.....	611	629	409	352
12.....	752	556	433	352	27.....	635	598	395	353
13.....	788	626	427	359	28.....	640	578	397	353
14.....	774	583	475	356	29.....	758	572	395	353
15.....	752	558	474	353	30.....	781	550	391	353
					31.....		611	410	

NOTE.—No record obtained Oct. 1 to May 31. Discharge interpolated for days of no gage height during September.

Combined monthly discharge of canals diverting from Fall River between Squirrel and Chester gaging stations for the irrigation season of 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
June.....	788	523	649	38,600
July.....	913	419	640	39,400
August.....	581	364	460	28,300
September.....	400	344	357	21,200
The period.....				128,000

FALL RIVER NEAR CHESTER, IDAHO

LOCATION.—In sec. 13, T. 8 N., R. 41 E., half a mile above mouth and 2 miles north of Chester post office, Fremont County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 23, 1920, to September 30, 1923.

GAGE.—Stevens 8-day water-stage recorder on right bank; installed April 29, 1921; inspected by W. R. Wayman.

DISCHARGE MEASUREMENTS.—Made from cable 100 feet downstream or by wading.

CHANNEL AND CONTROL.—Bed composed of boulders in gravel drift and lava outcrop. Control is well-defined rock ledge immediately below gage. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 4.39 feet at 11 a. m. May 26 (discharge, 2,660 second-feet); minimum stage, 1.01 feet at 6 p. m. August 7 (discharge, 9 second-feet).

1920-1923: Maximum stage recorded, 5.30 feet at 6 p. m. May 29, 1921 (discharge, 3,720 second-feet); minimum stage, 1.01 feet at 6 p. m. August 7, 1923 (discharge, 9 second-feet).

ICE.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

DIVERSIONS.—Several irrigation canals divert above station.

REGULATION.—None except that due to manipulation of canal head gates above station.

ACCURACY.—Stage-discharge relation permanent. Rating curve fairly well defined between 75 and 2,000 second-feet. Operation of water-stage recorder satisfactory. Daily discharge obtained by applying mean daily gage height of recorder to rating table. Records good.

Discharge measurements of Fall River near Chester, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
Apr. 16	C. A. McClelland.....	Feet 2.45	Sec.-ft. 527	July 28	C. A. McClelland.....	Feet 1.32	Sec.-ft. 67.7
May 9	do.....	3.85	1,940	Aug. 21	do.....	1.80	188
May 19	do.....	3.85	1,970	Sept. 22	W. F. Dawson.....	1.76	193
June 5	do.....	3.35	1,390				

Daily discharge, in second-feet, of Fall River near Chester, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1		688	1,670	1,330	143	197	16	565	1,710	1,720	32	172	186
2		613	1,370	1,300	130	222	17	555	1,800	2,070	18	186	191
3		629	1,340	1,240	43	211	18	605	2,090	1,890	50	225	191
4		530	1,320	1,200	26	202	19	662	2,070	1,410	87	191	191
5		1,090	1,360	1,060	30	199	20	597	2,080	1,310	295	234	191
6		1,290	1,530	1,030	28	199	21	550	2,410	1,400	295	208	191
7		1,560	1,730	962	30	197	22	483	2,490	1,720	258	164	191
8		1,720	1,750	858	133	183	23	441	2,480	1,910	249	164	172
9		1,430	1,750	629	135	183	24	420	2,500	1,590	313	151	175
10		2,080	1,900	394	169	191	25	407	2,500	1,440	263	156	183
11		2,010	2,050	240	183	188	26	427	2,590	1,190	175	161	178
12		1,670	2,090	175	191	186	27	520	2,550	1,090	102	159	191
13		1,480	2,180	112	191	186	28	670	2,250	1,030	65	164	202
14		1,530	1,960	75	175	186	29	784	1,900	1,090	45	159	199
15		1,570	1,660	52	178	183	30	793	1,750	1,240	41	161	178
							31		1,730		94	167	

NOTE.—No record obtained Oct. 1 to Apr. 15.

Monthly discharge of Fall River near Chester, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 16-30.....	793	407	566	16,800
May.....	2,590	613	1,790	110,000
June.....	2,180	1,030	1,590	94,600
July.....	1,330	18	421	25,900
August.....	234	26	148	9,100
September.....	222	172	191	11,400
The period.....				268,000

TETON RIVER NEAR ST. ANTHONY, IDAHO

LOCATION.—In sec. 15, T. 7 N., R. 41 E., Fremont County, 4 miles southeast of St. Anthony, half a mile upstream from Oregon Short Line Railroad bridge, and three-quarters mile downstream from Hog Hollow highway bridge where station was maintained from 1903 to 1909; records comparable.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 29, 1903, to June 30, 1909; April 19, 1920, to September 30, 1923.

GAGE.—Stevens 8-day water-stage recorder on right bank; installed May 2, 1921; inspected by Johnson and Dawson. Records April 19, 1920, to May 2, 1921, staff readings only.

DISCHARGE MEASUREMENTS.—Made from cable 50 feet below gage.

CHANNEL AND CONTROL.—Bed composed of fine gravel. One channel at ordinary stages. Control subject to shift during high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period April 17 to September 30, 4.57 feet at 5 p. m. May 26 (discharge, 3,410 second-feet); minimum stage, 0.44 foot September 22, 23, and 24 (discharge, 532 second-feet).

1903–1909; 1920–1923: Maximum stage recorded, 6.9 feet at 3 p. m. June 5, 1909 (discharge, 7,820 second-feet); minimum stage, 1 foot March 12, 1906 (discharge, 88 second-feet). Both gage heights from Hog Hollow highway bridge gage.

ICE.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

DIVERSIONS.—Several irrigation canals divert in Teton River basin 20 miles above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not entirely permanent. Shifting-control methods used to May 26. Control permanent thereafter and rating curve well defined. Operation of water-stage recorder satisfactory. Daily staff readings obtained June 1 to August 31. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Teton River near St. Anthony, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 17	C. A. McClelland.....	1.80	1,210	June 30	W. F. Dawson.....	1.89	1,370
May 13	do.....	1.45	1,020	July 31	do.....	.96	820
May 24	Baldwin and McClelland.....	3.71	2,680	Aug. 30	do.....	.62	629
				Sept. 13	C. A. McClelland.....	.48	542

Daily discharge, in second-feet, of Teton River near St. Anthony, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1.....		630	1,640	1,420	779	657	16.....		929	1,820	940	729	562
2.....		567	1,370	1,470	751	641	17.....	1,060	1,020	1,780	923	690	557
3.....		542	1,330	1,460	718	641	18.....	1,200	1,260	1,820	882	663	567
4.....		552	1,350	1,390	723	625	19.....	1,140	1,340	1,490	836	679	567
5.....		646	1,420	1,370	712	609	20.....	900	1,420	1,370	825	706	547
6.....		762	1,520	1,350	701	604	21.....	701	1,750	1,370	819	757	537
7.....		848	1,650	1,320	701	609	22.....	640	2,100	1,470	830	701	532
8.....		952	1,880	1,230	690	583	23.....	578	2,290	1,630	830	679	532
9.....		1,060	1,900	1,180	684	578	24.....	542	2,600	1,440	906	652	532
10.....		1,180	2,000	1,150	684	572	25.....	542	2,880	1,370	917	641	562
11.....		1,300	2,160	1,080	668	567	26.....	557	3,280	1,300	946	636	552
12.....		1,170	2,450	1,020	668	578	27.....	588	3,340	1,270	906	636	557
13.....		1,020	2,640	976	657	562	28.....	641	2,890	1,230	848	625	593
14.....		940	2,380	940	668	567	29.....	663	2,360	1,240	836	625	614
15.....		923	1,880	958	723	557	30.....	696	2,070	1,320	808	625	604
							31.....		1,910		808	652	

NOTE.—No record obtained Oct. 1 to Apr. 16. No gage-height record Apr. 22; discharge interpolated.

Monthly discharge of Teton River near St. Anthony, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 17-30.....	1,200	542	746	20,700
May.....	3,340	542	1,500	92,200
June.....	2,640	1,230	1,650	98,200
July.....	1,470	808	1,040	64,000
August.....	779	625	685	42,100
September.....	657	532	579	34,500
The period.....				352,000

DIVERSIONS FROM TETON RIVER BETWEEN GAGING STATION NEAR ST. ANTHONY AND MOUTH OF RIVER, IDAHO

Between St. Anthony gaging station and the mouth of the stream 14 separate canals divert water from Teton River for irrigation. Gaging stations are maintained at heading of each canal by the United States Geological Survey for the Idaho State Department of Reclamation to facilitate distribution of the water. Records are available from June 1, 1919, to September 30, 1923.

The stage-discharge relation on these canals is affected by growth of aquatic plants. Rating curves are fairly well defined. Gages read to hundredths daily except during September, when occasional readings were made. Records fair.

Combined daily discharge, in second-feet, of canals diverting from Teton River between St. Anthony gaging station and mouth of river for the irrigation season of 1923

Day	June	July	Aug.	Sept.	Day	June	July	Aug.	Sept.
1.....	863	968	741	566	16.....	1,190	835	645	497
2.....	858	1,050	706	560	17.....	1,180	817	621	494
3.....	875	1,070	644	551	18.....	1,120	781	564	493
4.....	811	1,040	633	541	19.....	1,020	741	565	495
5.....	797	980	634	536	20.....	921	729	596	499
6.....	874	1,020	632	525	21.....	890	692	654	503
7.....	921	1,130	605	523	22.....	881	682	637	507
8.....	979	1,110	616	519	23.....	909	673	608	512
9.....	1,080	1,080	580	514	24.....	902	753	587	517
10.....	1,090	1,000	544	511	25.....	784	792	589	522
11.....	1,090	994	549	507	26.....	757	836	575	524
12.....	1,130	933	572	505	27.....	749	819	590	524
13.....	1,140	898	591	503	28.....	761	786	568	524
14.....	1,200	853	590	501	29.....	753	747	568	524
15.....	1,180	823	639	500	30.....	863	735	567	524
					31.....		743	589	-----

NOTE.—No record obtained Oct. 1 to May 31. Discharge interpolated for days of no gage-height record during September.

Combined monthly discharge of canals diverting from Teton River between St. Anthony gaging station and mouth of river for the irrigation season of 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
June.....	1,200	749	952	56,600
July.....	1,130	673	874	53,700
August.....	741	544	606	37,300
September.....	566	493	517	30,800
The period.....				178,000

CANYON CREEK NEAR NEWDALE, IDAHO

LOCATION.—In T. 6 N., R. 42 E., one-fourth mile west of Pincock Warm Springs and 14 miles southeast of Newdale, Madison County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 29, 1920, to September 30, 1923.

GAGE.—Vertical staff on left bank 300 feet below highway bridge; read by J. Frank Pincock.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of compact gravel; fairly permanent.

Two channels at low and medium stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period May 26 to September 30, 3.81 feet at 11 a. m. May 26 (discharge, 330 second-feet); minimum discharge, 11 second-feet September 23 by meter measurement; by estimate September 24–30. Beaver dam below gage.

1920–1923: Maximum stage recorded, 4.22 feet at 8 a. m. May 28, 1921 (discharge, 419 second-feet); minimum stage, 0.95 foot April 18, 1922 (discharge, 6 second-feet).

ICE.—Formation of ice prevented by inflow from warm springs but no winter observations obtained.

DIVERSIONS.—Power canal of Pincock sawmill diverts about three-eighths of a mile upstream; water is returned above station.

REGULATION.—None except that caused by operation of power canal.

ACCURACY.—Stage-discharge relation fairly permanent. Rating curve fairly well defined. Gage read to hundredths daily. Daily discharge ascertained by applying to rating table mean daily gage height. Records fair.

Discharge measurements of Canyon Creek near Newdale, Idaho, for the period May 26 to September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec-ft.</i>			<i>Feet</i>	<i>Sec-ft.</i>
May 7	C. A. McClelland.....	2.15	97.1	July 17	C. A. McClelland.....	1.35	32.4
26	W. R. Wayman.....	3.81	343	Aug. 23	do.....	1.18	13.6
June 11	C. A. McClelland.....	2.80	191	Sept. 23	W. F. Dawson.....	1.49	11.3

Daily discharge, in second-feet, of Canyon Creek near Newdale, Idaho, for the year ending September 30, 1923

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1.....		149	87	23	15	16.....		130	63	18	12
2.....		145	85	22	15	17.....		161	32	18	
3.....		140	70	20	15	18.....		136	28	18	
4.....		154	65	18	15	19.....		118	28	18	
5.....		154	66	18	15	20.....		113	26	22	
6.....		188	56	18	15	21.....		157	26	18	11
7.....	97	183	54	18	15	22.....		172	26	17	
8.....		199	60	18	15	23.....		151	26	15	
9.....		191	44	17	14	24.....		135	26	15	
10.....		188	44	17	14	25.....		123	26	15	
11.....		190	44	17	14	26.....	330	99	26	15	11
12.....		196	40	17	14	27.....	323	106	25	14	
13.....		202	36	16	12	28.....	256	98	25	14	
14.....		153	34	19		29.....	235	88	26	19	
15.....		133	36	20		30.....	214	89	25	18	
						31.....	186		25	15	

NOTE.—No record Oct. 1 to May 26; discharge May 7, meter measurement; discharge estimated Sept. 13–22 and 24–30 on basis of measurement Sept. 23

Monthly discharge of Canyon Creek near Newdale, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 26-31.....	330	186	257	3,060
June.....	202	88	148	8,800
July.....	87	25	40.4	2,480
August.....	23	14	17.6	1,080
September.....	15	11	12.8	762
The period.....				16,200

WILLOW CREEK NEAR RIRIE, IDAHO

LOCATION.—In T. 3 N., R. 40 E., at Cutler ranch, 3 miles above mouth of canyon and 6 miles southeast of Ririe, Bonneville County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—December 23, 1916, to September 30, 1923.

GAGE.—Friez water-stage recorder on right bank; installed July 1, 1921; inspected by Ira Moore.

DISCHARGE MEASUREMENTS.—Made from cable 200 feet downstream from gage or by wading.

CHANNEL AND CONTROL.—Bed composed of boulders in gravel drift; fairly permanent. Banks brush covered; left bank is overflowed at high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 9.97 feet at 5 a. m. May 7 (discharge, 1,740 second-feet); minimum stage, 2.71 feet at 8 a. m. September 11 and 12 (discharge, 34 second-feet).

1916-1923: Maximum stage recorded, 16.3 feet May 15, 1917 (discharge, 4,200 second-feet); minimum stage, 1.91 feet August 27-29, 1919 (discharge, 13 second-feet).

ICE.—Stage-discharge relation seriously affected by ice; records discontinued during winter.

DIVERSIONS.—No irrigation canals of any consequence above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation slightly affected by ice November 14-25; changed during winter, during high water in May, and again during small flood during later part of July. Standard rating curve well defined. Operation of water-stage recorder satisfactory except for several periods when clock stopped. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph or as noted in footnote to daily-discharge table. Records good.

Discharge measurements of Willow Creek near Ririe, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 16	T. R. Newell.....	2.90	40.6	June 11	L. L. Bryan.....	4.58	370
Apr. 5	.....do.....	3.12	89.4	29	.....do.....	4.07	247
24	.....do.....	3.96	224	July 22	.....do.....	3.13	83.2
May 12	G. C. Baldwin.....	7.42	1,060	Aug. 31	.....do.....	2.80	45.2

• Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Willow Creek near Ririe, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	41	52		802	629	218	87	49
2	41	54		852	581	205	79	57
3	41	56		953	510	195	72	53
4	41	53		1,130	475	184	64	43
5	41	54	88	1,430	452	173	63	41
6	41	49	94	1,670	475	166	60	37
7	42	48	101	1,640	441	159	56	36
8	43	53	107	1,510	429	151	56	36
9	42	56	106	1,320	407	143	53	36
10	42	58	106	1,210	385	141	51	36
11	42	59	109	1,160	363	138	49	36
12	41	54	117	1,060	341	136	48	36
13	42	47	132	953	317	120	47	36
14	43	45	134	979	306	117	47	36
15	45	43	132	927	300	115	51	37
16	46	41	141	876	294	112	54	37
17	47	45	164	852	296	106	51	37
18	47	49	205	902	316	96	48	38
19	48	60	258	953	337	92	45	40
20	49	49	264	876	357	88	45	41
21	48	44	236	802	377	87	52	41
22	48	44	212	826	398	84	53	41
23	49	44	205	776	418	114	48	41
24	49	44	236	702	371	262	46	42
25	49	40	250	665	325	159	43	43
26	49		279	617	296	153	42	46
27	49		341	581	277	132	42	49
28	49		452	545	258	110	41	57
29	51		629	533	246	104	40	64
30	52		776	521	234	102	41	60
31	51			569		94	45	

NOTE.—No record obtained Nov. 26 to Apr. 4. No gage-height record Nov. 10, 17, 21-24, Apr. 6, 7, May 18, June 18-22, July 31, and Aug. 1-3; discharge interpolated. Discharge estimated Nov. 21-24.

Monthly discharge of Willow Creek near Ririe, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	52	41	45.4	2,790
November 1-25	60	40	49.6	2,460
April 5-30	776	88	196	10,100
May	1,670	521	942	57,900
June	629	234	374	22,300
July	262	84	137	8,420
August	87	40	52.2	3,210
September	64	36	42.7	2,540

WILLOW CREEK NEAR IONA, IDAHO

LOCATION.—In sec. 19, T. 3 N., R. 38 E., at concrete bridge 3 miles northeast of Iona, Bonneville County, and 9 miles on main road northeast of Idaho Falls. Boomer Canal crosses in a flume 600 feet above station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—December 22, 1916, to September 30, 1923.

GAGE.—Vertical staff attached to downstream face of right abutment of concrete arch bridge; read by C. N. Kemper.

DISCHARGE MEASUREMENTS.—Made from rating bridge 250 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of mud, sand, and gravel; shifting. Banks subject to overflow at very high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 6.30 feet at 10.20 a. m. May 7 (discharge, 354 second-feet); minimum stage, 1.05 feet April 10 and 11 (discharge, 20 second-feet). Minimum discharge during year probably occurred during winter.

1916-1923: Maximum stage recorded, 7.75 feet May 16 and 17, 1917 (discharge, 603 second-feet). Minimum discharge, about 1 second-foot December 31, 1918, January 1, 1919, and January 1-10, 1920.

ICE.—Stage-discharge relation seriously affected by ice; record discontinued during winter.

DIVERSIONS.—Sand Creek and irrigation canals divert above station; definite information not available as to number of canals and quantity of water diverted.

REGULATION.—Flow regulated at diversion works above station. Several irrigation canals waste water into creek.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve fairly well defined. Gage read to hundredths once daily. Daily discharge ascertained by applying mean daily gage height to rating table or by shifting-control methods. Records fair.

Discharge measurements of Willow Creek near Iona, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 21	C. A. McClelland.....	1.38	35.8	June 29	L. L. Bryan.....	2.85	136
Apr. 3	T. R. Newell.....	1.12	23.9	July 6	do.....	3.28	165
May 5	G. C. Baldwin.....	5.04	256	July 22	do.....	2.62	119
May 12	do.....	4.66	248	Aug. 24	R. B. Johnson.....	1.82	64.3
June 14	L. L. Bryan.....	3.48	169				

Daily discharge, in second-feet, of Willow Creek near Iona, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Apr.	May	June	July	Aug.	Sept.
1.....	34	24	25	24	175	150	146	131	70
2.....	34	24	22	24	196	146	150	128	76
3.....	44	24		23	211	142	160	124	76
4.....	52	25		32	228	136	167	122	75
5.....	52	25		38	271	122	170	122	79
6.....	54	24		39	293	120	166	125	118
7.....	54	24		43	354	118	150	125	132
8.....	54	24		45	351	118	150	125	125
9.....	60	24		32	294	114	136	125	124
10.....	194	25		20	283	111	139	132	124
11.....	194	25		20	271	108	139	139	125
12.....	27	24		22	254	122	135	139	125
13.....	27	24		25	246	178	136	118	122
14.....	27	27		28	232	173	135	117	124
15.....	28	40		28	219	188	146	117	124
16.....	27	46		28	136	192	139	118	118
17.....	27	47		32	164	195	146	121	118
18.....	27	47		32	170	209	139	124	117
19.....	26	47		30	192	197	132	118	111
20.....	26	45		28	198	182	125	114	110
21.....	26	37		25	192	184	118	104	107
22.....	25	36		26	178	172	119	76	97
23.....	26	45		30	160	153	118	70	98
24.....	26	36		38	136	146	146	66	90
25.....	27	34		50	122	139	153	66	89
26.....	27	34		63	118	136	146	60	76
27.....	27	32		70	136	136	143	59	75
28.....	26	27		97	125	132	140	55	75
29.....	26	25		125	128	134	132	53	75
30.....	25	25		168	136	146	133	50	35
31.....	24				142		133	63	

NOTE.—No record obtained Dec. 3 to Mar. 31.

Monthly discharge of Willow Creek near Iona, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	194	24	43.6	2,680
November.....	47	24	31.5	1,870
December 1-2.....	25	22	23.5	93.3
April.....	168	20	42.8	2,550
May.....	354	118	204	12,500
June.....	209	108	150	8,930
July.....	170	118	142	8,730
August.....	139	50	103	6,330
September.....	132	35	100	5,950

GRAYS LAKE OUTLET NEAR HERMAN, IDAHO

LOCATION.—In sec. 15, T. 3 S., R. 42 E., 3 miles below bridge at outlet of lake, $3\frac{1}{4}$ miles west of Herman, Bonneville County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 5, 1916, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder on right bank; installed April 20, 1918; inspected by W. H. Miles.

DISCHARGE MEASUREMENTS.—Made from cable near gage or by wading.

CHANNEL AND CONTROL.—Channel composed of gravel and small cobbles; left bank subject to overflow at gage height of about 3.5 feet. Control is rock ledge 25 feet below gage; practically permanent. Point of zero flow determined August 2, 1921, as at gage height 0.43 foot \pm 0.05 foot.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.49 feet 9 to 10 p. m. May 3 (discharge, 574 second-feet); minimum stage, 0.73 foot at 4.30 p. m. September 9 (discharge, 1.0 second-foot). A lower discharge may have occurred during period of no record.

1916-1923: Maximum stage recorded, 5.9 feet at 9 a. m. May 15, 1917 (discharge, 1,350 second-feet); minimum stage, 0.63 foot August 30 and 31, 1920 (discharge, 0.5 second-foot).

ICE.—Ice practically stops flow from lake at times but springs probably keep channel near gage free from ice. Observations discontinued during winter.

DIVERSIONS.—No diversions between lake and station. Diversions for irrigation are made above lake, but amount of water diverted is not known.

REGULATION.—No artificial regulation above station.

ACCURACY.—Stage-discharge relation changed slightly June 5-16, during which shifting-control methods were used. Standard rating curve well defined. Operation of water-stage recorder satisfactory except June 28 to August 8, during which staff gage was read to hundredths once or twice a week. Daily discharge ascertained by applying to rating table mean daily gage height. During period water-stage recorder was operated mean daily gage height obtained by inspection of recorder graph. Records good.

Discharge measurements of Grays Lake outlet near Herman, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
May 14	C. G. Paulsen.....	<i>Feet</i> 3.44	<i>Sec.-ft.</i> 290	July 19	C. G. Paulsen.....	<i>Feet</i> 1.33	<i>Sec.-ft.</i> 22.6
June 3	.....do.....	2.50	147	Aug. 27	Berkeley Johnson.....	.86	2.64
27	A. G. Fiedler.....	1.99	77.0				

Daily discharge, in second-feet, of Grays Lake outlet near Herman, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1.....		428	163	° 59	° 8	5	16.....		273	85	° 27	3	2
2.....		504	156	° 56	° 7	3	17.....		290	86	° 26	3	3
3.....		538	146	° 54	° 6	3	18.....		273	89	° 24	3	3
4.....		538	139	° 52	° 6	3	19.....	2	264	85	° 23	3	3
5.....		472	135	° 50	° 6	2	20.....	2	248	84	° 22	3	3
6.....		428	133	° 48	° 6	2	21.....	2	223	82	° 20	3	3
7.....		365	129	° 46	° 5	2	22.....	2	212	86	° 18	2	3
8.....		° 345	124	° 42	° 5	2	23.....	3	205	88	° 16	2	3
9.....		325	119	° 39	° 4	1	24.....	3	194	85	° 14	3	3
10.....		300	114	° 36	° 4	° 1	25.....	3	181	83	° 14	3	3
11.....			108	° 34	° 4	° 2	26.....	12	162	79	° 13	2	3
12.....		282	101	° 33	° 3	2	27.....	32	157	78	° 12	2	4
13.....		298	98	° 32	° 3	2	28.....	143	149	° 73	° 11	3	4
14.....		307	93	° 31	° 4	2	29.....	256	145	° 68	° 10	3	4
15.....		298	89	° 29	° 4	3	30.....	316	149	° 62	° 10	3	4
							31.....		157		° 9	7	-----

* Interpolated.

NOTE.—Discharge estimated May 10 and 11. Braced figure shows mean discharge for period indicated.

Monthly discharge of Grays Lake outlet near Herman, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 19-30.....	316	2	64.7	1,540
May.....	538	145	291	17,900
June.....	163	62	102	6,070
July.....	59	9	29.4	1,810
August.....	8	2	4.0	246
September.....	5	1	2.8	167
The period.....				27,700

IDAHO (GOVERNMENT) CANAL NEAR SHELLEY, IDAHO¹

LOCATION.—In sec. 31, T. 1 N., R. 37 E., 600 feet below canal head gates, 1½ miles southwest of Shelley, Bingham County, and 10 miles above point where Sand Creek crosses canal.

RECORDS AVAILABLE.—June 20, 1912, to September 30, 1923. No water diverted during 1913 because of break in canal.

GAGE.—Friez water-stage recorder on right bank; installed September 12, 1923; inspected by M. A. Jensen.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge at gage or by wading.

CHANNEL AND CONTROL.—Trapezoidal concrete rating section. Growth of weeds and brush causes changes in stage-discharge relation, but bottom of rating section evidently furnishes a permanent point of zero flow at gage height about 0.0 foot.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.72 feet September 13, 14, and 15 (discharge, 114 second-feet); minimum discharge, practically no flow during period of no record, when head gates were closed.

1912-1923: Maximum stage recorded, 4.83 feet August 12, 1920 (discharge, 486 second-feet); minimum discharge, practically no flow during period of no record when head gates were closed.

¹ Record for this diversion is also included in "Total diversions from Snake River between Shelley and Porterville gaging stations."

ICE.—Canal not operated during winter.

DIVERSIONS.—None.

REGULATION.—Flow controlled at head gates 600 feet above.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve fairly well defined. Shifting-control method used September 11–19. Staff gage read to hundredths daily. Daily discharge ascertained by applying mean daily gage height from recorder graph or from staff gage to rating table. Records fair.

Idaho (Government) Canal diverts water from left bank of Snake River in sec. 31, T. 1 N., R. 37 E., and discharges into Blackfoot River in sec. 24, T. 2 S., R. 36 E. The canal also receives water from Sand Creek about 10 miles below station.

Discharge measurements of Idaho (Government) Canal near Shelley, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge
Sept. 12	L. L. Bryan.....	<i>Feet</i> 1.71	<i>Sec.-ft.</i> 108
20	F. A. Backman.....	1.02	49.2

Daily discharge, in second-feet, of Idaho (Government) Canal near Shelley, Idaho, for the year ending September 30, 1923

Day	Sept.	Day	Sept.	Day	Sept.
1.....		11.....	60	21.....	12
2.....		12.....	110	22.....	12
3.....		13.....	112	23.....	11
4.....		14.....	113	24.....	10
5.....		15.....	114	25.....	10
6.....		16.....	112	26.....	8
7.....		17.....	112	27.....	8
8.....		18.....	113	28.....	1
9.....		19.....	92	29.....	0
10.....		20.....	41	30.....	0
				31.....	

NOTE.—Canal reported dry prior to Sept. 11. Total run-off for the year, 2,080 acre-feet.

BLACKFOOT RIVER ABOVE RESERVOIR, NEAR HENRY, IDAHO

LOCATION.—About sec. 9, T. 7 S., R. 42 E., at Swanson ranch, 1½ miles above flow line of Blackfoot-Marsh Reservoir, 7 miles south of Henry, Caribou County, and 13 miles north of Soda Springs.

DRAINAGE AREA.—360 square miles (measured on Land Office map).

RECORDS AVAILABLE.—March 25, 1914, to September 30, 1923.

GAUGE.—Vertical staff on right bank to rear of Swanson's house and 500 feet below highway bridge; installed June 23, 1921; read by Mrs. A. C. Swanson.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Bed rough; composed of loose rocks and boulders with some gravel. One channel at ordinary stages; two or three channels at high stages. Control of loose rock, fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.68 feet April 3, caused by ice effect. Maximum discharge occurred at a gage height of 4.28 feet April 29 (discharge, 824 second-feet); minimum stage recorded, 1.50 feet September 14–16 (discharge, 64 second-feet). A lower discharge may have occurred during winter.

1914–1923: Maximum stage estimated from high-water mark above gage, 6.85 feet May 16, 1917 (discharge, 2,060 second-feet); minimum stage, 0.98 foot August 17, 1919 (discharge, 23 second-feet). Minimum discharge probably occurred during winter.

ICE.—Stage-discharge relation affected by ice; observations discontinued during winter.

DIVERSIONS.—A few small ranch diversions are made above gage.

REGULATION.—None. Entire flow passing gage is stored in Blackfoot-Marsh Reservoir $1\frac{1}{2}$ miles below.

ACCURACY.—Stage-discharge relation changed during period of no record. Standard rating curve well defined. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table. Records good.

Discharge measurements of Blackfoot River above reservoir, near Henry, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 7	L. L. Bryan	4.38	154	June 26	A. G. Fiedler	2.17	172
23	A. G. Fiedler	2.90	361	July 18	C. G. Paulsen	1.76	99.4
May 13	C. G. Paulsen	3.22	451	Aug. 29	Berkeley Johnson	1.60	77.5
June 3	do.	2.74	307				

* Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Blackfoot River above reservoir, near Henry, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Apr.	May	June	July	Aug.	Sept.
1.	96	99	93	100	708	409	158	90	89
2.	96	99	96		500	380	132	84	83
3.	96	96	87		500	310	125	82	80
4.	96	96	87		532	284	118	84	77
5.	93	96	105		634	297	118	84	83
6.	96	93	105	165	708	310	118	87	83
7.	96	87	90		670	284	105	84	77
8.	96	87	93		634	284	102	87	75
9.	93	93	93		599	271	99	82	75
10.	93	99	—		500	234	96	79	75
11.	93	102	—	199	500	234	96	79	72
12.	93	102	—		469	210	99	79	72
13.	105	102	—		439	199	102	79	72
14.	105	93	—		222	469	178	93	84
15.	99	71	—		199	500	210	105	84
16.	93	84	—	352	188	439	168	121	84
17.	93	87	—		246	409	188	118	76
18.	93	87	—		352	409	210	100	76
19.	90	121	—		469	439	199	93	76
20.	90	87	—		439	439	178	96	87
21.	90	73	—	352	409	409	199	93	84
22.	90	125	—		469	222	90	82	67
23.	90	125	—		352	500	234	99	84
24.	87	125	—		380	469	199	93	84
25.	87	118	—		439	409	234	178	84
26.	84	90	—	352	469	380	168	148	79
27.	84	96	—		352	352	158	118	79
28.	87	99	—		670	352	158	105	76
29.	90	84	—		824	324	139	96	77
30.	93	84	—		785	324	132	96	83
31.	90	—	—	—	366	—	—	90	92

NOTE.—Braced figures show estimated mean discharge for the periods indicated. Discharge estimated on account of ice Apr. 1–12. Discharge estimated May 21 on account of uncertainty of recorded gage height.

Monthly discharge of Blackfoot River above reservoir, near Henry, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	105	84	92.8	5,710
November.....	125	71	96.7	5,750
December 1-9.....	105	87	94.3	1,680
April.....	824	-----	306	18,200
May.....	708	324	479	29,500
June.....	409	132	229	13,600
July.....	178	90	110	6,760
August.....	92	76	82.3	5,060
September.....	148	64	81.9	4,870

BLACKFOOT-MARSH RESERVOIR NEAR HENRY, IDAHO

LOCATION.—In sec. 12, T. 5 S., R. 40 E., 12 miles northwest of Henry, Caribou County, and 45 miles southeast of Blackfoot.

RECORDS AVAILABLE.—January 1, 1912, to September 30, 1923.

GAGE.—Vertical staff near spillway at right end of dam; installed April 23, 1918; read once daily by B. B. Reynolds. Gage datum was raised 51.6 feet on April 23, 1918, but subsequent readings have been reduced to original datum. To reduce published gage heights to elevation above sea level, add 6,048.40 feet.

EXTREMES OF STAGE.—Maximum stage recorded, 59.67 feet May 23-24; minimum stage, 41.80 feet September 27.

1912-1923: Maximum stage recorded, 68.60 feet June 27-30, 1912; minimum stage, 40.76 feet September 28 and 29, 1919.

ACCURACY.—Gage moved several times during year on account of repair work on dam. As many of the gage settings were not checked by level, parts of the record may be slightly in error with respect to correct datum.

COOPERATION.—Gage-height record furnished by United States Office of Indian Affairs.

Stored water from this reservoir is used for irrigation of lands near Pocatello and on Fort Hall Indian Reservation, the area covered by the project being approximately 50,000 acres. The reservoir is formed by a loose rock and hydraulic-fill dam with a concrete core wall, paved on the reservoir side to prevent erosion. The dam is 120 feet long at base, 250 feet long at crest, and about 40 feet high. The reservoir is 17 miles long and $5\frac{1}{2}$ miles wide at the widest point, and covers about 15,000 acres of land. The spillway, excavated in rock at north end of dam, is 50 feet wide and the crest elevation is 6,118.0 feet. The capacity of the reservoir at elevation of crest of spillway is 303,000 acre-feet. Elevation of lowest point to which water may be drawn is 6,090.0 feet. The distribution system comprises 56 miles of main canal, 108 miles of laterals, and $3\frac{1}{2}$ miles of drainage ditch.

Daily gage height, in feet, of Blackfoot-Marsh Reservoir near Henry, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	52.58	53.12	53.87	54.55	54.99	55.37	55.95	58.40	59.30	57.30	53.30	47.42
2	52.80	53.15	53.90	54.56	55.00	55.38	56.00	58.55	59.26	57.18	53.10	47.30
3	52.60	53.19	53.93	54.58	55.00	55.40	56.04	58.06	59.22	57.04	52.93	47.18
4	52.60	53.23	53.96	54.60	55.02	55.42	56.10	58.77	59.17	56.88	52.76	46.95
5	52.61	53.26	53.98	54.61	55.03	55.44	56.16	58.85	59.19	56.74	52.60	46.75
6	52.62	53.29	54.00	54.63	55.04	55.45	56.30	58.94	59.21	56.60	52.38	46.60
7	52.64	53.33	54.03	54.64	55.06	55.47	56.40	59.02	59.23	56.50	52.14	46.50
8	52.65	53.37	54.05	54.65	55.08	55.49	56.44	59.10	59.20	56.45	51.90	46.40
9	52.66	53.41	54.07	54.66	55.10	55.51	56.49	59.16	59.16	56.38	51.72	46.31
10	52.67	53.45	54.10	54.68	55.12	55.54	56.54	59.23	59.12	56.25	51.50	46.20
11	52.68	53.48	54.12	54.69	55.14	55.56	56.57	59.27	59.07	56.05	51.30	46.08
12	52.69	53.50	54.14	54.71	55.15	55.59	56.62	59.32	59.02	55.85	51.09	45.90
13	52.70	53.55	54.16	54.73	55.17	55.61	56.67	59.36	58.97	55.75	50.96	45.75
14	52.71	53.59	54.18	54.75	55.19	55.63	56.75	59.46	58.90	55.60	50.81	45.60
15	52.72	53.61	54.20	54.77	55.21	55.65	56.81	59.53	58.82	55.50	50.65	45.48
16	52.75	53.63	54.22	54.78	55.22	55.67	56.87	59.62	58.75	55.40	50.49	45.36
17	52.77	53.65	-----	54.80	55.24	55.69	56.93	59.56	58.68	55.25	50.34	45.24
18	52.79	53.67	-----	54.82	55.26	55.71	57.00	59.54	58.60	55.05	50.22	45.05
19	52.83	53.69	-----	54.84	55.29	55.73	57.06	59.56	58.50	54.90	50.14	44.60
20	52.85	53.71	-----	54.86	55.31	55.74	57.14	59.58	58.48	54.81	50.02	44.20
21	52.86	53.73	-----	54.87	55.32	55.75	57.20	59.62	58.24	54.69	49.90	43.80
22	52.90	53.75	-----	54.89	55.33	55.76	57.25	59.64	58.13	54.55	49.77	43.40
23	52.92	53.76	-----	54.91	55.33	55.77	57.35	59.67	58.04	54.40	49.62	43.00
24	52.94	53.77	-----	54.92	55.34	55.78	57.42	59.67	57.96	54.30	49.50	42.60
25	52.97	53.78	-----	54.94	55.34	55.79	57.50	59.64	57.82	54.20	49.38	42.20
26	52.99	53.79	-----	54.96	55.35	55.81	57.60	59.60	57.81	54.10	49.20	42.00
27	53.01	53.80	54.48	54.97	55.36	55.82	57.70	59.52	57.70	53.98	49.10	41.80
28	53.04	53.81	54.50	54.98	55.36	55.84	57.80	59.46	57.60	53.85	49.05	42.10
29	53.06	53.83	-----	54.98	-----	55.86	57.95	59.41	57.50	53.69	48.90	42.30
30	53.09	53.85	-----	54.99	-----	55.88	58.15	59.38	57.40	53.50	48.75	42.30
31	53.10	-----	54.53	54.99	-----	55.91	-----	59.35	-----	53.40	47.60	-----

BLACKFOOT RIVER NEAR HENRY, IDAHO

LOCATION.—In sec. 11, T. 5 S., R. 40 E., 200 feet below wagon bridge at Rockyford crossing, 1 mile below Blackfoot-Marsh Dam of United States Office of Indian Affairs, and 12 miles northwest of Henry, Caribou County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—July 15, 1908, to September 30, 1923.

GAGE.—Friez water-stage recorder on left bank installed September 18, 1912; inspected by B. B. Reynolds.

DISCHARGE MEASUREMENTS.—Made from cable 600 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of lava rock, boulders, and gravel; fairly permanent. One channel at all stages. Growth of moss at times affects stage-discharge relation.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year from water-stage recorder, 3.15 feet at noon July 7 (discharge, 1,010 second-feet); minimum stage, 0.94 foot on numerous days in October and November (discharge, 22 second-feet).

1908-1923: Maximum stage recorded, 4.15 feet May 14, 1909 (discharge, 1,640 second-feet); minimum stage, 0.50 foot May 11 and 12, 1917 (discharge, about 1 second-foot).

ICE.—Stage-discharge relation not seriously affected by ice.

DIVERSIONS.—Few small diversions for irrigation above reservoir.

REGULATION.—Flow entirely regulated by storage in reservoir, which has a capacity of about 300,000 acre-feet.

ACCURACY.—Stage-discharge relation not permanent; affected by growth of moss. Standard rating curve well defined. Staff gage read to hundredths once daily except during winter, when only occasional readings were obtained. Water-stage recorder operated October 1-7 and April 30 to September 22. Daily discharge ascertained by applying daily gage height to rating table; shifting-control method used October 1-14, June 11-20, July 4-13, July 22 to August 9, and September 6-28. For periods water-stage recorder was operated mean daily gage height obtained by inspection of recorder graph. Records good for October and May to September, and fair for remainder of year.

COOPERATION.—Gage-height record furnished by United States Office of Indian Affairs.

Discharge measurements of Blackfoot River near Henry, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
May 13	C. G. Paulsen.....	<i>Feet</i> 1. 91	<i>Sec.-ft.</i> 283	July 18	C. G. Paulsen.....	<i>Feet</i> 3. 06	<i>Sec.-ft.</i> 984
June 2	do.....	2. 69	693	Aug. 28	Berkeley Johnson.....	2. 89	747
June 26	A. G. Fiedler.....	2. 92	823				

Daily discharge, in second-feet, of Blackfoot River near Henry, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	168	22	24	25	27	• 27	29	159	696	828	881	702
2.....	235	22	25		• 27	• 27	29	159	690	834	881	690
3.....	149	22	26		• 27	27	29	162	659	834	847	684
4.....	76	22	26		27	27	29	162	623	841	828	659
5.....	56	22	26		27	27	29	162	606	901	868	647
6.....	57	22	26	25	• 27	• 27	65	162	606	936	901	641
7.....	57	22	26		• 27	27	112	162	606	971	894	629
8.....		22	26		• 27	27	112	162	606	971	894	623
9.....		22	26		• 27		112	162	606	1, 010	894	612
10.....	50	22	26		27		112	162	606	971	881	577
11.....		22	26	26	27	27	112	168	606	971	868	548
12.....	48	22	26		27		137	281	623	971	861	581
13.....	48	22	26		• 27		165	285	733	936	861	515
14.....	50	22	26		27	27	165	303	841	936	854	499
15.....	52	22	26		• 27	29	165	326	841	936	847	493
16.....	52	22	26	26	27	• 29	165	349	834	986	841	392
17.....	52	22			• 27	29	165	441	847	936	834	446
18.....	52	22			27	29	165	537	936	936	834	421
19.....	52	22			27	• 29	165	537	936	936	828	397
20.....	29	24			• 27	29	165	542	901	936	821	372
21.....	29	24	26	26	• 27	• 29	165	542	894	854	808	335
22.....	29	24			27	29	165	542	888	936	802	312
23.....	29	24			• 27		165	542	888	936	796	278
24.....	29	24			27		165	542	868	901	783	
25.....	22	24			• 27		165	623	834	901	770	243
26.....	22	24	26	26	• 27	29	165	696	828	901	758	239
27.....	22	24			• 27		165	696	828	901	751	230
28.....	22	24			• 27		165	696	828	901	745	170
29.....	22	24			26		162	696	828	888	745	298
30.....	22	24			• 26	29	159	696	828	888	739	284
31.....	22		• 26	• 27		29		696		888	684	

• Interpolated.

NOTE.—Braced figures show mean estimated discharge for periods indicated. Discharge estimated Sept. 27, 28, and 30.

Monthly discharge of Blackfoot River near Henry, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	235	22	54.9	3,380
November.....	24	22	22.7	1,350
December.....			22.9	1,590
January.....			25.8	1,590
February.....			27.0	1,500
March.....	27	27	28.1	1,730
April.....	165	29	129	7,680
May.....	696	159	398	24,500
June.....	936	606	764	45,500
July.....	1,010	828	917	56,400
August.....	901	684	826	50,800
September.....	702	170	458	27,300
The year.....	1,010	22	308	223,000

BLACKFOOT RIVER NEAR SHELLEY, IDAHO

LOCATION.—In sec. 7, T. 2 S., R. 38 E., $1\frac{1}{2}$ miles above mouth of canyon, 3 miles above the N. A. Just ranch, 10 miles southeast of Shelley, Bingham County, and 18 miles northeast of Blackfoot. Below all important tributaries.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 26, 1909, to September 30, 1923. March 23, 1903, to December 31, 1909, records were obtained near Presto, about 5 miles below present site. No tributaries enter between two sites, but during irrigation season several canals divert approximately 50 second-feet.

GAGE.—Friez water-stage recorder on right bank; inspected by Rufus E. Reid.

DISCHARGE MEASUREMENTS.—Made by wading or from cable at gage.

CHANNEL AND CONTROL.—Bed, rocky and rough. One channel at all stages. Control shifts occasionally.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 6.30 feet at 9 p. m. July 23 (discharge, 1,830 second-feet); minimum stage 3.34 feet December 23 (discharge, 74 second-feet); a lower flow may have occurred during period of ice effect.

1909–1923: Maximum stage recorded, 6.30 feet at 9 p. m. July 23, 1923 (discharge, 1,830 second-feet); minimum stage, 2.83 feet at midnight January 23, 1919 (discharge, approximately 15 second-feet). Ice jam above station caused temporary drop in stage.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—No noteworthy diversions are made from river on tributaries above station.

REGULATION.—Flow regulated largely by storage in Blackfoot-Marsh Reservoir of United States Office of Indian Affairs, about 40 miles upstream.

ACCURACY.—Stage-discharge relation permanent except as affected by ice.

Rating curve well defined. Operation of water-stage recorder fairly satisfactory except during winter, when occasional staff observations were obtained. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting recorder graph, except as noted in footnote to daily-discharge table. Records good.

Discharge measurements of Blackfoot River near Shelley, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 18	T. R. Newell.....	3.51	122	June 4	L. L. Bryan.....	4.98	778
Jan. 16	.....do.....	3.52	60.8	July 12	.....do.....	5.34	1,060
Mar. 31	.....do.....	3.48	114	Aug. 2	.....do.....	5.24	942
Apr. 26	.....do.....	4.23	387	Sept. 3	.....do.....	4.91	724

* Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Blackfoot River near Shelley, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept
1.....	412	92	86	86		100	138	386	860	853	952	756
2.....	244	90	86	86		100	150	377	814	853	960	750
3.....	278	88		86		100	147	382	801	847	952	737
4.....	207	86		86		102	135	412	781	847	952	725
5.....	129	86	86	86		104	135	407	756	860	952	713
6.....	123	86		86		106	150	403	744	960	952	695
7.....	126	86		86		108	166	390	731	968	952	701
8.....	123	86		86	86	110	166	369	713	1,030	960	707
9.....	123	86		86		112	160	365	707	1,040	952	695
10.....	123	86		86		114	157	360	701	1,050	945	683
11.....	123	86		86		112	186	356	677	1,050	909	677
12.....	123	86		86		110	204	352	660	1,040	902	660
13.....	129	86		86		108	267	470	701	1,000	895	654
14.....	129	86		78		106	274	470	874	982	895	642
15.....	126	86	80	70		104	282	490	867	982	888	576
16.....	123	86		62	92	102	319	510	860	1,000	881	529
17.....	120	86		97	100	100	377	610	902	975	874	490
18.....	120	86		86	100	99	434	700	982	960	860	519
19.....	120	86		84	100	99	456	701	990	952	853	495
20.....	120	86		82	100	98	404	695	975	952	847	466
21.....	120	86		79	100	97	352	695	998	881	834	430
22.....	117	86		114	100	96	348	695	1,020	952	820	407
23.....	114	86	74	100	100	96	339	683	1,030	1,020	814	386
24.....	111	86	76	97	100	95	352	671	975	1,150	807	356
25.....	114	86	77		100	100	360	689	916	990	781	339
26.....	109	86	79		100	105	377	794	902	960	775	331
27.....	105	86	81		100	110	412	788	888	945	769	335
28.....	100	86	83	90	100	114	438	788	888	930	762	348
29.....	98	86	84			119	452	781	881	938	762	348
30.....	96	86	86			124	434	807	867	945	762	344
31.....	94		86			129		847		952	750	

NOTE.—Stage-discharge relation affected by ice Dec. 3-22 and Jan. 25 to Feb. 16: discharge ascertained by means of fragmentary gage-height record, one discharge measurement, and comparison with flow at station below Blackfoot-Marsh Reservoir. Discharge estimated on account of lack of gage-height record Jan. 16 and May 13-18 on basis of flow at upper station. Discharge interpolated on account of lack of gage-height record Oct. 26, 27, Oct. 29 to Nov. 3, Nov. 5-10, 12-17, 19-24, 26-30, Dec. 1, 24-29, 31, Jan. 1-5, 7-12, 14, 15, Feb. 18-23, 25-28, Mar. 1, 2, 4-9, 11-16, 18-23, 25-30, Apr. 6, 20, and Sept. 7. Braced figures show mean discharge for periods indicated.

Monthly discharge of Blackfoot River near Shelley, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	412	94	139	8,550
November.....	92	86	86.4	5,140
December.....			81.4	5,010
January.....			87.0	5,350
February.....			92.2	5,120
March.....	129	95	106	6,520
April.....	456	135	286	17,000
May.....	847	352	563	34,600
June.....	1,030	660	849	50,500
July.....	1,150	847	963	59,200
August.....	960	750	870	53,500
September.....	756	331	550	32,700
The year.....	1,150		391	283,000

BLACKFOOT RIVER NEAR BLACKFOOT, IDAHO

LOCATION.—In sec. 27, T. 3 S., R. 34 E., 2 miles above junction of Blackfoot and Snake Rivers and 8 miles southwest of Blackfoot, Bingham County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—July 27, 1913, to September 30, 1923.

GAGE.—Inclined staff on right bank half a mile south of Kofoed ranch house; read by O. L. Kofoed.

DISCHARGE MEASUREMENTS.—Made by wading or from cable 100 yards below gage.

CHANNEL AND CONTROL.—Bed composed of gravel. Control presumably of the same material; fairly permanent. One channel at all stages. Banks covered with heavy growth of brush and willows which may affect stage-discharge relation at high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 8.50 feet at 9 a. m. June 26 (discharge, 662 second-feet); minimum stage, 4.03 feet July 20 (discharge, 1 second-foot).

1913-1923: Maximum stage recorded, 9.6 feet at 12.30 p. m. May 21, 1921 (discharge, 868 second-feet); minimum discharge, no flow on numerous days 1919-1921.

ICE.—Observations discontinued during winter.

DIVERSIONS.—Principal diversions above gage are the two Fort Hall canals near Blackfoot; several smaller diversions also made near Blackfoot.

REGULATION.—Flow regulated by storage in the Blackfoot-Marsh Reservoir of the United States Office of Indian Affairs and by manipulation of canal head gates above station.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve fairly well defined. Gage read to hundredths daily. Daily discharge ascertained by applying daily gage height to rating table or by shifting-control method. Records good.

Discharge measurements of Blackfoot River near Blackfoot, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
May 11	G. C. Baldwin	7.79	544	Aug. 3	F. A. Backman	5.12	54.1
25	F. A. Backman	5.72	169	12	do.	5.53	118
June 7	L. L. Bryan	7.29	461	24	do.	6.65	323
25	do.	8.45	645	Sept. 4	L. L. Bryan	5.55	114
July 13	do.	6.88	371	16	do.	5.64	132
20	do.	4.11	• 2.8				

* Estimated.

Daily discharge, in second-feet, of Blackfoot River near Blackfoot, Idaho, for the year ending September 30, 1923

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1.....		302	252	247	128	16.....	420	123	250	220	132
2.....		222	198	167	134	17.....	330	54	200	307	160
3.....		525	162	53	132	18.....	354	138	88	267	194
4.....		619	120	14	130	19.....	385	339	25	258	174
5.....		446	354	12	134	20.....	401	400	1	310	181
6.....		434	158	25	250	21.....	368	437	1	424	132
7.....		459	160	47	258	22.....	360	500	2	461	79
8.....		498	86	77	237	23.....	270	540	4	440	70
9.....		486	109	60	156	24.....	222	619	18	358	68
10.....		484	110	76	156	25.....	162	669	305	429	55
11.....	551	415	218	103	117	26.....	94	662	351	369	52
12.....	538	295	369	117	120	27.....	95	643	298	319	55
13.....	536	82	371	26	122	28.....	145	536	218	256	68
14.....	520	49	300	130	124	29.....	176	376	258	192	68
15.....	509	208	267	46	122	30.....	183	319	316	146	118
						31.....	208	-----	300	142	-----

NOTE.—No record Oct. 1 to May 10. Discharge interpolated Aug. 28 on account of missing gage height. Shifting-control method used June 15-24 and July 21 to Aug. 2.

Monthly discharge of Blackfoot River near Blackfoot, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 11-31.....	551	94	325	13,500
June.....	662	49	396	23,600
July.....	371	1	189	11,600
August.....	461	12	197	12,100
September.....	258	52	131	7,800
The period.....				68,600

LITTLE BLACKFOOT RIVER AT HENRY, IDAHO

LOCATION.—In sec. 10, T. 6 S., R. 42 E., at bridge on Kirk ranch at Henry, Caribou County, a short distance above flow line of Blackfoot-Marsh Reservoir, 20 miles north of Soda Springs.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 24, 1914, to September 30, 1923.

GAGE.—Vertical staff on left bank attached to upstream side of bridge; read by Mrs. W. J. Chester. Prior to August 19, 1919, gage was vertical staff fastened to log across stream just below barn 40 feet above present gage; at different datum.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of rocks overlain with sand and gravel.

Control is rock crest on an 8-foot falls, 20 feet below gage. Stage-discharge relation is at times seriously affected by growth of aquatic vegetation.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.70 feet at 5.30 p. m. April 20 (discharge, 69 second-feet); minimum stage, 0.82 foot occurred several days January to March (discharge, 10 second-feet).

1914-1923: Maximum stage recorded, 3.5 feet at 8 p. m. April 19, 1914 (discharge, determined from extension of rating curve, about 292 second-feet); minimum discharge, 6.9 second-feet on morning of January 8, 1919.

ICE.—Stage-discharge relation not affected by ice because of warm springs.

DIVERSIONS.—One small diversion above station and one below.

REGULATION.—No artificial regulation.

ACCURACY.—Stage-discharge relation affected by growth of aquatic vegetation.

Standard rating curve well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table, using shifting-control method December 16 to January 4 and March 26 to September 30. Records good April to September and fair October to March.

Discharge measurements of Little Blackfoot River at Henry, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 5	L. L. Bryan.....	0.83	12.9	June 26	A. G. Fiedler.....	0.92	15.2
22	A. G. Fiedler.....	1.06	27.5	July 18	C. G. Paulsen.....	.97	11.3
May 13	C. G. Paulsen.....	.99	21.0	Aug. 27	Berkeley Johnson.....	.97	13.6
June 3	do.....	.94	16.6				

Daily discharge, in second-feet, of Little Blackfoot River at Henry, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	11	12	12	13	11	10	13	35	18	13	12	14
2	11	12	12	14	10	10	13	33	18	13	12	14
3	11	12	12	14	10	10	13	26	16	12	13	13
4	11	12	12	13	11	10	13	26	16	12	13	14
5	11	12	12	14	11	10	13	20	16	12	13	14
6	11	12	12	14	11	10	14	20	15	12	12	14
7	11	12	12	13	11	10	14	19	16	12	12	14
8	10	12	12	13	10	10	14	19	17	11	13	14
9	11	12	12	12	10	10	14	18	16	11	13	14
10	11	12	12	10	11	10	14	18	15	11	13	14
11	11	12	12	12	11	11	15	18	15	11	14	14
12	11	12	12	12	11	10	15	18	15	10	13	14
13	11	13	12	12	11	10	15	20	14	• 10	14	15
14	11	12	12	11	11	10	15	19	14	• 11	14	15
15	• 10	12	12	11	11	10	17	21	14	• 12	14	15
16	10	13	13	10	11	10	17	20	14	12	14	16
17	10	14	12	10	11	10	28	20	14	11	14	15
18	11	13	12	10	11	10	50	20	14	10	14	15
19	11	14	12	10	10	10	54	19	14	10	13	15
20	10	13	12	10	10	10	55	18	14	11	13	15
21	• 10	14	12	11	10	10	45	18	14	12	13	15
22	11	13	13	11	10	10	37	19	15	12	12	15
23	11	12	13	11	10	• 10	45	19	15	12	12	15
24	12	13	13	11	10	• 10	46	16	14	12	12	16
25	12	12	13	11	10	10	44	18	14	13	13	15
26	12	12	14	10	10	10	46	15	15	12	13	15
27	12	12	13	10	10	11	39	15	14	12	14	16
28	13	13	12	11	10	11	38	15	14	12	14	16
29	12	12	12	11	-----	11	42	15	14	12	13	16
30	12	13	13	11	-----	12	42	15	13	12	14	15
31	12	-----	13	11	-----	12	-----	18	-----	12	13	-----

• Interpolated.

Monthly discharge of Little Blackfoot River at Henry, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	13	10	11.1	682
November	14	12	12.5	744
December	14	12	12.3	756
January	14	10	11.5	707
February	11	10	10.5	683
March	12	10	10.3	653
April	55	13	28.0	1,670
May	35	15	19.7	1,210
June	18	13	14.9	887
July	13	10	11.6	713
August	14	12	13.1	806
September	16	13	14.7	875
The year	55	10	14.2	10,300

MEADOW CREEK NEAR HENRY, IDAHO

LOCATION.—In sec. 3, T. 6 S., R. 42 E., half a mile above flow line of Blackfoot-Marsh Reservoir, three-fourths mile below Goose Lake or Pelican Slough, and 1½ miles northeast of Henry, Caribou County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 20, 1914, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder on left bank; installed June 27, 1914; inspected by Mrs. W. J. Chester.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of rock and gravel. One channel at all stages; banks very brushy. Control somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.54 feet from 7.30 to 8 p. m. April 30 (discharge, 157 second-feet); minimum stage, 1.20 feet August 12 (discharge, 3.2 second-feet). A lower stage and discharge no doubt occurred during period of no record.

1914-1923: Maximum stage recorded, 4.81 feet May 17, 1917 (discharge, 424 second-feet); minimum discharge, probably somewhat less than 0.5 second-foot during July, 1919.

ICE.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

DIVERSIONS.—Several small irrigation diversions above gage.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve well defined. Operation of water-stage recorder fairly satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting recorder graph; shifting-control method used May 31 to June 2, June 16, 17, 27-30, and August 13-26. Records fair.

Discharge measurements of Meadow Creek near Henry, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 5	L. L. Bryan.....	1.74	5.58	June 26	A. G. Fiedler.....	2.34	35.4
22	A. G. Fiedler.....	3.06	95.2	July 18	C. G. Paulsen.....	1.28	3.79
May 14	C. G. Paulsen.....	3.04	88.6	Aug. 27	Berkeley Johnson.....	1.65	4.59
June 3	do.....	2.55	45.2				

* Stage-discharge relation affected by ice.

* Control cleared of drift at end of measurement. Stage dropped from gage reading of 1.65 feet to 1.28 feet.

Daily discharge, in second-feet, of Meadow Creek near Henry, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1		144	47	4.4	4.2	10	16		82	14	5.9	5.2	7.5
2		136	48	5.2	4.0	9.6	17		77	6.8	5.0	5.2	7.2
3		127	45	6.3	3.9	11	18		77	10	4.4	5.0	6.8
4		117	42	7.0	3.9	12	19		77	14	3.8	5.3	5.8
5	5.6	116	39	7.7	3.8	12	20	103	77	13	3.7	6.1	5.9
6		118	38	7.9	3.7	10	21	* 97	74	14	3.9	5.8	5.2
7		120	36	7.7	3.7	9.2	22	91	72	14	4.7	4.3	4.6
8		120	36	7.7	3.7	9.0	23	72	66	17	4.6	3.9	5.4
9		114	34	7.7	3.6	9.0	24	54	62	22	4.6	3.7	7.0
10		109	32	7.2	3.3	8.5	25	107	57	34	6.3	3.8	8.1
11		102	28	7.2	3.3	8.1	26	112	54	36	7.0	3.2	9.4
12		95	25	6.8	3.2	8.1	27	124	51	31	5.8	4.3	9.8
13		92	20	6.3	3.6	7.9	28	134	48	25	5.2	4.0	* 12
14		90	19	6.4	4.6	7.7	29	147	45	15	4.8	4.4	14
15		89	18	5.9	5.3	7.9	30	155	44	5.0	* 4.6	5.9	12
							31		44		* 4.4	10	

* Interpolated.

NOTE.—Discharge estimated June 13 and Sept. 30.

Monthly discharge of Meadow Creek near Henry, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 20-30.....	155	54	109	2,380
May.....	144	44	87.0	5,350
June.....	48	5.0	25.9	1,640
July.....	7.9	3.7	5.81	357
August.....	10	3.2	4.45	274
September.....	14	4.6	8.69	517
The period.....				10,400

IDAHO (GOVERNMENT) CANAL NEAR FIRTH, IDAHO

LOCATION.—In sec. 13, T. 2 S., R. 36 E., 200 feet above concrete drop in canal, a quarter of a mile below nearest highway bridge, 1½ miles below point where Sand Creek crosses canal, and 5 miles southeast of Firth, Bingham County.

RECORDS AVAILABLE.—March 29, 1914, to September 30, 1923.

GAGE.—Friez water-stage recorder on right bank; installed May 8, 1923. Prior to this date gage was a Friez water-stage recorder installed on left bank opposite present location. Old gage at different datum; read by M. A. Jensen.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of silt, sand, and fine gravel. Control is lip of concrete drop and should be permanent at all stages. Point of zero flow at about 1.40 feet gage height.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 5.10 feet at 3 p. m. May 7 (discharge, 553 second-feet). Canal dry during winter period.

1914-1923: Maximum discharge, 553 second-feet May 7, 1923. Canal dry during winter.

ICE.—Stage-discharge relation seriously affected by ice. No winter flow in canal this year.

DIVERSIONS.—None.

REGULATION.—Flow partly regulated by Snake River head gates, 12 miles above, and partly by gates at Sand Creek crossing, 1½ miles above.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting recorder graph. Records good.

Idaho (Government) Canal diverts water from left bank of Snake River in sec. 31, T. 1 N., R. 37 E., and discharges into Blackfoot River in sec. 24, T. 2 S., R. 36 E. The canal also receives water from Sand Creek 1½ miles above this station.

Discharge measurements of Idaho (Government) Canal near Firth, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
May 7	L. L. Bryan.....	5.09	550	Aug. 2	L. L. Bryan.....	2.46	64.7
June 4	.....do.....	4.37	373	21	.....do.....	3.94	286
24	G. C. Baldwin.....	4.77	474	Sept. 3	.....do.....	2.57	69.9
30	L. L. Bryan.....	2.81	111	3	.....do.....	2.50	69.4
July 12	.....do.....	3.55	217				

Daily discharge, in second-feet, of Idaho (Government) Canal near Firth, Idaho, for the year ending September 30, 1923

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1.....		453	48	168	71	16.....	334	129	127	185	206
2.....		487	74	71	74	17.....	311	165	41	153	256
3.....		411	30	26	66	18.....	323	338	11	100	188
4.....		374	48	18	58	19.....	334	323	7	140	143
5.....		359	68	24	193	20.....	323	346	14	276	144
6.....		361	36	34	240	21.....	291	330	12	299	97
7.....	553	418	23	43	240	22.....	291	394	16	240	96
8.....	514	424	46	42	165	23.....	305	399	10	203	94
9.....	455	411	41	59	182	24.....	274	467	188	162	122
10.....	424	390	34	111	160	25.....	240	507	288	164	106
11.....	406	319	195	110	158	26.....	212	368	236	141	159
12.....	397	182	216	91	162	27.....	229	250	190	115	280
13.....	388	177	218	77	154	28.....	293	140	219	73	379
14.....	372	245	188	81	158	29.....	257	112	309	45	397
15.....	359	209	159	112	158	30.....	250	87	297	48	295
						31.....	334		234	82	

NOTE.—Dam in canal below Sand Creek reported cut Apr. 30, but no record of flow available prior to May 7.

Monthly discharge of Idaho (Government) Canal near Firth, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 7-31.....	553	212	339	16, 800
June.....	507	87	319	19, 000
July.....	309	7	117	7, 190
August.....	299	18	113	6, 950
September.....	397	58	173	10, 300
The period.....				60, 200

SAND CREEK NEAR FIRTH, IDAHO

LOCATION.—In sec. 7, T. 2 S., R. 37 E., 400 feet downstream from point where Idaho (Government) Canal crosses creek and 4 miles east of Firth, Bingham County.

RECORDS AVAILABLE.—December 21, 1916, to September 30, 1923.

GAGE.—Vertical staff on left bank just above highway bridge; read by P. W. Wernette.

DISCHARGE MEASUREMENTS.—Made by wading, from highway bridge, or from small flume crossing creek 50 feet downstream.

CHANNEL AND CONTROL.—Bed composed of silt, sand, and fine gravel; shifting. Banks clean; subject to overflow at high stages. Point of zero flow, about -0.2 foot gage height; measured October 11, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.50 feet April 29 (discharge, 304 second-feet). Creek dry on numerous dates when entire flow was diverted into Idaho (Government) Canal.

1916-1923: Maximum stage recorded, 4.34 feet at 7 a. m. April 3, 1919 (discharge, 348 second-feet). Flow zero on days when regulation head gate was closed.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—None between canal crossing and station.

REGULATION.—The Idaho (Government) Canal has been constructed directly across the channel of the creek above station. The canal receives the entire flow of the creek as tributary and regulates the flow returned to the creek channel below by means of head gates. Above this point numerous canal systems utilize the creek channel as a waste ditch.

ACCURACY.—Stage-discharge relation changed during high water in April. Standard rating curve fairly well defined. Staff gage read to hundredths once daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good during open-channel season, fair during period of winter estimates.

Discharge measurements of Sand Creek near Firth, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 21	T. R. Newell.....	1.33	64.6	June 30	L. L. Bryan.....	0.40	7.5
Jan. 16	do.....	2.01	22.4	July 12	do.....	.47	11.4
Mar. 30	do.....	1.72	103	Aug. 2	do.....	.33	7.28
Apr. 27	do.....	2.44	168	Sept. 25	R. B. Johnson.....	.59	15.1
June 4	L. L. Bryan.....	.14	2.5	Sept. 3	L. L. Bryan.....	.49	12.2

* Stage-discharge relation affected by ice.

† Estimated.

Daily discharge, in second-feet, of Sand Creek near Firth, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	49	75	57				87	62	54	0	21	12
2	57	75	57				91	90	5	0	7	13
3	57	75	57				93	90	5	0	7	16
4	57	75	57				87	71	2	0	6	20
5	57	75	57				91	0	2	0	6	18
6	49	75	49		5		89	0	2	0	6	21
7	49	94	49				76	0	2	4	6	21
8	49	94	49	23		18	76	0	2	12	7	19
9	75	94	49				76	62	0	12	6	21
10	94	94	49				73	71	0	12	3	22
11	151	94					73	71	0	11	3	20
12	151	94					68	64	0	11	5	21
13	151	94					68	59	4	11	9	20
14	151	84					68	58	4	12	12	19
15	151	75					77	54	0	12	12	16
16	151	75	38	22	24		119	46	11	12	16	16
17	151	84					106	46	46	12	13	17
18	127	84					114	46	46	10	14	16
19	104	84					159	54	39	10	16	16
20	94	84				26	222	46	39	10	16	16
21	49	74		23			183	46	32	0	20	17
22	49	84					183	32	26	0	21	18
23	49	84					183	32	26	8	18	16
24	49	115					186	30	12	21	16	17
25	49	84			26	43	186	30	12	21	16	16
26	49	84	27				160	21	12	21	17	15
27	57	84					171	21	9	21	15	16
28	57	84				91	234	21	9	12	12	16
29	57	57		8			304	19	0	16	12	16
30	66	57				104	36	21	4	12	11	17
31	75					100		54		12	12	

NOTE.—Stage-discharge relation affected by ice and discharge estimated Dec. 11 to Mar. 29. Braced figures show mean discharge for periods indicated.

Monthly discharge of Sand Creek near Firth, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	151	49	83.3	5,120
November.....	115	57	82.8	4,930
December.....	57	.....	38.9	2,390
January.....	.....	.....	20.1	1,240
February.....	.....	.....	17.8	989
March.....	104	.....	35.5	2,180
April.....	304	36	125	7,440
May.....	90	0	42.5	2,610
June.....	54	0	13.5	803
July.....	21	0	9.52	585
August.....	21	3	11.6	713
September.....	22	12	17.5	1,040
The year.....	304	0	41.5	30,000

FORT HALL UPPER CANAL NEAR BLACKFOOT, IDAHO

LOCATION.—In sec. 13, T. 3 S., R. 35 E., 500 feet below head gates and $3\frac{1}{2}$ mile southeast of Blackfoot, Bingham County.

RECORDS AVAILABLE.—May 8, 1912, to September 30, 1923.

GAGE.—Stevens 8-day water-stage recorder on right bank; installed July 20, 1921; read by ditch rider and gate tender.

DISCHARGE MEASUREMENTS.—Made by wading or from suspension footbridge at gage.

CHANNEL AND CONTROL.—Concrete trapezoidal rating section.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.92 feet at 9 a. m. July 18 (discharge, 521 second-feet). Canal dry during various periods in most winters.

1912-1923: Maximum discharge recorded, 533 second-feet July 21, 1922.

Canal dry during various periods in most winters.

ICE.—Observations discontinued during winter.

DIVERSIONS.—None above station or for several miles below.

REGULATION.—Flow regulated at head gates 500 feet above.

ACCURACY.—Stage-discharge relation changed during winter. Rating curves well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying mean daily gage height from recorder graph to rating table. Records good.

Fort Hall Upper Canal diverts water from left bank of Blackfoot River in sec. 12, T. 3 S., R. 35 E., for irrigation on Fort Hall Indian Reservation.

Discharge measurements of Fort Hall Upper Canal near Blackfoot, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
May 14	L. L. Bryan.....	2.04	136	June 27	G. W. Glenn.....	3.40	312
June 2	G. W. Glenn.....	3.78	381	27	L. L. Bryan.....	2.23	157
7	do.....	3.70	365	27	G. W. Glenn.....	2.20	155
8	L. L. Bryan.....	3.70	335	July 11	do.....	4.40	450
8	G. W. Glenn.....	3.70	357	16	do.....	4.70	487
17	do.....	4.10	397	19	do.....	4.84	502
18	do.....	4.10	403	20	L. L. Bryan.....	4.86	509
19	do.....	4.00	394	Aug. 21	do.....	4.16	414
25	do.....	3.40	310	Sept. 5	do.....	4.01	399
27	L. L. Bryan.....	3.40	312	28	do.....	3.01	262

• Employee of U. S. Office of Indian Affairs.

Daily discharge, in second-feet, of Fort Hall Upper Canal near Blackfoot, Idaho, for the year ending September 30, 1923

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1.....	216	-----	386	318	438	391	16.....	-----	205	388	490	447	364
2.....	160	-----	364	322	459	392	17.....	-----	205	402	498	440	361
3.....	102	15	365	321	489	392	18.....	-----	205	406	512	434	361
4.....	56	15	364	322	490	391	19.....	-----	231	392	511	424	349
5.....	41	15	364	332	489	393	20.....	-----	282	377	511	427	333
6.....	10	15	360	344	487	392	21.....	-----	326	363	508	405	321
7.....	-----	42	350	357	482	392	22.....	-----	332	346	490	378	302
8.....	-----	78	350	372	482	386	23.....	-----	337	352	494	370	282
9.....	-----	99	350	388	482	378	24.....	-----	353	321	501	370	279
10.....	-----	99	350	414	482	378	25.....	-----	377	316	494	375	264
11.....	-----	121	351	440	479	378	26.....	-----	379	308	486	392	258
12.....	-----	132	367	458	468	377	27.....	-----	395	218	480	391	264
13.....	-----	132	377	472	468	364	28.....	-----	407	309	470	389	256
14.....	-----	132	379	487	458	364	29.....	-----	407	309	452	391	247
15.....	-----	156	378	490	454	364	30.....	-----	416	308	442	391	231
							31.....	-----	416	-----	440	392	-----

NOTE.—No record obtained Oct. 7 to May 2.

Monthly discharge of Fort Hall Upper Canal near Blackfoot, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October 1-6.....	216	10	97.5	1, 160
May 3-31.....	416	15	218	12, 500
June.....	406	218	352	20, 900
July.....	512	318	439	27, 000
August.....	490	370	436	26, 800
September.....	393	231	340	20, 200

FORT HALL LOWER CANAL NEAR BLACKFOOT, IDAHO

LOCATION.—In sec. 15, T. 3 S., R. 35 E., 200 feet below ford where road to head gates half a mile above crosses canal and 2½ miles southeast of Blackfoot, Bingham County.

RECORDS AVAILABLE.—May 15, 1912, to September 30, 1923.

GAGE.—Stevens 8-day recorder on right bank; installed July 14, 1921; read by ditch rider for United States Office of Indian Affairs.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge at gage.

CHANNEL AND CONTROL.—Channel at gage is trapezoidal concrete rating section, at sides of which sand and silt have been deposited. Principal control is a wooden check across canal about one-third mile below gage. Variations in amount of water carried in a large lateral that diverts between gage and check and growth of moss and weeds in canal caused several changes in stage-discharge relation during each season.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.19 feet at 4 a.m. June 18 (discharge, 350 second-feet). Canal dry during various periods in winter.

1912-1923: Maximum stage recorded, 4.51 feet at 6 a. m. July 9, 1922 (discharge, 544 second-feet). Canal reported dry on numerous dates.

ICE.—No record obtained during winter. Small quantities of water are run at times for use of stock, but during greater part of winter the head gates are closed.

DIVERSIONS.—None above gage; one large and one small lateral divert between gage and check that forms main control.

REGULATION.—Flow regulated at head gates half a mile above gage.

ACCURACY.—Stage-discharge relation not permanent; affected by variation in quantity of water diverted just below gage, by variable conditions at control, and by growth of aquatic vegetation. Standard rating curves fairly well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying mean daily gage height obtained from inspection of recorder graph to rating table; shifting-control methods used during greater part of period. Records fair.

Fort Hall Lower Canal diverts water from left bank of Blackfoot River in sec. 11, T. 3 S., R. 35 E. Water is used for irrigation on Fort Hall Indian Reservation.

Discharge measurements of Fort Hall Lower Canal near Blackfoot, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
May 14	L. L. Bryan	2.17	188	July 11	G. W. Glenn	2.02	173
June 2	G. W. Glenn	2.54	237	13	L. L. Bryan	2.48	250
8	do	2.31	196	19	G. W. Glenn	2.66	269
8	L. L. Bryan	2.28	191	20	L. L. Bryan	2.66	278
18	G. W. Glenn	3.10	335	Aug. 21	do	2.35	223
25	do	2.62	251	Sept. 5	do	2.00	167
27	do	2.37	181	28	do	2.02	158

* Employee of U. S. Office of Indian Affairs.

Daily discharge, in second-feet, of Fort Hall Lower Canal near Blackfoot, Idaho, for the year ending September 30, 1923

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1	151		270	209	290	183	16		240	316	299	258	174
2	126		234	226	296	178	17		248	323	313	314	156
3	101		220	228	294	174	18		297	336	304	243	117
4	81		205	217	279	174	19		306	329	280	241	116
5	44	26	204	220	274	170	20		304	314	272	240	134
6		47	201	217	287	166	21		284	308	256	223	156
7		43	202	255	287	180	22		287	292	240	204	165
8		55	199	280	294	189	23		313	294	282	207	162
9		55	197	287	304	189	24		320	255	301	170	159
10		64	205	262	313	189	25		287	253	311	87	166
11		96	204	171	302	186	26		290	228	314	97	159
12		121	204	171	284	178	27		292	182	309	96	171
13		162	217	218	270	171	28		302	189	313	102	164
14		198	253	267	260	172	29		311	201	313	105	150
15		207	287	275	255	171	30		297	197	309	131	147
							31		294		297	166	

NOTE.—No record obtained Oct. 6 to May 4, but canal believed to have been dry during most of this time.

Monthly discharge of Fort Hall Lower Canal near Blackfoot, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October 1-5	151	44	101	1,000
May 5-31	320	26	213	11,400
June	336	182	244	14,500
July	314	171	265	16,300
August	314	87	231	14,200
September	189	116	166	9,880

MUD LAKE AT TERRETON, IDAHO

LOCATION.—In SW. $\frac{1}{4}$ sec. 13, T. 6 N., R. 34 E., 500 feet north of pump house in intake canal of Owsley Canal Co. on south side of lake, 1 mile west of Terreton, Jefferson County, 14 miles southwest of Hamer, and 19 miles northwest of Roberts.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 4, 1921, to September 30, 1923.

GAGE.—Vertical staff on left bank of intake canal; read by J. H. Walker. During irrigation season when water surface of intake canal is affected by draw down from pumping, a staff at Magill ranch in NW. $\frac{1}{4}$ sec. 3, T. 6 N., R. 35 E., $5\frac{1}{2}$ miles northeast of the Owsley Canal gage, was used; read by C. O. Magill. All gages at approximately same datum. Elevation of zero of gage is 4,775.33 feet above mean sea level.

EXTREMES OF CONTENTS.—Maximum stage recorded during year, 9.20 feet May 5 (contents, 61,660 acre-feet); minimum stage, 5.20 feet September 25 to 30 (contents, 23,070 acre-feet).

1921-1923: Maximum stage recorded, May 5, 1923; minimum stage, 3.94 feet September 14-19, 1921 (contents, 16,160 acre-feet).

ICE.—Ice at gage renders observations difficult at times.

DIVERSIONS.—Considerable water diverted from tributaries to Mud Lake. During the year about 46,800 acre-feet were diverted from the lake (includes Rays Lake, Sandhole Lake, and all other ponds and sloughs which are affected by backwater when Mud Lake is at high stage) to irrigate about 12,400 acres.

REGULATION.—None except as the supply in the lake is affected by pumping operations.

COOPERATION.—Gage heights from gage at the pump house furnished by Owsley Canal Co.

Daily contents, in acre-feet, of Mud Lake at Terreton, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	23, 310	27, 050	*32, 630	*37, 950	*43, 250	*49, 130	*54, 130	*61, 140	*58, 620	50, 410	36, 490	27, 260
2.....	23, 310	27, 540	*32, 780	*38, 140	*43, 400	*49, 290	*54, 440	*61, 270	*58, 480	50, 050	36, 040	26, 980
3.....	23, 310	27, 680	32, 940	38, 330	43, 540	49, 450	*54, 560	*61, 400	*58, 340	49, 570	35, 600	26, 910
4.....	23, 310	27, 900	33, 020	*38, 520	44, 210	*49, 630	*54, 690	*61, 530	*58, 200	49, 210	35, 250	26, 570
5.....	23, 310	28, 260	33, 190	*38, 720	*44, 400	49, 810	*55, 020	61, 660	*58, 080	48, 730	34, 820	26, 570
6.....	23, 620	28, 400	33, 360	38, 910	*44, 580	*49, 990	*55, 350	*61, 600	57, 950	48, 260	34, 470	26, 230
7.....	23, 870	28, 550	33, 440	*39, 100	44, 770	50, 170	55, 680	61, 530	*57, 820	47, 780	34, 040	25, 900
8.....	23, 990	28, 770	33, 620	39, 290	*45, 000	*50, 370	*55, 000	*61, 400	*57, 700	47, 310	33, 870	25, 900
9.....	24, 180	29, 000	33, 780	*39, 490	*45, 220	*50, 570	56, 310	61, 270	57, 570	46, 840	33, 440	25, 700
10.....	24, 240	29, 150	34, 210	39, 690	45, 450	50, 770	*56, 560	*61, 100	57, 320	46, 260	33, 020	25, 570
11.....	24, 550	29, 300	*34, 410	*39, 750	46, 030	*50, 900	56, 810	*60, 930	57, 190	45, 680	32, 600	25, 250
12.....	24, 680	*29, 410	*34, 620	*39, 820	*46, 220	*51, 020	*57, 100	60, 760	56, 940	45, 110	32, 190	25, 250
13.....	24, 990	29, 520	34, 820	39, 880	*46, 420	*51, 140	*57, 400	60, 760	56, 560	44, 650	31, 780	24, 930
14.....	24, 990	*29, 740	*35, 080	39, 980	46, 610	51, 260	57, 690	60, 760	56, 310	44, 210	31, 380	24, 620
15.....	24, 990	29, 970	*35, 340	*40, 180	*46, 770	*51, 380	*57, 940	60, 760	56, 060	43, 760	30, 980	24, 300
16.....	25, 310	30, 130	35, 600	*40, 390	*46, 920	*51, 500	58, 200	60, 760	55, 680	43, 210	30, 590	24, 300
17.....	25, 380	30, 440	*35, 640	40, 590	47, 080	51, 620	*58, 460	60, 670	55, 440	42, 780	30, 200	23, 990
18.....	25, 570	30, 600	35, 690	*40, 790	*47, 380	*51, 680	58, 710	*60, 590	55, 060	42, 350	29, 820	23, 680
19.....	25, 660	30, 750	*35, 810	*41, 000	47, 670	51, 740	*58, 960	60, 500	54, 810	41, 820	29, 440	23, 680
20.....	25, 740	*30, 910	*35, 920	*41, 200	*47, 780	*51, 860	*59, 220	60, 370	54, 440	41, 400	29, 440	23, 560
21.....	25, 830	*31, 060	36, 040	*41, 300	47, 900	51, 990	59, 470	60, 240	54, 070	40, 990	29, 440	23, 380
22.....	25, 900	*31, 220	*36, 220	41, 400	*48, 100	*52, 110	*59, 600	60, 120	53, 820	40, 480	29, 440	23, 380
23.....	26, 160	*31, 380	36, 400	*41, 560	48, 300	*52, 230	59, 730	59, 990	53, 460	40, 080	29, 070	23, 380
24.....	26, 230	*31, 530	*36, 440	41, 720	48, 500	52, 350	60, 050	59, 820	53, 090	39, 690	29, 070	23, 380
25.....	26, 370	*31, 690	36, 490	*41, 930	*48, 620	*52, 660	60, 370	*59, 640	52, 840	39, 290	28, 700	23, 070
26.....	26, 500	*31, 850	*36, 670	42, 140	48, 730	52, 960	*60, 500	59, 470	52, 470	38, 810	28, 330	23, 070
27.....	26, 570	*32, 000	36, 850	*42, 250	*48, 840	*52, 960	*60, 630	*59, 320	52, 230	38, 330	28, 330	23, 070
28.....	26, 710	*32, 160	*37, 000	*42, 350	48, 970	52, 960	60, 760	*59, 180	51, 740	37, 960	27, 970	23, 070
29.....	26, 710	*32, 320	*37, 150	42, 460	-----	52, 960	60, 890	*59, 040	51, 260	37, 590	27, 610	23, 070
30.....	26, 710	*32, 470	37, 310	*42, 780	-----	*53, 390	61, 020	*58, 900	51, 020	37, 220	27, 260	23, 070
31.....	26, 840	-----	37, 770	43, 110	-----	53, 820	-----	*58, 760	-----	36, 850	27, 260	-----

* Interpolated.

NOTE.—Records based on Owsley Canal gage Oct. 1 to June 9; based on graphical comparison with gage heights on Magill gage June 10 to Aug. 7; based on Magill gage Aug. 8 to Sept. 30. Contents estimated on account of wind affecting gage heights Oct. 4, 19, 20, 29, and Mar. 28.

CAMAS CREEK NEAR DUBOIS, IDAHO

LOCATION.—In NE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 13, T. 11 N., R. 38 E., 2 miles north of Lone Tree Reservoir, 2 miles downstream from 18-mile shearing corral, $5\frac{1}{2}$ miles south of Idmon, and 19 miles northeast of Dubois, Clark County. Station is 26 miles north (upstream) of gage on Camas Creek near Camas.

DRAINAGE AREA.—216 square miles (measured on United States Geological Survey map of Mud Lake drainage basin).

RECORDS AVAILABLE.—April 11, 1921, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder on right bank; inspected by William McCall.

DISCHARGE MEASUREMENTS.—Made at high stages from wagon bridge 2 miles upstream, at which point during extreme high stages water flows in a flood channel to the left of main channel and unites above the gage. Measured by wading at low and medium stages 300 feet above gage.

CHANNEL AND CONTROL.—Bed composed of lava boulders and gravel; practically permanent. Banks fairly high and brushy; subject to overflow on right bank. Control well defined.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period from water-stage recorder, 4.18 feet from 7 to 8 a. m. May 5 (discharge, 753 second-feet); minimum stage, 1.23 feet September 28 (discharge, 38 second-feet). A lower discharge may have occurred during the period of no record.

1921-1923: Maximum stage recorded, 5.75 feet probably on May 21, 1922 (discharge, 1,550 second-feet); minimum stage, 1.05 feet July 23-24, 1921 (discharge, 28 second-feet).

ICE.—Stage-discharge relation seriously affected by ice. No record during winter.

DIVERSIONS.—Two stock-watering ditches of the Wood Live Stock Co. are the principal diversions above station. In addition, a number of small irrigation ditches divert water on tributaries above.

REGULATION.—Some water stored in Frazier Reservoir, which has a capacity of 2,000 to 3,000 acre-feet, on West Camas Creek and released during low-water period for use above gaging station.

ACCURACY.—Stage-discharge relation permanent during period. Rating curve well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspection of recorder graph, except as indicated in footnote to daily discharge table. Records good.

COOPERATION.—Gage-height record furnished in part by Camas Mutual Irrigation District.

Discharge measurements of Camas Creek near Dubois, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 14	L. L. Bryan.....	1.22	36.1	July 5	A. G. Fiedler.....	1.74	88.2
Apr. 26	A. G. Fiedler.....	2.12	156	29	do.....	1.50	62.9
May 20	do.....	3.34	423	Sept. 5	Berkeley Johnson.....	1.31	43.5
June 8	do.....	2.88	297				

Daily discharge, in second-feet, of Camas Creek near Dubois, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1.....		383	473	136	61	44	16.....		199	176	51	48	40
2.....		370	525	125	55		17.....		225	171	51	48	40
3.....		397	397	112	52		18.....		262	201	47	47	40
4.....		473	321	100	50		19.....		426	207	44	46	40
5.....		543	280	89	48	43	20.....		426	221	43	46	40
6.....		490	280	78	48	42	21.....		383	225	42	49	39
7.....		426	293	71	48	42	22.....		411	247	43	52	39
8.....		370	302	64	54	42	23.....		473	331	42	48	39
9.....		331	296	64	48	41	24.....		441	324	62	47	42
10.....		344	277	57	48	41	25.....		397	289	105		43
11.....		370	260	53	47	41	26.....	171	397	258	131		39
12.....		326	254	51	46	41	27.....	192	397	209	86		39
13.....		273	243	48	45	41	28.....	239	370	178	69	46	38
14.....		225	233	49	45	40	29.....	344	326	156	63		41
15.....		223	205	40	45	40	30.....	426	293	138	60		40
							31.....		356		61		

* Interpolated.

NOTE.—Braced figures show mean discharge for the periods indicated, estimated on account of missing gage heights.

Monthly discharge of Camas Creek near Dubois, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 26-30.....	426	171	274	2,720
May.....	543	199	365	22,400
June.....	525	138	266	15,800
July.....	136	42	69.3	4,260
August.....	61		48.2	2,960
September.....		38	41.0	2,440
The period.....				50,600

CAMAS CREEK NEAR CAMAS, IDAHO

LOCATION.—In NE. $\frac{1}{4}$ sec. 34, T. 9 N., R. 36 E., Clark County, one-fourth mile south of C. J. Thompson ranch, 1 mile east of Oregon Short Line Railroad track, and 5 miles northeast of Camas, Jefferson County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 1, 1921, to September 30, 1923.

GAGE.—Stevens 8-day water-stage recorder on right bank; installed November 30, 1921; inspected by William McCall.

DISCHARGE MEASUREMENTS.—Made from wagon bridge 500 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of lava, covered in places by gravel. Control formed by lava boulders; well defined. Banks high. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year from water-stage recorder, 2.07 feet at 6 a. m. July 25 (discharge, 136 second-feet); minimum discharge, 7.0 second-feet March 12.

1921-1923: Maximum stage recorded, 4.82 feet at 9.30 a. m. May 22, 1922 (discharge, 645 second-feet); minimum stage, 0.33 foot at 3 p. m. November 6, 1921 (discharge, 4.7 second-feet).

ICE.—Stage-discharge relation seriously affected by ice; flow estimated from observer's notes, weather records, and one discharge measurement.

DIVERSIONS.—A number of irrigation and stock-watering diversions above station.

REGULATION.—Flow past station affected to some extent by losses through lava crevices in Lone Tree Reservoir, 24 miles upstream, particularly at high stages when outlet tunnel in dam became partly choked. Gates in dam were not regulated to any extent during year.

ACCURACY.—Stage-discharge relation changed slightly during winter. Standard rating curve well defined. Water-stage recorder operated satisfactorily except during winter and during short periods at other times on account of clock trouble. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting recorder graph. Records for estimated periods fair; others good.

COOPERATION.—Gage-height record furnished by Camas Mutual Irrigation District.

Discharge measurements of Camas Creek near Camas, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 14	L. L. Bryan	0.74	17.5	June 9	A. G. Fiedler	1.61	81.3
Mar. 12	do		• 6.95	July 3	do	.94	28.2
Apr. 13	do	.92	25.5	July 27	do	1.38	55.8
May 19	Fiedler and Bryan	1.15	42.0	Sept. 6	Berkeley Johnson	.93	27.2
	A. G. Fiedler	1.68	88.2				

• Measured 1 mile below gage.

Daily discharge, in second-feet, of Camas Creek near Camas, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	22	29						50	83	41	38	27
2	20							88	78	34	36	27
3	19						30	90	86	27	• 94	28
4	19							80	88	35	• 32	29
5	18							105	88	60	30	32
6	18		18			8	26	72	84	64	28	27
7	18						29	54	83	• 62	27	24
8	19			16	14		29	85	81	• 61	26	24
9	19						29	113	81	62	27	24
10	18						29	110	77	46	28	23
11	18						27	107	74	44	27	22
12	18						22	105	72	46	26	22
13	18					7	32	103	• 72	43	26	20
14	17						43	101	• 72	38	27	20
15	18						44	98	• 72	35	26	• 20
16	19	20	14			7	41	95	• 71	32	26	• 21
17	18						42	88	• 71	31	27	• 22
18	19						39	86	• 71	29	• 26	23
19	19						37	86	71	27	• 26	24
20	19						• 88	88	67	24	• 25	24
21	19						40	81	65	22	24	21
22	19						39	88	62	22	24	20
23	19					10	38	88	62	27	27	19
24	19			15			38	88	66	29	30	19
25	19						36	83	68	61	• 29	19
26	20		15				39	84	69	52	• 27	
27	20						40	84	70	57	• 26	
28	20					15	41	88	43	58	24	23
29	22						42	94	38	54	25	
30	22					18	43	81	42	47	25	
31	• 26					19		82		41	26	

• Interpolated.

NOTE.—Braced figures show mean estimated discharge for periods indicated.

Monthly discharge of Camas Creek near Camas, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	26	17	19.3	1,190
November.....			20.3	1,210
December.....			15.6	959
January.....			15.5	953
February.....			13.1	728
March.....			9.6	590
April.....	44		35.1	2,090
May.....	113	50	88.5	5,440
June.....	88	38	70.9	4,220
July.....	64	22	42.3	2,600
August.....	38	24	27.6	1,700
September.....			23.2	1,380
The year.....	113		31.8	23,100

BEAVER CREEK AT DUBOIS, IDAHO

LOCATION.—In NW. $\frac{1}{4}$ sec. 21, T. 10 N., R. 36 E., at Ed F. Palmer ranch, half a mile north of Dubois, Clark County. Locally this stream is often called Dry Creek.

DRAINAGE AREA.—220 square miles (measured on U. S. Geological Survey map of Mud Lake drainage basin).

RECORDS AVAILABLE.—April 15, 1921, to September 30, 1923.

GAGE.—Vertical staff attached to cottonwood tree on left bank, 25 feet below wagon bridge; read by John Miller.

DISCHARGE MEASUREMENTS.—Made from wagon bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of lava rock and gravel. Control fairly well defined but occasionally fouled by drift. Banks steep and brushy. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.0 feet at 7 a. m. May 19 (discharge, 219 second-feet); minimum stage, 0.60 foot September 14 (discharge, 6.0 second-feet). A lower discharge may have occurred during winter when daily discharge was not accurately determined.

1921-1923: Maximum stage recorded, 4.9 feet May 20, 1922 (discharge, 637 second-feet); minimum stage and discharge occurred during 1923.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—A few small diversions several miles upstream. After high water practically the entire flow is diverted below gage for irrigation.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curves fairly well defined. Gage read to hundredths occasionally October 1 to March 31, twice daily April 1 to June 30, and once daily July 1 to September 30. Daily discharge ascertained by applying mean daily gage height to rating table, using shifting-control method October 1-7, April 21 to May 1, and July 23 to August 15. Records good April to September and poor October to March.

Discharge measurements of Beaver Creek at Dubois, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 15	L. L. Bryan.....	0.90	12.9	June 9	A. G. Fieldler.....	2.35	136
Mar. 10	do.....	* 2.09	16.4	July 3	do.....	1.31	44.0
Apr. 13	do.....	1.48	58.4	do.....	do.....	1.03	23.4
27	Bryan and Fieldler.....	2.09	101	Sept. 6	Berkeley Johnson.....	.78	13.9
May 18	A. G. Fieldler.....	2.40	145				

* Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Beaver Creek at Dubois, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	10	• 34						119	191	49	16	20
2.....	9	• 37						109	205	47	16	19
3.....	8	• 40						109	178	43	16	18
4.....	7.5	43						124	153	42	15	17
5.....	8.5						40	136	136	41	13	15
6.....	8.5		25			16		165	153	37	12	14
7.....	9							153	165	33	12	10
8.....		41			13			141	147	32	14	9.2
9.....						16		130	136	31	14	9.2
10.....							50	153	141	29	13	8.4
11.....	11			22				153	124	29	11	7.6
12.....		40						73	147	109	25	14
13.....								54	141	104	25	14
14.....								94	136	99	25	16
15.....	13	38	15					73	119	86	25	42
16.....								73	119	69	31	37
17.....								119	114	104	31	31
18.....		37				20		104	130	141	25	23
19.....								153	205	104	15	25
20.....	12							130	147	90	13	36
21.....		40						99	165	90	15	31
22.....					15			81	165	109	24	27
23.....	10							65	178	141	24	25
24.....	• 11							51	165	130	30	23
25.....	• 12	42						56	165	119	35	20
26.....	• 13		20	15				69	165	109	35	19
27.....	• 14							86	165	86	28	18
28.....	15	35						99	153	73	23	19
29.....	• 22					25		130	147	57	22	19
30.....	28							178	136	51	21	18
31.....	• 31							153		17	24	

* Interpolated.

NOTE.—Braced figures show estimated mean discharge for periods indicated. Stage-discharge relation affected by ice Dec. 1 to Mar. 9 and Mar. 11 to Apr. 11; discharge estimated from one meter measurement, observer's notes, and weather records.

Monthly discharge of Beaver Creek at Dubois, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	31	7.5	12.6	775
November.....			38.8	2,310
December.....			20.0	1,230
January.....			19.5	1,200
February.....			13.9	772
March.....			19.7	1,210
April.....	178		75.6	4,500
May.....	205	109	145	8,920
June.....	205	51	120	7,140
July.....	49	13	29.1	1,790
August.....	42	11	20.4	1,250
September.....	20	6.0	11.2	666
The year.....	205	6.0	43.9	31,800

BEAVER CREEK AT CAMAS, IDAHO

LOCATION.—In NE. $\frac{1}{4}$ sec. 21, T. 8 N., R. 36 E., three-eighths mile above confluence with Camas Creek and one-fourth mile northwest of Oregon Short Line Railroad depot at Camas, Jefferson County. Locally this stream is generally called Dry Creek.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 25, 1921, to September 30, 1923.

GAGE.—Vertical staff attached to highway bridge on right bank; read by William McCall.

DISCHARGE MEASUREMENTS.—Made by wading or from highway bridge.

CHANNEL AND CONTROL.—Bed composed of gravel. Control is a fairly well defined gravel riffle 250 feet below gage; fairly permanent. Banks subject to overflow at extreme high stages. Zero flow would occur at gage height of 0.45 foot \pm 0.10 foot, as determined July 3, 1923.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.20 feet May 23 (discharge, 83 second-feet); channel reported dry except during April, May, and June.

1921-1923: Maximum stage recorded, 2.94 feet June 1, 1921 (discharge, 153 second-feet). No flow past station reported except during April, May, and sometimes June of each year.

ICE.—Channel dry during winter.

DIVERSIONS.—After high water, entire flow is diverted for irrigation about 14 miles above, near Dubois.

REGULATION.—None, except as flow is affected by irrigation diversions above.

ACCURACY.—Stage-discharge relation changed slightly May 2 to 14. Rating curves fairly well defined. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table except as indicated in footnote to table of daily discharge. Records good.

COOPERATION.—Gage-height record furnished by Camas Mutual Irrigation District.

Discharge measurements of Beaver Creek at Camas, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 27	Fiedler and Bryan	1.50	33.3
May 19	A. G. Fiedler	2.14	77.3
June 9	do	1.66	42.5

NOTE.—Stream reported dry on July 3 and Sept. 6.

Daily discharge, in second-feet, of Beaver Creek at Camas, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	Day	Apr.	May	June	Day	Apr.	May	June
1.		79	59	11.		63	32	21.	49	67	4.8
2.		57	75	12.		65	9.9	22.	33	67	11
3.		52	53	13.		58	5.9	23.	29	83	15
4.		44	52	14.	3.4	55	4.8	24.	25	75	26
5.		56	33	15.	5.4	49	1.2	25.	25	61	24
6.	0	62	34	16.	9.1	45	0	26.	22	53	28
7.		69	61	17.	20	42	0	27.	28	55	14
8.		63	51	18.	33	49	27	28.	33	52	7.0
9.		56	41	19.	65	79	28	29.	49	38	3.5
10.		54	38	20.	75	75	12	30.	71	39	0
								31.		52	

NOTE.—Discharge interpolated because of missing gage heights June 8 and 29. Shifting-control method used May 2-14. Channel reported dry Oct. 1 to Apr. 13 and June 30 to Sept. 30.

*Monthly discharge of Beaver Creek at Camas, Idaho, for the year ending
September 30, 1923*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April.....	75	0	19.2	1, 140
May.....	83	38	58.5	3, 600
June.....	75	0	25.0	1, 490
The year.....	83	0	8.6	6, 230

NOTE.—No flow October to March and July to September.

MEDICINE LODGE CREEK NEAR SMALL, IDAHO

LOCATION.—In NW. $\frac{1}{4}$ sec. 25, T. 11 N., R. 34 E., 400 feet west of H. W. Small's ranch house, 1 mile below mouth of Indian Creek, 3 miles northwest of Small, Clark County, and $12\frac{1}{2}$ miles west of Dubois.

DRAINAGE AREA.—270 square miles (measured on United States Geological Survey map of Mud Lake drainage basin).

RECORDS AVAILABLE.—April 19, 1921, to December 1, 1923, when records were discontinued.

GAGE.—Vertical staff on right bank; read by H. W. Small.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of lava covered mostly by gravel and sand; shifting at times; gradient steep. Control well defined except at high stages. Channel winding. Banks low and wooded; right bank subject to overflow during high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 2.10 feet June 17 and 21 (discharge, 140 second-feet); minimum stage, 0.99 foot October 1, 1922 (discharge, 44 second-feet).

1921–1923: Maximum stage recorded, 2.8 feet June 1, 1921 (discharge, 196 second-feet); minimum discharge estimated, 38 second-feet, January 11–25, 1922.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—One small diversion from tributary above. Numerous diversions below station utilize practically entire flow during irrigation season.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve well-defined. Gage read to hundredths once daily. Daily discharge determined by applying daily gage height to rating table except as indicated in ofotnote to table of daily discharge. Records fair.

*Discharge measurements of Medicine Lodge Creek near Small, Idaho, during the
period October 1, 1922, to December 1, 1923*

Date	Made by—	Gage height	Dis- charge	Date	Made by—	Gage height	Dis- charge
1922		<i>Feet</i>	<i>Sec.-ft.</i>	1923		<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 15	L. L. Bryan.....	1.01	46.5	May 19	A. G. Fiedler.....	1.46	84.0
				June 4	.....do.....	1.67	97.1
1923				July 3	.....do.....	1.66	101
Mar. 11	.....do.....	1.10	58.0	.....do.....	.....do.....	1.56	95.1
Apr. 13	.....do.....	1.20	64.7	Sept. 5	Berkeley Johnson.....	1.32	68.9
27	Bryan and Fiedler.....	1.32	74.9	Oct. 26	.....do.....	1.23	60.2

Daily discharge, in second-feet, of Medicine Lodge Creek near Small, Idaho, for the period October 1, 1922, to December 1, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	44	*57	*58				70	78	122	106	98	70	52	62	48
2.....	48	*58	*59				66	74	118	106	102	66	52	62	
3.....	48	*60	59				70	66	106	102	98	66	52	66	
4.....	48	*61					70	66	102	98	98	70	52	59	
5.....	48	62					66	70	110	98	94	66	52	59	
6.....	52	*63				55	66	70	114	102	94	66	52	59	
7.....	48	*63	55				62	70	122	98	98	66	59	59	
8.....	48	*64			45		62	70	114	102	90	62	59	59	
9.....	52	*64					62	74	122	106	90	59	59	59	
10.....	48	*65		55			62	86	114	102	86	59	59	59	
11.....	48	*66				56	66	86	118	114	78	52	59	59	
12.....	52	66				*57	70	82	114	106	78	56	52	59	
13.....	48	*66				*59	66	82	110	106	74	56	56	56	
14.....	48	*66				*60	70	82	114	114	78	52	52	59	
15.....	48	*66				*62	70	78	110	106	90	56	59	59	
16.....	*49	*66		50		*63	70	78	114	122	82	52	59	56	
17.....	*50	*66				*65	70	74	140	98	78	52	59	59	
18.....	*50	*66				66	74	82	140	98	74	59	59	56	
19.....	*51	66				*66	74	86	131	98	78	56	56	62	
20.....	52	*64				*65	74	86	122	98	106	56	59	59	
21.....	*53	*63				*64	74	90	140	98	86	56	59	56	
22.....	*54	*62			50	*64	74	106	122	106	82	56	56	56	
23.....	*54	*60				*63	70	114	122	102	78	52	59	59	
24.....	*55	*59				*63	70	122	140	114	78	56	59	56	
25.....	56	*57				62	66	122	131	118	74	56	62	56	
26.....	*56	56	52	50		*63	70	122	122	102	74	56	59	56	
27.....	*56	*56				*64	74	122	114	90	74	56	59	48	
28.....	*56	*57				*65	78	122	110	94	74	56	59	56	
29.....	*56	*57				*66	82	114	106	94	70	52	48	52	
30.....	*56	*58				*68	82	131	106	90	66	52	48	59	
31.....	56					*69		131		94	70		59		

* Interpolated.

NOTE.—Braced figures show mean discharge for periods indicated; estimated on account of ice Dec. 14 to Mar. 10 from one meter measurement, observer's notes, and weather records. Shifting-control method used Aug. 1-31.

Monthly discharge of Medicine Lodge Creek near Small, Idaho, for the period October 1, 1922, to November 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1922-23				
October.....	56	44	51.2	3,150
November.....	66	56	62.0	3,690
December.....			52.7	3,240
January.....			53.2	3,270
February.....			47.3	2,630
March.....	69		60.6	3,730
April.....	82	62	70.0	4,170
May.....	131	66	91.5	5,630
June.....	140	102	119	7,080
July.....	122	90	103	6,330
August.....	106	66	83.5	5,130
September.....	70	52	58.2	3,460
The year.....	140	44	71.1	51,500
1923				
October.....	62	48	56.3	3,460
November.....	66	48	58.0	3,450
The period.....				6,910

BIRCH CREEK NEAR RENO, IDAHO

LOCATION.—In sec. 13, T. 10 N., R. 29 E., 6 miles northwest of Reno post office, at old Worthing ranch, near abandoned post office of Kaufman, and 45 miles (by road) west of Dubois, Clark County. Prior to June 30, 1912, station was designated as "Birch Creek near Kaufman, Idaho."

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 5, 1910, to June 30, 1912; April 1, 1921, to January 27, 1923, when station was discontinued.

GAGE.—Vertical staff on left bank; read by Blanche Bare and Mrs. Auto Bare.

DISCHARGE MEASUREMENTS.—From footbridge or by wading.

CHANNEL AND CONTROL.—Bed composed of lava outcrop and gravel. Banks fairly low but not subject to overflow. Control well defined; affected by aquatic growth at times.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 2.10 feet January 23–27 (discharge, 95 second-feet); minimum stage, 2.02 feet on numerous days in December and January (discharge, 85 second-feet).

1910–1912; 1921–1923: Maximum stage recorded, 2.20 feet March 2, 1912 (discharge, 160 second-feet); minimum stage, July 14 and 15, 1922 (discharge, 67 second-feet).

ICE.—Stage-discharge relation seldom affected by ice on account of springs which feed creek above gage.

DIVERSIONS.—A few small diversions for irrigation above and numerous diversions below station.

REGULATION.—None at present. Proposed dam for reservoir of Birch Creek Irrigation Co. is about one-fourth mile upstream.

ACCURACY.—Stage-discharge relation probably permanent during period of record, but subject to occasional slight changes due largely to aquatic growth below gage. Rating curve well defined. Gage read to hundredths once daily October 1–16 and December 30 to January 27; read about three times a week during the intervening period. Daily discharge determined by applying daily gage height to rating table. Records good.

COOPERATION.—Gage-height record furnished by observers.

Discharge measurements of Birch Creek near Reno, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 16	L. L. Bryan.....	2.04	84.1	July 4	A. G. Fiedler.....	1.99	85.4
Apr. 14	do.....	2.03	92.5	Sept. 4	Berkeley Johnson.....	2.04	81.8
May 21	A. G. Fiedler.....	2.02	95.5				

Daily discharge, in second-feet, of Birch Creek near Reno, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Day	Oct.	Nov.	Dec.	Jan.
1.....	88	88	90	85	16.....	88	90	88	93
2.....	88	88	90	85	17.....	88	90	85	93
3.....	88	88	90	85	18.....	88	90	85	93
4.....	88	89	90	85	19.....	88	90	85	93
5.....	88	90	90	85	20.....	88	90	85	93
6.....	88	90	90	85	21.....	88	90	85	93
7.....	88	90	90	93	22.....	88	90	85	93
8.....	88	90	90	93	23.....	88	90	85	95
9.....	88	90	90	93	24.....	88	90	85	95
10.....	88	90	88	93	25.....	88	90	85	95
11.....	88	90	87	93	26.....	88	90	85	95
12.....	88	90	86	93	27.....	88	90	85	95
13.....	88	90	85	93	28.....	88	90	85	-----
14.....	88	90	86	93	29.....	88	90	85	-----
15.....	88	90	87	93	30.....	88	90	85	-----
					31.....	88	-----	85	-----

* Discharge interpolated because of missing gage height.

Monthly discharge of Birch Creek near Reno, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	88	88	88.0	5,410
November.....	90	88	89.8	5,340
December.....	90	85	86.8	5,340
January 1-27.....	95	85	91.6	4,910
The period.....				21,000

LITTLE LOST RIVER AT RAYMOND RANCH, NEAR HOWE, IDAHO

LOCATION.—In sec. 29, T. 10 N., R. 27 E., 100 feet above wagon bridge at Raymond ranch, $1\frac{1}{2}$ miles above Wet Creek, and 32 miles northwest of Howe, Butte County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 13, 1921, to September 30, 1923. From August 28, 1910, to October 3, 1913, records were collected at station "Little Lost River near Clyde, Idaho," $2\frac{1}{2}$ miles upstream.

GAGE.—Vertical staff on left bank; read by Mrs. Nelle Raymond.

DISCHARGE MEASUREMENTS.—Made from wagon bridge below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and sand; subject to change at high stages. Control fairly well defined at low stages but affected by backwater from bridge and channel obstruction below at high stages. Banks are overflowed during extremely high water.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 184 second-feet May 27 and 28; minimum stage, 1.23 feet April 1 (discharge, 28 second-feet). A lower discharge probably occurred during winter when no record was obtained.

1921-1923: Maximum stage, 4.33 feet, obtained from high-water marks on gage post, occurred some time between June 7 and 29, 1921; discharge not determined. Maximum stage recorded occurred in 1923. Minimum discharge estimated, 14 second-feet, January 16-20, 1922 (stage-discharge relation affected by ice).

ICE.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

DIVERSIONS.—Several small ranch diversions above and numerous diversions for irrigation below. Water that is stored in the Blaine County Irrigation Co.'s reservoir in Dry Creek, a tributary which enters Little Lost River some distance above gage, is diverted during irrigation season through a pipe line and open ditch over small divide into Corral Creek, thence into Wet Creek through which water flows into Little Lost River below station and is used for irrigation on the company's project about 30 miles downstream.

REGULATION.—None except as affected by diversions above.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve well-defined between 30 and 140 second-feet. Gage read to hundredths once daily except May 23 to July 2 when observations were made twice daily. Daily discharge determined by applying daily gage height to rating table, using shifting-control method May 28 to July 5. Records fair.

Discharge measurements of Little Lost River at Raymond ranch, near Howe, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 15	L. L. Bryan.....	1.38	38.9	July 6	A. G. Fiedler.....	2.16	99.1
May 9	C. G. Paulsen.....	1.72	67.1	Aug. 17	Berkeley Johnson.....	1.46	42.7
May 22	A. G. Fiedler.....	2.39	124	Sept. 17	do.....	1.49	43.9

Daily discharge, in second-feet, of Little Lost River at Raymond ranch, near Howe, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1.....	28	49	154	122	57	44	16.....	39	77	144	77	44	43
2.....	34	40	130	126	53	43	17.....	40	86	164	73	43	45
3.....	34	45	126	122	53	43	18.....	53	94	154	73	43	46
4.....	34	47	126	122	49	43	19.....	53	99	144	65	43	44
5.....	32	53	126	126	53	44	20.....	31	99	144	65	65	44
6.....	39	49	135	99	49	43	21.....	42	104	154	65	57	43
7.....	35	57	154	94	49	43	22.....	40	122	144	65	53	44
8.....	35	61	164	94	53	43	23.....	42	135	144	65	49	44
9.....	35	65	154	90	49	43	24.....	37	144	154	65	49	44
10.....	37	77	164	86	49	44	25.....	37	164	154	73	47	43
11.....	39	86	154	81	47	43	26.....	40	174	154	65	47	47
12.....	43	77	154	77	46	43	27.....	45	184	154	65	46	49
13.....	32	77	174	77	44	43	28.....	47	184	144	61	46	47
14.....	35	81	164	81	46	43	29.....	53	154	135	57	44	46
15.....	38	77	144	81	47	43	30.....	53	154	135	57	44	44
							31.....		164		57	53	

Monthly discharge of Little Lost River at Raymond ranch, near Howe, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April.....	53	28	39.4	2,340
May.....	184	40	99.3	6,110
June.....	174	126	148	8,810
July.....	126	57	81.5	5,010
August.....	65	43	48.9	3,010
September.....	49	43	44.0	2,620
The period.....				27,900

LITTLE LOST RIVER NEAR HOWE, IDAHO

LOCATION.—In SE. $\frac{1}{4}$ sec. 11, T. 6 N., R. 28 E., a quarter of a mile above diversion dam of Blaine County Irrigation Co., 7 miles from Berenice, and 8 miles northwest of Howe, Butte County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 27, 1921, to September 30, 1923.

GAGE.—Vertical staff on left bank; read by Nephi W. Hansen.

DISCHARGE MEASUREMENTS.—Made by wading below gage.

CHANNEL AND CONTROL.—Bed composed of cobbles and gravel; subject to cutting by swift velocity. No well-defined control. One channel at all stages. Banks fairly high.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 1.64 feet June 14 (discharge, 176 second-feet); minimum stage, 0.23 foot April 15 and 20 (discharge, 13 second-feet). A higher and lower stage and discharge may have occurred during period of no record.

1921-1923: Maximum and minimum stages occurred in 1923.

ICE.—Observations discontinued during winter.

DIVERSIONS.—Numerous irrigation diversions above and below station.

REGULATION.—Water is stored in small reservoir of Blaine County Irrigation Co. on Dry Creek, 40 miles upstream, and during irrigation season water is released and carried through Corral and Wet Creeks to Little Lost River and diverted into the company's main canal one-fourth mile below gage.

ACCURACY.—Stage-discharge relation changed during high water in June. Standard rating curve well defined. Gage read to hundredths once daily. Daily discharge determined by applying daily gage height to rating table except as indicated in footnote to table of daily discharge. Records good.

COOPERATION.—Gage-height record furnished by water master for Little Lost River.

Discharge measurements of Little Lost River near Howe, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 15	L. L. Bryan.....	0.23	13.5	July 6	A. G. Fiedler.....	1.54	150
May 9	C. G. Paulsen.....	0.90	76.0	Aug. 18	Berkeley Johnson.....	1.11	92.6
May 22	Fiedler and Hansen.....	1.36	138	Sept. 17	do.....	1.04	80.9
June 3	A. G. Fiedler.....	1.53	154				

Daily discharge, in second-feet, of Little Lost River near Howe, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1.....		44	168	140	100	100	16.....		81	154	126	94	84
2.....		41	161	147	100	• 100	17.....	13	84	154	• 120	• 94	83
3.....		68	161	140	100	100	18.....		88	161	113	94	83
4.....		63	161	147	94	94	19.....		94	154	113	106	
5.....		69	161	147	100	100	20.....	13	106	154	113	• 110	
6.....		69	161	147	94	• 97	21.....		58	120	157	• 110	113
7.....		70	168	147	100	• 94	22.....		44	133	147	106	106
8.....		70	168	140	• 84	• 91	23.....		42	140	140	• 110	106
9.....		75	168	140	67	88	24.....		39	147	147	113	100
10.....		73	168	133	68	94	25.....		33	154	154	113	100
11.....		86	176	133	88	84	26.....		31	154	147	• 113	100
12.....		88	168	133	88	• 84	27.....		42	161	147	113	• 98
13.....		78	168	133	84	84	28.....	• 44	161	147	106	• 96	• 83
14.....		82	176	126	• 92	• 84	29.....		46	140	106	94	81
15.....	13	84	168	126	100	• 84	30.....		49	161	147	100	• 96
							31.....		161		100	• 98	• 104

• Discharge interpolated.

NOTE.—Braced figures show mean discharge for periods indicated; estimated because of missing gage-height record.

Monthly discharge of Little Lost River near Howe, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 15-30.....	58		31.6	1,000
May.....		41	102	6,270
June.....	176	140	158	9,400
July.....	147	100	124	7,620
August.....	113	67	95.6	5,880
September.....	104	81	88.8	5,280
The period.....				35,400

WET CREEK AT CLYDE SCHOOL, NEAR HOWE, IDAHO

LOCATION.—About sec. 4, T. 9 N., R. 27 E., Custer County, near wagon bridge on main highway up Little Lost River Valley, a quarter of a mile west of Clyde schoolhouse, three-eighths mile above confluence with Little Lost River, and 30 miles northwest of Howe, Butte County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 13, 1921, to September 26, 1923, when station was discontinued. Gage-height record and results of discharge measurements only available during 1923.

GAGE.—Vertical staff on right bank 45 feet below highway bridge; installed May 22, 1923. Prior to this date vertical staff gage on left bank 145 feet upstream and at a different datum was used. Gages read by N. W. Hansen.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of gravel; shifting. No well-defined control. Banks high; one channel at all stages.

EXTREMES OF DISCHARGE.—Data insufficient to determine extremes of stage and discharge.

ICE.—Records discontinued during winter.

DIVERSIONS.—A few small diversions for irrigation above station.

REGULATION.—Water released during irrigation season by Blaine County Irrigation Co. from its Dry Creek reservoir passes gage enroute to point of diversion from Little Lost River for irrigation of land about 25 miles below.

ACCURACY.—Stage-discharge relation changed several times owing to accumulation of debris on control. Rating curves are therefore not well defined and daily discharge not determined. Gage read to hundredths at irregular intervals. Record of daily gage heights and results of current meter measurements shown in following tables.

COOPERATION.—Gage-height record furnished by water master for Little Lost River.

Discharge measurements of Wet Creek at Clyde School, near Howe, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 15	L. L. Bryan	0.92	14.6	July 24	Lynn Crandall ^b	1.54	55
May 9	C. G. Paulsen	1.07	21.2	Aug. 5	do	1.61	57
22	A. G. Fiedler	^a 1.68	76	10	do	.91	16.6
July 6	do	1.71	70	17	Berkeley Johnson	^c 1.42	63
8	Lynn Crandall ^b		71	Sept. 17	do	.74	16.6
15	do	1.64	58				

^a Reading on new gage installed May 22. Old gage 145 feet upstream in use prior to May 22, read 1.60 feet at time measurement was made.

^b Water commissioner for Big Lost River.

^c Before removing debris from control, gage read 1.72 feet.

Daily gage height, in feet, of Wet Creek at Clyde School, near Howe, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1							16					1.73	
2							17					1.41	0.74
3			1.59				18				1.63		
4			1.60				19				1.63		.74
5					1.61	1.42	20			1.02		1.45	
6				1.71			21		1.56			1.45	
7				1.72	1.69		22		1.68				
8		1.05					23					1.42	
9		1.08			.87		24		1.70		1.54		
10					.92	1.03	25						
11						.88	26						.75
12		1.08		1.70			27						
13			1.28	1.70		.67	28			1.18			
14							29			1.18			
15	0.92			1.64			30		1.66				
							31				1.62		

NOTE.—Prior to May 22, gage readings obtained from staff gage 145 feet upstream and at a different datum from gage used May 22 to Sept. 26.

BIG LOST RIVER AT HOWELL RANCH, NEAR CHILLY, IDAHO¹

LOCATION.—In sec. 30, T. 8 N., R. 21 E., at Howell Ranch, 12 miles southwest of Chilly, Custer County, and 30 miles northwest of Mackay, the nearest railroad point.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 25, 1904, to August 31, 1906; July 1, 1907, to November 14, 1914; May 11, 1920, to September 30, 1923.

GAGE.—Friez water-stage recorder on left bank; installed June 17, 1920; inspected by Ed Mulligan and Mrs. John Howell.

DISCHARGE MEASUREMENTS.—Made from cable 50 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of sand, gravel, and cobbles. Channel straight. Banks covered with brush and subject to overflow at high stages. Control composed of gravel and cobbles; may shift at high stages.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.68 feet 3 to 5 a. m. June 13 (discharge, 2,360 second-feet); minimum measured discharge, 61.9 second-feet, November 13. A lower discharge probably occurred during period of no record.

1904-1914; 1920-1923: Maximum stage recorded, 5.94 feet 4 to 8 a. m. June 12, 1921 (discharge, 3,500 second-feet); minimum discharge, 35 second-feet April 2, 1909.

ICE.—Stage-discharge relation seriously affected by ice. Observations discontinued during winter.

DIVERSIONS.—Several small diversions above. Hammerly ditch, capacity about 20 second-feet, diverts one-fourth mile below gage.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curves are well defined. Shifting-control method used July 1-4 and September 22-30. Staff gage read to hundredths once daily October 2, July 31, August 1-2, 5-21, and September 9-11, when water-stage recorder was not operating; water-stage recorder operated satisfactorily during remainder of period. Daily discharge ascertained by applying mean daily gage height to rating table except during periods of shifting control and except as noted in footnote to table of daily discharge. During periods water-stage recorder was operated, mean daily gage height determined by inspection of recorder graph. Records good except for November for which they are fair.

COOPERATION.—Several discharge measurements furnished by water commissioner for Big Lost River.

¹Designated in previous reports as "Big Lost River near Chilly, Idaho."

*Discharge measurements of Big Lost River at Howell ranch, near Chilly, Idaho
during the year ending September 30, 1923*

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 18	Lynn Crandall*	1.72	111	June 28	Lynn Crandall	3.28	955
Nov. 13	do	1.81	61.9	July 10	A. G. Fiedler	3.17	975
Apr. 9	do	1.44	76.2	Aug. 3	Lynn Crandall	2.24	312
16	L. L. Bryan	1.66	126	22	Berkeley Johnson	2.13	283
May 5	C. G. Paulsen	2.06	248	Sept. 14	do	1.73	146
24	A. G. Fiedler	3.48	1,120				

* Water commissioner for Big Lost River.

† Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Big Lost River at Howell ranch, near Chilly, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	118			176	706	1,620	361	196
2	117			188	614	1,640	329	187
3				168	589	1,620	299	180
4				196	614	1,310	299	187
5			60	250	740	1,240	287	177
6		90		315	885	1,110	275	171
7				385	1,140	987	260	165
8				456	1,360	952	260	159
9			76	583	1,360	960	243	142
10			81	672	1,590	952	237	142
11		80	87	614	1,900	960	230	142
12		70	64	564	2,060	952	223	153
13		62	68	523	2,060	960	230	150
14			108	478	1,400	934	230	148
15			118	451	1,060	817	287	142
16			128	483	923	858	237	139
17			148	517	825	794	230	148
18			153	614	768	648	230	145
19			162	653	790	580	223	142
20			133	646	768	554	410	136
21		112	142	713	818	560	275	133
22			125	915	848	593	271	128
23			131	970	870	560	260	128
24			127	1,140	915	593	237	133
25			123	1,590	840	926	230	148
26			128	1,790	862	707	220	159
27			145	1,310	848	535	213	153
28			168	1,010	970	498	206	150
29			187	870	1,260	475	199	145
30			184	797	1,400	426	210	142
31				754		361	206	

NOTE.—On account of missing gage heights and ice, discharge based largely on information furnished by water commissioner for Big Lost River, estimated Oct. 1, 3-11, 20-22, 30-31; Nov. 1-12, and Apr. 1-8; interpolated Apr. 14-15, 24, and May 1. Result of discharge measurement used Nov. 13. Braced figures show mean discharge for periods indicated.

Monthly discharge of Big Lost River at Howell ranch, near Chilly, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October			113	6,950
November 1-13		62	85.5	2,200
April	187		111	6,600
May	1,790	168	670	41,200
June	2,060	589	1,060	63,100
July	1,040	361	860	52,900
August	410	199	255	15,700
September	196	128	152	9,040

BIG LOST RIVER (EAST CHANNEL) ABOVE MACKAY RESERVOIR, NEAR MACKAY, IDAHO

LOCATION.—In sec. 32, T. 8 N., R. 23 E., 3 miles above Mackay Dam, above flow line of reservoir, and 7½ miles above Mackay, Custer County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 9, 1919, to September 30, 1923.

GAGE.—Stevens 8-day water-stage recorder on right bank; inspected by employees of Utah Construction Co.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge 20 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel; shifts occasionally. One channel at low and medium stages, right bank is overflowed at high stages. Control fairly well defined.

EXTREMES OF DISCHARGE.—Maximum mean daily stage recorded during year, 3.04 feet June 13 (discharge, 646 second-feet); channel reported dry at times during winter.

1919-1923: Maximum mean daily stage recorded, 3.37 feet June 16, 1922 (discharge, 999 second-feet); no flow April 27 to May 16, 1920, or in winter of 1923.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—None between gage and reservoir. Several canals divert in vicinity of Chilly above "dry beds" which extend from a few miles above gage to a point about 15 miles above.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curves well defined. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph, using shifting-control method June 30 to July 3. Records good, except December to April, for which they are fair.

COOPERATION.—Gage-height record and several discharge measurements furnished by water commissioner for Big Lost River.

The record at this station represents a portion of the natural flow of Big Lost River, and, taken in conjunction with the record for west channel of Big Lost River and with the record for east and west channels of Warm Spring Creek, will show the entire flow of Big Lost River at this point. The combined flow of Big Lost River and Warm Spring Creek represents practically the entire surface flow at this point into Mackay Reservoir located a short distance below. For record at station on west channel of river and on east and west channels of Warm Spring Creek, see pages 98, 106, and 108, respectively. For combined flow of both channels of Big Lost River and both channels of Warm Spring Creek, see page 101.

Discharge measurements of Big Lost River (east channel) above Mackay Reservoir, near Mackay, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 17	Lynn Crandall a.....	—0. 16	3. 5	June 14	Crandall and Sloan.....	2. 88	563
Mar. 15	L. L. Bryan.....		b. 6	July 9	A. G. Fiedler.....	1. 80	• 300
Apr. 11	Lynn Crandall.....		b. 4	Aug. 2	Lynn Crandall.....	. 69	99
17	L. L. Bryan.....		b. 4	23	Berkeley Johnson.....	. 37	46. 2
May 22	Lynn Crandall.....	1. 26	139	Sept. 15	—do.....	. 20	24. 8
25	A. G. Fiedler.....	2. 14	a 332				

a Water commissioner for Big Lost River.

b Estimated.

c Includes 78.1 second-feet measured and estimated in overflow channel.

d Includes 196 second-feet measured and estimated in overflow channel.

e Includes 45.5 second-feet measured and estimated in overflow channel.

Daily discharge, in second-feet, of Big Lost River (east channel) above Mackay Reservoir, near Mackay, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	6.2	5.4							218	477	117	37
2	6.2	5.4							181	528	105	35
3	5.8	5.4							146	565	93	35
4	5.4	5.1							129	541	84	34
5	5.4	5.1							150	435	75	34
6	5.8	5.4					0.5		187	390	65	33
7	5.4	5.1					0.5		271	336	62	32
8	5.1	5.4	2.4	1.0			0.5	0.4	375	312	58	31
9	5.1	5.4							418	289	54	30
10	5.1	5.8							462	256	52	29
11	5.1	4.8							530	256	47	29
12	5.1	4.4							618	248	45	27
13	5.4	4.4							646	248	41	27
14	5.8	3.5			0.4				550	267	42	25
15	5.4	3.2							362	239	43	25
16	5.8	3.5						2	288	237	42	24
17	5.8	3.5						19	247	239	39	24
18	5.8	3.5						31	214	208	37	24
19	5.8	3.5						57	214	184	38	24
20	5.8	3.2						73	211	170	49	23
21	5.4						.4	79	216	161	49	22
22	5.1							124	224	177	49	22
23	5.1		1.6	.6		.6		175	231	175	*45	23
24	5.4							220	264	196	*44	23
25	5.1	3.2						322	266	227	*43	23
26	5.4							462	240	312	*42	23
27	5.4							478	240	198	*41	24
28	5.4							375	242	172	*40	24
29	5.4							322	312	155	*39	24
30	5.4							271	402	142	38	23
31	5.4							242		127	38	

* Interpolated.

NOTE.—Braced figures show mean estimated discharge for periods indicated.

Monthly discharge of Big Lost River (east channel) above Mackay Reservoir, near Mackay, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	6.2	5.1	5.48	337
November	5.8		4.10	244
December			1.99	122
January			.79	48.6
February			.40	22.2
March			.55	33.8
April			.43	25.6
May	478		105	6,460
June	646	129	302	18,000
July	565	127	273	16,800
August	117	37	53.4	3,280
September	37	22	27.1	1,610
The year	646		64.8	47,000

BIG LOST RIVER (WEST CHANNEL) ABOVE MACKAY RESERVOIR, NEAR MACKAY, IDAHO

LOCATION.—In sec. 5, T. 7 N., R. 23 E., 3 miles above Mackay Dam, above flow line of reservoir, and 7½ miles above Mackay, Custer County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 9, 1919, to September 30, 1923.

GAGE.—Stevens 8-day water-stage recorder on left bank; installed May 4, 1920; inspected by employees of Utah Construction Co.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge just above gage or by wading.

CHANNEL AND CONTROL.—Bed composed chiefly of gravel. Channel winding. Banks subject to overflow at extremely high stages. Control of gravel, fairly well defined, but subject to change.

EXTREMES OF DISCHARGE.—Maximum mean daily stage recorded during year, 3.21 feet June 13 (discharge, 534 second-feet); minimum stage, 1.04 feet May 3-10 (discharge, 30 second-feet).

1919-1923: Maximum discharge estimated, 1,200 second-feet, from high-water mark on gage (4.45 feet) during period June 5-16, 1921, when water-stage recorder was not operating. Minimum discharge from actual measurement, 18.3 second-feet, May 1, 1920.

ICE.—Ice formation negligible on account of spring inflow above.

DIVERSIONS.—None between station and reservoir. Several canals divert above "dry beds" which extend from a point a few miles above station to a point about 15 miles above, near Chilly. No surface flow passes the "dry beds" except during fairly high stages.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curves well defined. Operation of water-stage recorder satisfactory except for few short periods. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph; shifting-control method used February 1 to March 12 and May 17-24. Records good.

COOPERATION.—Gage-height record and several discharge measurements furnished by water commissioner for Big Lost River.

The record at this station represents a portion of the natural flow of Big Lost River and taken in conjunction with record for east channel of Big Lost River and with the record for east and west channels of Warm Spring Creek will show the entire surface flow of Big Lost River at this point. The combined flow of Big Lost River and Warm Spring Creek represents practically the entire flow at this point into Mackay Reservoir located a short distance below. For record at station on east channel of river and on east and west channels of Warm Spring Creek, see pages 97, 106, and 108, respectively. For combined flow of both channels of Big Lost River and Warm Spring Creek, see page 101.

Discharge measurements of Big Lost River (west channel) above Mackay Reservoir, near Mackay, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 17	Lynn Crandall*	1.27	53.6	June 14	Crandall and Sloan	3.11	504
Jan. 29	do	1.13	34.5	July 9	A. G. Fiedler	2.23	264
Mar. 15	L. L. Bryan	1.07	39.8	Aug. 2	Lynn Crandall	1.58	120
Apr. 17	do	1.05	31.9	23	Berkeley Johnson	1.32	71.3
May 22	Lynn Crandall	1.88	164	Sept. 15	do	1.23	56.2
25	A. G. Fiedler	2.27	265				

* Water commissioner for Big Lost River.

Daily discharge, in second-feet, of Big Lost River (west channel) above Mackay Reservoir, near Mackay, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	66	58	47	41	34	38	37	32	238	381	•135	61
2.....	66	58	47	41	35	38	37	32	213	409	120	61
3.....	66	57	46	41	35	38	37	30	196	424	116	59
4.....	66	57	46	41	34	39	36	30	179	395	108	59
5.....	66	57	46	41	34	39	36	30	181	354	98	59
6.....	66	57	47	40	35	39	•36	30	211	324	93	59
7.....	66	57	47	40	35	40	•35	30	249	296	89	59
8.....	66	56	46	40	35	40	•34	30	296	270	83	59
9.....	66	56	46	40	36	40	•33	30	322	259	74	59
10.....	66	57	46	38	36	40	•32	30	354	249	71	57
11.....	66	56	45	38	36	41	32	32	409	252	69	57
12.....	66	54	45	38	37	41	32	32	484	249	65	57
13.....	66	54	•45	37	37	41	32	32	534	242	64	56
14.....	66	54	•45	37	37	41	32	32	484	249	67	•56
15.....	66	53	•45	36	38	40	32	45	381	242	69	56
16.....	66	53	•45	36	38	40	32	32	311	240	64	56
17.....	63	53	•44	36	38	40	32	74	282	233	62	56
18.....	63	53	•44	36	38	40	32	91	261	216	61	56
19.....	61	51	•44	35	38	40	32	114	254	200	67	56
20.....	61	51	•44	35	38	40	32	126	252	187	80	56
21.....	61	51	44	35	38	37	32	130	254	185	72	56
22.....	61	51	44	35	39	37	32	160	259	187	71	56
23.....	61	50	44	35	39	37	32	187	261	187	71	56
24.....	60	49	42	35	39	37	32	218	277	200	•70	56
25.....	60	49	42	35	38	37	32	272	279	227	•69	56
26.....	60	49	42	35	38	36	32	368	263	268	•68	56
27.....	58	49	42	35	37	37	32	381	263	218	•67	56
28.....	58	49	42	35	37	38	32	317	254	194	•66	56
29.....	58	49	42	35	38	32	284	282	•179	•65	56	56
30.....	58	47	41	35	38	32	259	327	•164	64	56	56
31.....	58	-----	41	34	38	-----	249	-----	•150	62	-----	-----

• Interpolated.

NOTE.—Braced figures show mean estimated discharge for periods indicated.

Monthly discharge of Big Lost River (west channel) above Mackay Reservoir, near Mackay, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	66	58	63.1	3,880
November.....	58	47	53.2	3,170
December.....	47	41	44.4	2,730
January.....	41	34	37.1	2,280
February.....	39	34	36.8	2,040
March.....	41	36	38.9	2,390
April.....	37	32	33.1	1,970
May.....	381	30	121	7,440
June.....	534	179	294	17,500
July.....	424	150	253	15,600
August.....	135	61	77.4	4,760
September.....	61	56	57.1	3,400
The year.....	534	30	92.6	67,200

Combined daily discharge, in second-feet, of Big Lost River (east and west channels) and Warm Spring Creek (east and west channels) above Mackay Reservoir, near Mackay, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	191	191	174	166	157	158	158	153	671	1, 210	417	227
2.....	189	191	176	166	157	158	158	152	600	1, 300	384	224
3.....	186	187	173	166	157	158	156	150	543	1, 360	364	220
4.....	185	188	172	166	155	160	156	152	504	1, 290	343	219
5.....	184	191	172	166	154	160	156	149	532	1, 100	319	218
6.....	184	191	174	165	153	158	154	147	611	1, 010	301	215
7.....	183	192	176	165	154	160	152	146	758	908	291	213
8.....	185	192	176	164	154	160	152	145	968	837	278	211
9.....	187	193	176	164	155	158	150	147	1, 060	793	260	209
10.....	187	195	176	162	157	158	150	147	1, 140	746	253	205
11.....	186	193	175	161	157	160	148	147	1, 290	754	244	204
12.....	185	189	175	161	158	158	148	145	1, 480	742	237	202
13.....	185	188	174	159	157	158	148	147	1, 570	729	230	200
14.....	187	188	174	159	157	158	148	148	1, 400	763	238	200
15.....	187	185	174	157	158	156	148	159	1, 010	724	242	201
16.....	188	186	174	157	158	157	148	163	844	717	234	199
17.....	183	186	173	157	156	157	148	211	760	710	229	202
18.....	183	186	173	156	156	157	149	250	700	653	227	202
19.....	180	184	173	154	156	157	150	310	693	587	238	202
20.....	181	183	173	154	156	156	151	347	689	559	271	201
21.....	180	184	173	154	156	153	152	365	696	544	257	200
22.....	180	184	173	154	158	153	152	458	718	565	256	201
23.....	180	182	173	153	158	153	152	556	733	563	250	204
24.....	181	180	170	154	159	153	152	656	793	609	248	203
25.....	181	179	170	154	158	154	151	853	799	676	246	204
26.....	182	179	170	155	158	154	151	1, 150	751	841	243	204
27.....	183	179	171	156	157	157	152	1, 180	751	624	241	205
28.....	183	179	171	161	157	159	151	986	745	565	238	205
29.....	182	179	169	165	159	159	153	877	872	525	236	205
30.....	183	175	168	164	159	159	153	796	1, 030	491	234	203
31.....	190	168	162	159	159	159	153	719	457	230	200	.....

Combined monthly discharge of Big Lost River (east and west channels) and Warm Spring Creek (east and west channels) above Mackay Reservoir, near Mackay, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	191	180	184	11, 300
November.....	195	175	186	11, 100
December.....	176	168	173	10, 600
January.....	166	153	160	9, 840
February.....	159	153	157	8, 720
March.....	160	153	157	9, 650
April.....	158	148	152	9, 040
May.....	1, 180	145	390	24, 000
June.....	1, 570	504	857	51, 000
July.....	1, 360	457	773	47, 500
August.....	417	230	267	16, 400
September.....	227	199	207	12, 300
The year.....	1, 570	145	306	221, 000

MACKAY RESERVOIR NEAR MACKAY, IDAHO

LOCATION.—In sec. 12, T. 7 N., R. 23 E., 4 miles northwest of Mackay, Custer County.

RECORDS AVAILABLE.—January 1, 1919, to September 30, 1923.

GAGE.—Vertical staff on head-gate tower near right end of dam; read to hundredths once daily by employees of Utah Construction Co.

EXTREMES OF STAGE.—Maximum stage recorded during year, 62.60 feet July 4 and 6 (contents, 39,180 acre-feet); minimum stage, 34.36 feet October 1 (contents, 11,570 acre-feet).

1919-1923: Maximum stage recorded, 63.62 feet June 26, 1922 (contents, 40,500 acre-feet); minimum contents, water surface below bottom of outlet tunnel August 1 to October 19, 1919, August 5, 17-27, 31, September 1-5, 12-14, and 18, 1920 (minimum stage during these periods, 6.6 feet August 24 to September 2, 1919).

COOPERATION.—Gage-height record furnished by Utah Construction Co. through water commissioner for Big Lost River.

Stored water from this reservoir is used for irrigation of land near Arco, under the Utah Construction Co.'s Carey Act project. About 6,400 acres are under cultivation at present, but this area is subject to change from year to year. The reservoir is formed by a gravity earth dam 750 feet in length at crest. The crest is 75 feet above bottom of concrete core wall below which there is 15 feet of sheet piling to prevent excessive seepage. Crest of spillway is 10 feet below crest of dam, and 55 feet above bottom of outlet tunnel. Elevation of bottom of outlet tunnel corresponds to 7.0 feet on gage, at which stage the usable storage is zero, although there is about 125 acre-feet of water in the reservoir, which is not available for use. Elevation of crest of spillway corresponds to 62.0 feet on gage, at which stage the capacity of the reservoir is 38,400 acre-feet, about 2,400 acres of land being submerged. As the foundation of the dam is located on very porous material and the core wall does not penetrate to bedrock, heavy seepage loss occurs, and at times during low water the inflow is not sufficient to counteract this loss plus the loss sustained by evaporation. Thus the stage of water in the reservoir occasionally falls below the bottom of the outlet tunnel. A study of the stream-flow records at this point indicates that most of the seepage from the reservoir reappears in the river channel above the gaging station at the "Narrows" $1\frac{1}{2}$ miles downstream, where favorable rock structure forces underground water to the surface. Additional water also reappears, part of which is probably side drainage while part evidently flows underground at the places where the surface flow into the reservoir is measured and thence through the reservoir. Seepage loss will probably diminish as silting takes place, although the amount of water thus lost has not varied appreciably in the last few years.

Daily contents, in acre-feet, of Mackay Reservoir near Mackay, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	11,570	17,700	22,610	27,180	30,420	32,230	33,370	34,480	33,960	37,900	31,840	18,200
2	11,800	17,950	22,820	27,310	30,500	32,290	33,450	34,500	33,840	38,600	31,590	18,200
3	12,090	18,190	23,010	27,450	30,560	32,340	33,520	34,500	33,660	39,110	31,150	18,200
4	12,360	18,420	23,210	27,560	30,650	32,400	33,580	34,540	33,420	39,180	30,360	18,200
5	12,610	18,610	23,400	27,740	30,730	32,430	33,640	34,560	33,130	39,070	29,590	18,090
6	12,830	18,790	23,600	27,880	30,760	32,460	33,700	34,560	33,310	39,180	29,040	17,920
7	13,020	18,980	23,750	27,990	30,790	32,520	33,720	34,570	33,720	39,110	28,410	17,810
8	13,220	19,210	23,850	28,100	30,890	32,580	33,720	34,590	34,180	38,980	27,840	17,780
9	13,430	19,460	24,060	28,160	31,010	32,640	33,720	34,600	34,240	38,850	27,150	17,720
10	13,630	19,720	24,330	28,230	31,120	32,700	33,720	34,620	34,280	38,720	26,640	17,640
11	13,810	19,960	24,510	28,250	31,230	32,720	33,720	34,660	34,590	38,470	26,070	17,610
12	14,010	20,160	24,640	28,250	31,350	32,750	33,760	34,510	35,110	38,150	25,450	17,560
13	14,220	20,330	24,740	28,320	31,380	32,780	33,820	34,360	35,930	37,770	24,860	17,420
14	14,430	20,510	24,850	28,500	31,440	32,810	33,880	34,320	36,270	37,390	24,330	17,310
15	14,620	20,730	24,960	28,640	31,520	32,840	33,940	34,240	36,190	36,890	23,860	17,230
16	14,780	20,930	25,060	28,750	31,560	32,870	33,960	34,040	35,960	36,520	23,360	17,140
17	14,930	21,110	25,300	28,940	31,580	32,930	34,000	33,900	35,990	36,210	22,810	17,120
18	15,140	21,070	25,460	29,100	31,650	32,950	34,020	33,960	35,990	35,900	22,170	17,060
19	15,340	20,830	25,560	29,190	31,710	32,950	34,060	34,140	36,150	35,470	21,820	17,040
20	15,510	20,800	25,660	29,300	31,730	32,990	34,080	34,080	36,210	34,860	21,640	16,980
21	15,690	20,890	25,770	29,420	31,810	33,010	34,120	34,020	36,370	34,320	21,210	16,960
22	15,860	21,080	25,870	29,530	31,840	33,050	34,140	33,960	36,480	33,840	20,780	16,960
23	16,020	21,320	26,040	29,640	31,930	33,070	34,180	33,960	36,520	33,370	20,410	16,960
24	16,210	21,460	26,250	29,750	31,960	33,110	34,240	34,020	36,640	33,130	20,050	16,930
25	16,400	21,600	26,400	29,800	32,040	33,130	34,300	34,200	36,640	33,010	19,910	16,910
26	16,570	21,790	26,500	29,860	32,080	33,170	34,320	34,620	36,640	33,370	19,700	16,890
27	16,740	22,000	26,670	29,970	32,110	33,220	34,360	34,680	36,640	33,130	19,430	16,870
28	16,960	22,180	26,890	30,090	32,170	33,250	34,380	34,440	36,590	32,950	19,150	16,870
29	17,140	22,290	26,960	30,130	-----	33,280	34,420	34,140	36,620	32,720	18,830	16,870
30	17,310	22,410	27,040	30,280	-----	33,310	34,440	33,900	36,950	32,370	18,540	16,870
31	17,470	-----	27,130	30,360	-----	33,340	-----	33,900	-----	32,190	18,290	-----

NOTE.—Contents May 6-13 estimated.

BIG LOST RIVER BELOW MACKAY RESERVOIR, NEAR MACKAY, IDAHO

LOCATION.—In sec. 18, T. 7 N., R. 24 E., 450 feet below Oleson suspension bridge, half a mile above heading of Streeter ditch, $1\frac{1}{2}$ miles below Mackay Dam, and $2\frac{1}{2}$ miles above Mackay, Custer County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—December 1, 1903, to August 31, 1906; May 12, 1912, to March 15, 1915; January 1, 1919, to September 30, 1923.

GAGE.—Friez water-stage recorder on left bank; installed May 4, 1920; inspected by employees of Utah Construction Co. From April 29, 1913, to March 15, 1915, records were obtained 1 mile below present site. Streeter ditch diverts water between these two points.

DISCHARGE MEASUREMENTS.—Made from cable just below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel; shifts occasionally. Moss growth at times affects stage-discharge relation.

EXTREMES OF DISCHARGE.—Maximum mean daily stage recorded during year, 3.85 feet June 13 (discharge, 1,350 second-feet); minimum stage, 1.40 feet October 3-5 (discharge, 87 second-feet).

1903-1906; 1912-1915; 1919-1923: Maximum stage recorded, 5.79 feet June 10, 1921 (discharge, 2,990 second-feet); minimum stage, 0.36 foot March 26-28, 1914 (discharge, 41 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—Numerous diversions above Mackay Reservoir but Sharp ditch is only diversion between gage and reservoir.

REGULATION.—Flow past gage regulated by operation of gates in Mackay Dam. Prior to 1917 regulation from storage above was practically negligible.

ACCURACY.—Stage-discharge relation shifting throughout year. Standard rating curve well defined. Operation of water-stage recorder satisfactory except as shown in footnote to daily-discharge table. Daily discharge obtained by applying mean daily gage height to rating table. Records good.

COOPERATION.—Gage-height record and several discharge measurements furnished by water commissioner for Big Lost River.

Discharge measurements of Big Lost River below Mackay Reservoir, near Mackay, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 7	Lynn Crandall *	1.46	102	June 2	A. G. Fiedler	2.77	673
Nov. 17	do	1.50	105	27	Lynn Crandall	3.06	792
Jan. 29	do	1.57	123	July 7	A. G. Fiedler	3.20	939
Mar. 14	L. L. Bryan	1.61	146	31	Lynn Crandall	2.75	606
Apr. 17	do	1.60	151	Aug. 23	Berkeley Johnson	2.34	438
May 4	C. G. Paulsen	1.58	141	Sept. 15	do	1.92	264

* Water commissioner for Big Lost River.

Daily discharge, in second-feet, of Big Lost River below Mackay Reservoir, near Mackay, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	114	111	106	114	123	142	155	139	679	843	570	261
2.....	103	103	106	114	126	142	• 153	• 139	679	968	564	234
3.....	87	103	106	114	126	142	• 152	• 139	673	1, 130	564	242
4.....	87	103	109	117	126	142	• 150	139	673	1, 290	558	242
5.....	87	103	109	117	126	142	• 148		667	1, 190	575	238
6.....	98	103	111	117	126	145	• 147		592	1, 000	581	238
7.....	103	103	111	117	126	145	145		558	937	575	238
8.....	106	103	111	117	130	148	152	139	751	906	564	238
9.....	106	103	111	117	130	148	• 152		1, 060	874	553	245
10.....	106	103	114	117	130	148	• 151		1, 190	874	542	253
11.....	106	106	114	117	130	148	• 150		1, 220	874	536	261
12.....	106	106	114	117	130	148	• 149	152	1, 320	937	548	269
13.....	109	106	• 114	117	130	148	• 149	215	1, 350	937	542	265
14.....	109	106	• 114	117	133	148	• 148	238	1, 350	1, 000	542	265
15.....	109	106	• 114	117	133	152	148	238	1, 130	968	536	261
16.....	109	106	• 114	117	133	152	148	238	968	937	536	261
17.....	109	106	• 114	117	136	152	145	242	769	874	536	261
18.....	109	186	• 114	120	136	152	145	242	632	812	553	257
19.....	109	340	• 114	120	136	152	145	253	609	800	542	245
20.....	106	280	• 114	120	136	152	142	366	615	788	536	242
21.....	103	109	• 114	• 120	136	152	142	424	615	800	520	234
22.....	103	106	• 114	• 120	136	152	142	484	632	782	510	230
23.....	103	106	• 114	• 121	139	152	145	558	703	769	463	• 228
24.....	103	106	• 114	• 121	139	152	152	656	788	782	534	• 226
25.....	103	106	• 114	• 122	139	152	145	800	788	763	429	• 224
26.....	103	106	114	• 122	142	152	142	1, 000	794	691	406	• 223
27.....	103	106	114	• 123	142	152	142	1, 220	794	650	396	• 221
28.....	109	106	114	• 123	142	155	142	1, 220	794	644	410	219
29.....	117	106	114	123		155	142	1, 060	806	638	401	211
30.....	117	106	114	123		155	142	968	812	632	392	211
31.....	120		114	123		155		739		609	383	

• Discharge interpolated.

NOTE.—Braced figure shows mean estimated discharge for period indicated.

Monthly discharge of Big Lost River below Mackay Reservoir, near Mackay, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	120	87	105	6, 460
November.....	340	103	122	7, 260
December.....	114	106	113	6, 950
January.....	123	114	119	7, 320
February.....	142	123	133	7, 390
March.....	155	142	149	9, 160
April.....	155	142	147	8, 750
May.....	1, 220		414	25, 500
June.....	1, 350	558	834	49, 600
July.....	1, 290	609	861	52, 900
August.....	581	383	513	31, 500
September.....	269	211	241	14, 300
The year.....	1, 350	87	314	227, 000

BIG LOST RIVER NEAR MOORE, IDAHO

LOCATION.—In sec. 4, T. 5 N., R. 26 E., at Grant Walburn ranch, 1 mile above Moore Canal diversion, 4 miles north of Moore, Butte County, and 11 miles north of Arco.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 18, 1919, to September 30, 1923.

GAGE.—Vertical staff on right bank; read by L. G. Walburn.

DISCHARGE MEASUREMENTS.—Made from cable 20 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of clean gravel. Banks are low and likely to be overflowed at high stages. Channel winding. Control formed by well-defined gravel bar; shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.02 feet June 15 (discharge, 737 second-feet). Minimum stage, 0.60 foot December 21 (discharge, 63 second-feet).

1920-1923: Maximum discharge, estimated 2,330 second-feet, June 14, 1921, based upon high-water marks on gage; minimum stage, 0.39 foot December 17, 1920 (discharge, 19 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—Numerous diversions above station. Moore Canal diverts 1 mile below.

REGULATION.—Flow regulated by operation of head gates at Mackay Dam and by canal diversions above station.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve well-defined below 670 second-feet. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table; shifting-control method used October 6 to May 20, June 14 to July 6, and August 3-20. Records good.

COOPERATION.—Gage-height record and several discharge measurements furnished by water commissioner for Big Lost River.

Discharge measurements of Big Lost River near Moore, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 11	Lynn Crandall.....	0.78	97.7	June 13	Lynn Crandall.....	2.95	700
Feb. 1	.....do.....	.72	79.4	July 7	A. G. Fiedler.....	1.62	337
Apr. 6	L. L. Bryan.....	.90	131	Aug. 1	Lynn Crandall.....	1.32	250
May 4	C. G. Pauldsen.....	.89	116	Sept. 24	Berkeley Johnson.....	1.00	140
23	A. G. Fiedler.....	1.26	193	Sept. 16	.....do.....	.94	128

• Water commissioner for Big Lost River.

Daily discharge, in second-feet, of Big Lost River near Moore, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	111	90	114	107	79	124	137	126	346	346	246	128
2	105	82	111	95	90	126	142	124	316	346	232	139
3	103	90	111	95	76	131	148	114	288	405	219	131
4	103	90	114	114	77	133	144	118	288	513	206	135
5	103	90	114	109	70	126	142	118	274	482	206	137
6	103	90	109	109	70	122	151	118	302	405	206	139
7	103	90	107	111	64	124	144	122	260	346	193	139
8	95	94	88	109	82	120	137	126	260	331	181	135
9	99	95	99	111	77	120	131	137	360	288	169	139
10	101	* 97	109	109	77	122	131	137	513	274	181	137
11	97	99	109	114	82	126	126	139	576	232	158	137
12	99	101	92	114	88	124	124	128	640	260	158	139
13	101	99	95	90	90	120	128	116	704	302	146	133
14	99	101	90	114	92	122	135	111	737	302	169	128
15	99	101	92	86	94	126	131	92	737	288	158	126
16	97	101	92	84	105	128	131	84	672	288	135	126
17	99	103	72	107	109	124	126	81	576	288	128	128
18	103	103	69	97	116	118	135	79	420	260	122	131
19	99	137	67	118	116	122	142	79	390	260	133	126
20	95	135	64	114	114	124	139	70	390	260	169	128
21	94	137	63	133	124	* 123	137	105	346	246	146	128
22	94	122	70	128	122	122	137	169	346	246	146	128
23	94	118	76	131	124	124	135	193	360	260	146	126
24	92	118	88	111	120	122	133	246	451	260	139	126
25	90	118	94	111	118	122	126	260	451	420	137	131
26	90	118	107	109	124	120	120	346	451	288	135	135
27	90	120	114	97	114	124	111	513	451	302	126	128
28	88	118	109	109	118	122	116	576	405	274	126	124
29	88	118	109	* 98	-----	126	133	576	375	274	135	124
30	86	116	92	86	-----	128	128	482	375	274	137	120
31	88	-----	111	77	-----	137	-----	451	-----	246	131	-----

• Interpolated

*Monthly discharge of Big Lost River near Moore, Idaho, for the year ending
September 30, 1923*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	111	86	97.0	5,960
November.....	137	90	107	6,370
December.....	114	63	95.2	5,850
January.....	133	77	106	6,520
February.....	124	64	97.6	5,420
March.....	137	118	124	7,620
April.....	151	111	133	7,910
May.....	576	70	198	12,200
June.....	737	260	435	25,900
July.....	513	232	309	19,000
August.....	246	122	162	9,960
September.....	139	120	131	7,800
The year.....	737	63	166	121,000

WARM SPRING CREEK (EAST CHANNEL) NEAR MACKAY, IDAHO

LOCATION.—In NE. $\frac{1}{4}$ sec. 5, T. 7 N., R. 23 E., 500 feet above junction with west channel of Warm Spring Creek, $3\frac{1}{2}$ miles above Mackay Dam, and $7\frac{1}{2}$ miles northwest of Mackay, Custer County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 1, 1919, to September 30, 1923.

GAGE.—Vertical staff on right bank; installed May 3, 1920; read by employees of Utah Construction Co.

DISCHARGE MEASUREMENTS.—Made from suspension bridge 125 feet above gage or by wading.

CHANNEL AND CONTROL. Bed composed of sand and gravel. One channel at all stages. Banks steep and covered with brush. Stage-discharge relation affected by growth of moss during summer.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.53 feet June 14 (discharge, 127 second-feet); minimum stage, 1.42 feet March 14, April 11 and 17 (discharge, 19 second-feet). Actual maximum and minimum flow may have occurred on days of no record.

1919–1923: Maximum discharge recorded, 225 second-feet June 15, 1922; minimum discharge, 9 second-feet May 8, 9, 13, and 14, 1919, and May 18–21, 1920.

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—Natural flow practically all diverted during irrigation season. Flow during summer represents return flow from irrigation above. Entire flow stored in Mackay Reservoir.

REGULATION.—None.

ACCURACY.—Stage-discharge relation affected by growth of moss and by brush along banks. Rating curves fairly well defined. Gage read to hundredths about once a week. Daily discharge ascertained by applying daily gage height to rating table; shifting-control method used February 6 to March 14.

COOPERATION.—Gage-height record and several discharge measurements furnished by water commissioner for Big Lost River.

The record at this station represents a portion of the natural flow of Big Lost River and taken in conjunction with the record for west channel of Warm Spring Creek and east and west channels of Big Lost River will show the entire surface flow of Big Lost River which enters Mackay Reservoir a short distance below.

For record of station on west channel of Warm Spring Creek and east and west channels of Big Lost River, see pages 108, 97, and 98, respectively. For record of combined flow of both channels of Big Lost River and Warm Spring Creek, see page 101.

Discharge measurements of Warm Spring Creek (east channel) near Mackay, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 17	Lynn Crandall*	1.55	24.0	June 14	Crandall and Sloan	2.53	127
Jan. 29	do	1.54	23.9	July 9	A. G. Fiedler	2.03	76.2
Mar. 15	L. L. Bryan	1.44	20.0	Aug. 2	Lynn Crandall	1.70	40.5
Apr. 17	do	1.42	19.3	Aug. 23	Berkeley Johnson	1.62	30.1
May 22	Lynn Crandall	1.74	42.1	Sept. 15	do	1.56	23.8
25	A. G. Fiedler	1.97	74.9				

* Water commissioner for Big Lost River.

Daily discharge, in second-feet, of Warm Spring Creek (east channel) near Mackay, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	22	23	23	23	23	21	21	20	70	120	42	27
2	22	24	23	23	22	21	21	20			41	27
3	21	24	23	23	22	21	20	20			39	26
4	21	25	23	23	21	21	20	20			37	26
5	20	25	23	23	20	21	20	20			36	25
6	20	25	23	23	20	21	20	20	80	94	35	25
7	20	25	23	23	20	21	19	20		88	34	25
8	20	25	23	23	20	21	19	20		82	32	25
9	20	25	23	23	20	20	19	20		76	30	24
10	20	25	23	23	21	20	19	20		76	30	24
11	20	25	23	22	21	20	19	20	117	77	30	23
12	21	25	23	22	21	19	19	20		77	30	23
13	21	25	22	21	21	19	19	20		127	29	23
14	21	25	22	21	21	19	19	20			29	23
15	21	24	22	21	21	20	19	20			29	24
16	21	24	22	21	21	20	19	20	77	75	29	24
17	21	24	22	21	20	20	19	20			29	24
18	21	24	22	21	20	20	19	24			29	23
19	20	24	22	20	20	20	19	28			29	23
20	20	24	22	20	20	20	20	32			30	23
21	20	24	22	20	20	20	20	36	73	60	30	23
22	20	24	22	20	20	20	20	41			30	23
23	20	24	22	20	20	20	20	50			30	24
24	20	23	22	21	21	20	20	60			30	24
25	21	23	22	21	21	20	20	75			30	25
26	21	23	22	22	21	21	20	100	77	81	29	25
27	22	23	23	23	21	21	20				29	25
28	22	23	23	24	21	21	20				28	25
29	22	23	23	24	-----	21	20				28	
30	22	23	23	24	-----	21	20				28	
31	23	-----	23	23	-----	21	-----	78	-----	-----	28	-----

NOTE.—Braced figures show mean discharge for periods indicated. Gage read Oct. 7, 15, 22, 29, Nov. 5, 12, 17, 20, 27, Dec. 4, 21, Jan. 1, 8, 15, 22, 29, Feb. 6, 13, 20, 27, Mar. 6, 14, 15, 22, 29, Apr. 11, 17, 23, May 3, 10, 17, 22, 24, 25, 31, June 7, 14, 21, 28, July 5, 9, 12, 19, 26, Aug. 2, 9, 16, 23, 30, Sept. 6, 13, 15, 20, 27. Discharge estimated Aug. 1 but interpolated for other days when gage was not read.

Monthly discharge of Warm Spring Creek (east channel) near Mackay, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	23	20	20.8	1,280
November.....	25	23	24.1	1,430
December.....	23	22	22.5	1,380
January.....	24	20	22.0	1,350
February.....	23	20	20.7	1,150
March.....	21	19	20.4	1,250
April.....	21	19	19.6	1,170
May.....		20	40.8	2,510
June.....	127		85.9	5,110
July.....			76.5	4,700
August.....		28	31.3	1,920
September.....	27	23	24.4	1,450
The year.....	127	19	34.1	24,700

WARM SPRING CREEK (WEST CHANNEL) NEAR MACKAY, IDAHO

LOCATION.—In NE. $\frac{1}{4}$ sec. 5, T. 7 N., R. 23 E., 500 feet above junction with east channel of Warm Spring Creek, $3\frac{1}{2}$ miles above Mackay Dam, above flow line of reservoir, and $7\frac{1}{2}$ miles above Mackay, Custer County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 8, 1919, to September 30, 1923.

GAGE.—Stevens 8-day water-stage recorder on right bank; inspected by employees of Utah Construction Co.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge just below gage or by wading.

CHANNEL AND CONTROL.—Bed composed chiefly of gravel. One channel at all stages. Control formed by well-defined gravel riffle; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum mean daily stage recorded during year, 2.38 feet June 13 (discharge, 270 second-feet); minimum discharge, 92 second-feet October 6 and 7.

1919-1923: Maximum mean daily stage recorded, 3.38 feet June 12, 1921 (discharge, 411 second-feet); minimum stage, 0.76 foot May 20, 1920 (discharge, 65 second-feet).

ICE.—Stage-discharge relation practically unaffected by ice.

DIVERSIONS.—Practically entire flow diverted during irrigation season. Flow during summer represents return flow from irrigation above. Entire flow stored in Mackay Reservoir.

REGULATION.—None.

ACCURACY.—Stage-discharge relation affected by growth of moss. Standard rating curve well defined between 80 and 210 second-feet. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph. Shifting-control methods used throughout the greater part of the period February 6 to September 30. Records good.

COOPERATION.—Gage-height record and several discharge measurements furnished by water commissioner for Big Lost River.

The record at this station represents a portion of the natural flow of Big Lost River and taken in conjunction with the record for east channel of Warm Spring Creek and the record for east and west channels of Big Lost River will show practically the entire surface flow of Big Lost River which enters Mackay Reservoir a short distance below. For record from stations on east channel of Warm Spring Creek and on east and west channels of Big Lost River, see pages 106, 97, and 98, respectively. For record of combined flow of both channels of Big Lost River and Warm Spring Creek, see page 101.

Discharge measurements of Warm Spring Creek (west channel) near Mackay, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 17	Lynn Crandall	1.07	106	June 14	Lynn Crandall	2.14	239
Jan. 29	do.	1.10	105	July 9	A. G. Fiedler	1.52	171
Mar. 15	L. L. Bryan	.96	94.9	Aug. 2	Lynn Crandall	1.14	116
Apr. 17	do.	.95	97.3	Sept. 23	Berkeley Johnson	1.08	105
May 22	Lynn Crandall	1.19	135	Sept. 15	do.	1.00	96.1
25	A. G. Fiedler	1.44	178				

• Water commissioner for Big Lost River.

Daily discharge, in second-feet, of Warm Spring Creek (west channel) near Mackay, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	97	105	102	101	100	99	99	101	145	228	123	102
2	95	104	104	101		99	100	100	136	242	118	101
3	93	101	102	101		99	99	100	131	249	116	100
4	93	101	101	101		99	99	102	126	235	114	100
5	93	104	101	101		99	99	99	131	215	110	100
6	92	104	102	101	98	98		97	143	203	108	98
7	92	105	104	101	99	98		96	158	188	106	97
8	94	106	105	100	99	98	98	95	180	173	105	96
9	96	107		100	99	98		97	193	169	102	96
10	96	107		100	100	98		97	206	165	100	95
11	95	107		100	100	98	97	95	235	169	98	95
12	93	106		100	100	98	97	93	256	168	97	95
13	93	105		100	99	98	97	95	270	164	96	94
14	94	105		100	99	97	97	96	242	172	100	96
15	95	105	105	99	99	95	97	94	193	168	101	96
16	95	105		99	99	96	97	96	168	165	99	95
17	93	106		99	98	96	97	98	154	163	99	98
18	93	106		98	98	96	98	104	148	154	100	99
19	93	105		98	98	96	99	111	148	145	104	99
20	94	105		98	98	95	99	116	149	142	112	99
21	94	106	105	98	98	95		120	153	138	106	99
22	94	106	105	98	99	95	100	133	159	141	106	100
23	94	105	105	97	99	95		144	165	141	104	101
24	96	105	104	97	99	95	100	158	176	153		100
25	95	104	104	97	99	96	99	184	178	162		100
26	96	104	104	97	99	96	99	221	172	180	104	100
27	98	104	104	97	99	98	100	221	172	154		100
28	98	104	104	101	99	99	99	194	172	145		100
29	97	104	102	105		99	101	171	188	137		100
30	98	102	102			99	101	156	211	131	104	99
31	104		102	104		99		150		126	102	

• Discharge interpolated.

NOTE.—Braced figures show estimated mean discharge for periods indicated.

Monthly discharge of Warm Spring Creek (west channel) near Mackay, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	104	92	94.9	5,840
November	107	101	105	6,250
December		101	104	6,400
January		97	99.8	6,140
February			99.1	5,500
March	99	95	97.3	5,980
April	101	97	98.7	5,870
May	221	93	124	7,620
June	270	126	175	10,400
July	249	126	170	10,500
August	123	96	105	6,460
September	102	94	98.3	5,850
The year	270	92	114	82,800

SHARP DITCH NEAR MACKAY, IDAHO

LOCATION.—In sec. 12, T. 7 N., R. 23 E., 250 feet below head of ditch, half a mile below Mackay Reservoir, and $3\frac{1}{2}$ miles northwest of Mackay, Custer County.

RECORDS AVAILABLE.—June 6, 1912, to October 24, 1914; March 24, 1919, to September 30, 1923.

GAGE.—Vertical staff on right bank, installed April 20, 1920; read by water master or employees of Utah Construction Co.

DISCHARGE MEASUREMENTS.—Made from footbridge or by wading.

CHANNEL AND CONTROL.—Control composed of gravel and sand; poorly defined. Channel congested at times by moss and weeds.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 41 second-feet, during morning of July 8; no flow November 27–30 and April 1–18. Ditch probably dry except for leakage through head gates during period of no record.

1912–1914; 1919–1923: Maximum stage recorded, 2.50 feet June 23, 1921 (discharge, 42 second-feet); ditch reported dry during winter and on other days when water is shut off.

ICE.—No record obtained during winter. Probably only flow is leakage through head gates.

DIVERSIONS.—Station above all diversions.

REGULATION.—Flow controlled by head gate and by a small wasteway above gage.

ACCURACY.—Stage-discharge relation affected by growth of moss and silt deposits.

Standard rating curves fairly well defined. Shifting-control methods used May 5 to June 22, June 28 to August 7, and August 25 to September 15. Gage read to hundredths once daily; record fragmentary prior to May 17 and after August 27. Daily discharge ascertained by applying daily gage height to rating table except for periods for which shifting-control methods were used and except as indicated in footnote to table of daily discharge. Records of daily discharge good except those estimated which are fair.

COOPERATION.—Gage-height record and several discharge measurements furnished by water commissioner for Big Lost River.

Sharp ditch diverts from east side of Big Lost River in sec. 12, T. 7 N., R. 23 E., a mile above heading of Streeter ditch and half a mile below Mackay Reservoir. The water is used for irrigation on land northwest of Mackay and above Streeter ditch.

Discharge measurements of Sharp ditch near Mackay, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
May 4	C. G. Paulsen	1.02	11.7	July 20	Lynn Crandall.....	1.84	30.3
24	Fiedler and Sloan	1.54	22.8	Aug. 9	do	1.80	27.1
June 27	Lynn Crandall	1.68	29.8	22	Berkeley Johnson.....	1.58	21.2
July 10	A. G. Fiedler	1.54	23.2	Sept. 15	do	1.31	13.1

* Employee, Utah Construction Co.

† Water commissioner for Big Lost River.

Daily discharge, in second-feet, of Sharp ditch near Mackay, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1.....	11	6		11	25	30	27	16
2.....					27	35	26	
3.....	10			12	27	40	25	15
4.....					27	38	25	
5.....					26	29	25	
6.....		2		12	24	26	25	
7.....					24	25	24	
8.....			0		27	34	24	14
9.....					32	27	27	
10.....					37	23	26	
11.....		2		11	38	37	26	13
12.....					38	37	25	
13.....					31	37	24	13
14.....					33	40	24	
15.....					35	36	24	13
16.....	10			11	31	35	23	
17.....					30	34	24	
18.....			3	11	24	33	24	13
19.....					24	32	24	
20.....		1.5		11	24	30	24	
21.....			6	11	23	26	22	13
22.....					16	26	21	
23.....			3		22	24	19	
24.....					22	30	18	
25.....					23	30	18	
26.....			8		26	30	17	
27.....					26	30	16	
28.....		0			25	30	31	16
29.....					25	28	29	
30.....			10		27	30	28	
31.....					27	27	27	

* Discharge interpolated.

NOTE.—Discharge estimated on account of lack of gage readings Oct. 1-2, Oct. 4 to Nov. 30, Apr. 1-29, May 1-3, 5-16, June 23, July 24, Aug. 28-31, Sept. 28-31, Sept. 2-12, and 16-30. No flow Nov. 27-30 and Apr. 1-18. Ditch probably dry except for leakage through head gates Dec. 1 to Mar. 31. Braced figures show mean discharge for periods indicated.

Monthly discharge of Sharp ditch near Mackay, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....			10.1	621
November.....		0	1.65	98.2
April.....	10	0	2.40	143
May.....	27		15.4	947
June.....	38	23	28.8	1,710
July.....	40	23	31.4	1,980
August.....	27		22.3	1,370
September.....			13.6	809

PORTNEUF RIVER AT TOPAZ, IDAHO

LOCATION.—In sec. 23, T. 9 S., R. 37 E., at Oregon Short Line Railroad bridge, one-fourth mile west of Topaz station, Bannock County, $1\frac{1}{4}$ miles above diversion dam of Portneuf-Marsh Valley Canal Co., and 6 miles southeast of McCammon.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 12, 1913, to September 30, 1915; July 20, 1919, to September 30, 1923.

GAGE.—Enamel-faced vertical staff fastened to abandoned bridge pile on left bank at upstream side of railroad bridge; installed September 30, 1915; read by Mrs. Selma Hendricks.

DISCHARGE MEASUREMENTS.—Made from railroad bridge immediately below gage from highway bridge a mile above, or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and gravel. Hardpan and conglomerate formation 700 feet below gage forms control; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 3.14 feet April 2 (discharge, 562 second-feet); minimum discharge, 190 second-feet, July 8 and 9 and August 18 and 19.

1913–1915; 1919–1923: Maximum stage recorded, 6.1 feet (gage datum used prior to 1915) April 3, 1913 (discharge, 902 second-feet); minimum stage, 0.92 foot August 17 and 30, 1919 (discharge, 116 second-feet).

ICE.—Stage-discharge relation not affected by ice on account of warm springs entering stream above.

DIVERSIONS.—Numerous ranch diversions above. Stored water from Portneuf-Marsh Valley Canal Co.'s reservoir is diverted for irrigation $1\frac{1}{4}$ miles below.

REGULATION.—Water is stored during winter and spring in Portneuf-Marsh Valley Canal Co.'s reservoir near Chesterfield and released during irrigation season.

ACCURACY.—Stage-discharge relation changed following cloudburst on July 23. Standard rating curve well defined. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table. Records good.

Discharge measurements of Portneuf River at Topaz, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 1	L. L. Bryan.....	3.06	538	May 31	C. G. Paulsen.....	2.26	386
9	do.....	2.48	420	June 23	A. G. Fiedler.....	2.20	381
20	A. G. Fiedler.....	2.24	366	July 16	C. G. Paulsen.....	1.60	245
30	do.....	2.10	330	Sept. 23	Berkeley Johnson.....	1.34	216
May 12	C. G. Paulsen.....	2.90	500				

Daily discharge, in second-feet, of Portneuf River at Topaz, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1.....	538	323	363	247	247	247	16.....	323	447	266	247	266	228
2.....	562	323	343	247	247	247	17.....	343	469	247	247	247	228
3.....	562	323	304	209	266	247	18.....	383	492	247	247	190	228
4.....	447	363	285	218	266	247	19.....	404	515	266	247	190	228
5.....	383	383	285	266	266	228	20.....	363	492	285	247	266	247
6.....	562	425	266	266	266	228	21.....	363	492	323	228	247	228
7.....	538	469	266	209	247	247	22.....	323	492	363	247	247	228
8.....	492	492	266	190	247	247	23.....	304	469	363	447	247	209
9.....	425	492	266	190	247	247	24.....	285	425	323	285	266	209
10.....	404	538	323	247	247	247	25.....	285	425	304	285	266	209
11.....	383	538	304	266	247	247	26.....	304	425	285	285	266	218
12.....	363	515	304	266	247	228	27.....	323	404	266	285	247	228
13.....	343	515	285	266	266	228	28.....	343	383	247	266	247	228
14.....	343	515	266	266	285	228	29.....	343	363	247	266	247	247
15.....	323	469	247	247	266	228	30.....	343	343	247	266	247	218
							31.....	383	-----	-----	247	266	-----

Monthly discharge of Portneuf River at Topaz, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April.....	562	285	390	23, 200
May.....	538	323	442	27, 200
June.....	363	247	288	17, 100
July.....	447	190	256	15, 700
August.....	285	190	252	15, 500
September.....	247	209	232	13, 800
The period.....				112, 000

PORTNEUF RIVER AT POCATELLO, IDAHO

LOCATION.—In sec. 27, T. 6 S., R. 34 E., at highway bridge at foot of Carson Street, in west end of Pocatello, Bannock County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 31, 1911, to September 30, 1923. At a site 1 mile upstream, May 18, 1897, to October 14, 1899.

GAGE.—Vertical staff attached to pile of highway bridge near left bank; installed September 8, 1919; read by W. S. Hutson.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of rocks and boulders; rough. One channel except at extremely high stages when left bank is overflowed. Control shifts within well-defined limits.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.40 feet May 7 and 12 (discharge, 737 second-feet); minimum stage, 2.70 feet July 19, 21, and 22 (discharge, 105 second-feet). A somewhat higher discharge may have occurred when gage was not read.

1911–1923: Maximum discharge somewhat in excess of 2,000 second-feet occurred during period May 13 to June 14, 1917, when left bank was overflowed. Minimum stage, 1.92 feet June 24 and 28, 1919 (discharge, 44 second-feet).

1897–1899: Maximum stage recorded, 12.8 feet May 18, 1897 (discharge, 1,880 second-feet); minimum stage, 6.10 feet July 4–11, 13, 17, and 18, 1898 (discharge, 14 second-feet).

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—Numerous ranch diversions above gage. The largest single diversion is canal of Portneuf-Marsh Valley Canal Co., which irrigates land near Downey.

REGULATION.—None below head of Portneuf-Marsh Valley Canal Co.'s canal. Storage reservoir of company near Chesterfield has capacity of about 28,000 acre-feet.

ACCURACY.—Stage-discharge relation changed during winter; affected by ice December 10–22 and February 6–19. Rating curves well defined. Gage read to half-tenths several times a week except during periods when stage changed appreciably at which times daily readings were obtained. Daily discharge ascertained by applying daily gage height to rating table except for days of no gage reading for which it was interpolated, and except for periods during which stage-discharge relation was affected by ice for which it was ascertained by means of occasional gage readings, observer's notes, and weather records. Open-water records good; winter records fair.

Discharge measurements of Portneuf River at Pocatello, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 19	L. L. Bryan	3.34	240	June 5	C. G. Paulsen	3.55	280
Mar. 7	do	3.72	323	June 22	A. G. Fiedler	3.30	222
31	do	4.84	569	July 27	do	3.31	218
Apr. 19	A. G. Fiedler	5.25	676	28	C. G. Paulsen	3.08	170
24	do	4.90	593	Aug. 31	Berkeley Johnson	3.06	161
30	do	5.07	666	Sept. 2	C. G. Paulsen	3.22	175
May 18	do	4.90	607	22	Berkeley Johnson	3.05	157

Daily discharge, in second-feet, of Portneuf River at Pocatello, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	* 192	268	288	304	* 232	304	* 628	655	* 344	195	* 141	* 180
2	192	* 275	* 288	* 304	216	* 301	682	601	338	195	138	195
3	192	* 281	* 288	304	* 196	* 298	* 710	601	* 315	175	* 134	195
4	* 196	288	288	* 292	* 176	* 295	737	628	292	175	130	* 192
5	201	* 293	* 288	281	156	292	* 737	655	270	175	* 124	* 188
6	* 206	298	288	316	200	* 298	* 737	* 696	259	175	* 119	185
7	210	* 305	* 285	* 345		304	737	737	248	175	113	* 179
8	* 210	* 313	* 281	374		* 304	* 723	* 737	237	175	* 115	* 173
9	210	320	278	* 371		304	709	* 737	237	156	* 117	* 168
10	* 210	* 320		* 368		* 304	682	* 737	226	156	* 119	* 162
11	210	320	250	* 365	240	304	* 668	* 737	226	156	121	156
12	* 215	* 320		362		* 307	655	737	226	156	* 121	* 162
13	220	320		* 348		* 310	* 642	737	216	156	121	* 169
14	238	320		* 333		* 313	628	* 703	216	156	* 123	175
15	* 238	320		* 318		316	* 628	* 669	216	* 134	* 126	* 178
16	238	* 316	250	304	240	* 320	628	* 635	216	113	* 128	* 182
17	* 238	* 313		* 304		* 323	* 642	601	216	* 110	130	185
18	238	309		* 304		327	655	601	195	* 108	* 143	* 180
19	238	* 309		304		* 331	682	601	195	105	156	175
20	238	309		* 304	281	* 334	* 682	* 575	195	* 105	156	* 172
21	* 243	304	259	* 304	* 292	338	682	549	* 206	105	216	* 169
22	248	298		304	304	* 346	655	* 536	216	105	259	166
23	* 258	298		* 304	* 304	* 354	628	523	270	* 182	195	* 170
24	268	298		259	304	* 362	601	* 498	304	259	175	175
25	* 268	298		* 264	* 298	* 392	575	472	281	* 238	156	* 208
26	* 268	298	* 270	292	304	422	575	* 440	259	* 216	156	* 240
27	268	298	* 276	* 288	* 304	* 447	575	* 407	259	195	156	* 273
28	* 268	298	281	* 285	* 304	472	601	374	237	175	166	* 305
29	* 268	295	* 292	281		* 506	655	362	216	* 161	166	338
30	268	291	304	* 265		* 541	655	* 356	216	147	175	327
31	* 268		* 304	* 248		575		* 350		* 144	166	

* Discharge interpolated.

NOTE.—Braced figures show mean discharge for periods indicated.

Monthly discharge of Portneuf River at Pocatello, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	268	192	233	14,300
November	320	268	303	18,000
December	304		269	16,500
January	374	248	312	19,200
February	304		238	13,200
March	575	292	353	21,700
April	737	575	660	39,300
May	737	350	589	36,200
June	344	195	245	14,600
July	259	105	161	9,900
August	259	113	147	9,040
September	338	156	197	11,700
The year	737	105	309	224,000

NORTH SIDE MINIDOKA CANAL NEAR MINIDOKA, IDAHO

LOCATION.—In sec. 1, T. 9 S., R. 25 E., 650 feet below Minidoka Dam and 6 miles south of Minidoka, Minidoka County.

RECORDS AVAILABLE.—May 1, 1909, to September 30, 1923.

GAGE.—Friez water-stage recorder on left bank, installed October 31, 1914; inspected by employees of United States Bureau of Reclamation.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge at gage.

CHANNEL AND CONTROL.—Rock cut; practically permanent, but rough.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 9.46 feet at 8 p. m. June 19 (discharge, 1,500 second-feet); no flow at various times when head gates were closed.

1909–1923: Maximum stage recorded, 9.44 feet May 20, 1914 (discharge, 1,520 second-feet). No flow at various times when head gates were closed.

ICE.—Observations discontinued during winter.

DIVERSIONS.—None above station and none below near enough to affect stage-discharge relation.

REGULATION.—Flow controlled by head gates at Minidoka Dam.

ACCURACY.—Stage-discharge relation fairly permanent. Rating curves well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying mean daily gage height from recorder graph to rating table. Records excellent.

COOPERATION.—Gage-height record and one discharge measurement furnished by United States Bureau of Reclamation and Minidoka Irrigation District.

North Side Minidoka Canal diverts water from right bank of Snake River in sec. 1, T. 9 S., R. 25 E., for irrigation of land in North Side Minidoka project of United States Bureau of Reclamation. Project comprises about 20 miles of main canal and about 260 miles of laterals.

Discharge measurements of North Side Minidoka Canal near Minidoka, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 9	H. L. Crawford •-----	7.06	951	June 19	L. L. Bryan-----	9.40	1,480
Mar. 29	C. A. McClelland-----	2.48	152	Aug. 10	---do-----	9.39	1,490

• Employee of U. S. Bureau of Reclamation.

Daily discharge, in second-feet, of North Side Minidoka Canal near Minidoka, Idaho, for the year ending September 30, 1923

Day	Oct.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	1,070	-----	283	717	1,180	1,130	1,330	1,330
2.....	1,060	-----	283	719	1,180	1,140	1,370	1,380
3.....	1,040	-----	284	721	1,180	1,160	1,480	1,370
4.....	952	-----	284	777	1,170	1,170	1,490	1,360
5.....	937	-----	286	813	1,170	1,210	1,490	1,250
6.....	933	-----	344	817	1,170	1,280	1,490	1,180
7.....	937	-----	380	945	1,180	1,420	1,490	1,190
8.....	939	-----	380	1,100	1,180	1,480	1,490	1,200
9.....	952	-----	380	1,230	1,180	1,480	1,490	1,190
10.....	950	-----	448	1,350	1,280	1,490	1,490	1,200
11.....	935	-----	488	1,430	1,330	1,480	1,490	1,240
12.....	928	-----	488	1,480	1,430	1,490	1,490	1,270
13.....	937	-----	488	1,480	1,490	1,490	1,490	1,270
14.....	941	-----	555	1,480	1,490	1,490	1,490	1,280
15.....	946	-----	596	1,470	1,480	1,490	1,470	1,210
16.....	944	-----	598	1,480	1,480	1,490	1,420	1,130
17.....	948	-----	646	1,490	1,480	1,490	1,420	1,120
18.....	585	-----	671	1,480	1,480	1,490	1,380	1,120
19.....	-----	-----	667	1,480	1,490	1,480	1,350	1,080
20.....	-----	-----	675	1,480	1,490	1,490	895	1,010
21.....	-----	-----	675	1,480	1,370	1,490	887	982
22.....	-----	-----	679	1,480	1,170	1,490	882	982
23.....	-----	-----	679	1,490	1,170	1,490	882	980
24.....	-----	148	679	1,490	1,110	1,490	882	973
25.....	-----	150	679	1,490	1,070	1,490	876	976
26.....	-----	150	675	1,480	1,070	1,490	872	876
27.....	-----	150	690	1,480	1,060	1,490	672	711
28.....	-----	150	709	1,490	1,070	1,490	822	639
29.....	-----	150	711	1,480	1,100	1,490	1,070	637
30.....	-----	234	713	1,480	1,120	1,440	1,240	646
31.....	-----	283	-----	1,360	-----	1,390	1,290	-----

NOTE.—No record Oct. 19 to Mar. 23.

Monthly discharge of North Side Minidoka Canal near Minidoka, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October 1-18.....	1,070	585	941	33,600
March 24-31.....	283	148	177	2,810
April.....	713	283	537	32,000
May.....	1,490	717	1,290	79,300
June.....	1,490	1,060	1,260	75,000
July.....	1,490	1,130	1,420	87,300
August.....	1,490	672	1,250	76,900
September.....	1,380	637	1,090	64,900

SOUTH SIDE MINIDOKA CANAL NEAR MINIDOKA, IDAHO

LOCATION.—In sec. 12, T. 9 S., R. 25 E., Cassia County, 300 yards below head gates at Minidoka Dam and 6 miles south of Minidoka, Minidoka County.

RECORDS AVAILABLE.—April 21, 1909, to September 30, 1923.

GAGE.—Friez water-stage recorder on right bank; inspected by employees of United States Bureau of Reclamation.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge at gage.

CHANNEL AND CONTROL.—Canal section in earth; may shift. Stage-discharge relation affected by growth of aquatic plants.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.77 feet at 9 a. m. July 20 (discharge, 1,070 second-feet); probably no flow during period of no record.

1909-1923: Maximum discharge occurred at gage-height 5.71 feet July 16 and 18, 1921 (discharge, 1,100 second-feet). Probably no flow each year during periods of no record.

ICE.—No records obtained during winter.

DIVERSIONS.—None above gage.

REGULATION.—Flow controlled by head gates at Minidoka Dam.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve fairly well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying mean daily gage height from recorder graph to rating table, shifting-control method used after June 4. Records good.

COOPERATION.—Gage-height record and five discharge measurements furnished by United States Bureau of Reclamation.

South Side Minidoka Canal diverts water from the left bank of Snake River in sec. 1, T. 9 S., R. 25 E., for irrigation of land in South Side Minidoka project of United States Bureau of Reclamation. Project comprises about 13 miles of main canal and about 297 miles of laterals.

Discharge measurements of South Side Minidoka Canal near Minidoka, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 2	H. L. Crawford *	2.98	354	July 21	H. L. Crawford	5.71	1,050
June 19	L. L. Bryan	5.42	979	Aug. 9	L. L. Bryan	5.66	999
22	do.	4.69	759	17	H. L. Crawford	5.60	965
28	H. L. Crawford	3.66	541	Sept. 14	do.	5.12	846

* Employee of U. S. Bureau of Reclamation.

Daily discharge, in second-feet, of South Side Minidoka Canal near Minidoka, Idaho, for the year ending September 30, 1923

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1	365	187	719	794	904	918	16		753	996	1,050	979	854
2	354	187	693	854	918	879	17		815	993	1,050	973	818
3	363	193	693	904	950	876	18		884	976	1,050	979	810
4	362	236	688	896	1,000	870	19		938	973	1,050	964	748
5	360	267	688	941	1,010	851	20		927	973	1,060	915	758
6	360	309	714	988	1,010	829	21		930	927	1,050	842	745
7	362	311	727	988	1,000	829	22		932	810	1,050	745	724
8	362	369	735	1,000	996	820	23		932	737	1,050	678	698
9	363	447	730	1,020	999	826	24		941	655	1,050	645	693
10	365	540	732	1,040	988	840	25		938	579	1,050	625	665
11	367	611	820	1,030	982	842	26		962	549	1,050	599	613
12	351	680	896	1,040	985	842	27		970	536	1,040	625	494
13	259	680	959	1,040	982	837	28		970	542	1,030	735	435
14	185	668	1,000	1,040	982	845	29		970	606	1,030	815	421
15		691	1,000	1,050	979	851	30		964	672	1,030	904	365
							31		865		904	932	

NOTE.—No record obtained Oct. 16 to Apr. 30.

Monthly discharge of South Side Minidoka Canal near Minidoka, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October 1-14.....	367	185	341	9,470
May.....	970	187	680	41,800
June.....	1,000	536	777	46,200
July.....	1,060	794	1,010	62,100
August.....	1,010	599	892	54,800
September.....	918	365	753	44,800

GOOSE CREEK ABOVE TRAPPER CREEK, NEAR OAKLEY, IDAHO

LOCATION.—In sec. 13, T. 15 S., R. 21 E., 5 miles above Trapper Creek and 10 miles south of Oakley, Cassia County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 29, 1911, to September 30, 1916; March 27, 1919, to September 30, 1923.

GAGE.—Friez water-stage recorder on right bank; inspected by employees of Oakley Canal Co.

DISCHARGE MEASUREMENTS.—Made from cable 250 feet above gage or by wading. Since summer of 1921 flow has been slightly augmented by flow of artesian water from well of West Pearl Oil & Gas Co., 2 miles above station.

CHANNEL AND CONTROL.—Bed composed of rock, overlain with gravel and silt. Control fairly well defined; shifts occasionally. Banks high and not likely to be overflowed.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.24 feet from 11 a. m. to 4 p. m. May 14 (discharge, 185 second-feet) minimum stage, 1.73 feet September 14, 15, and 16 (discharge, 12 second-feet).

1911-1916; 1919-1923: Maximum stage recorded, 5.23 feet at 9 a. m. May 18, 1921 (discharge, 670 second-feet); minimum stage, 1.19 feet at 9 a. m. August 13, 1915 (discharge, 1.1 second-feet).

ICE.—Stage-discharge relation seriously affected by ice. Observations discontinued during winter.

DIVERSIONS.—Several small canals and ditches divert above station for irrigation chiefly of lands belonging to Utah Construction Co.

REGULATION.—None except that due to diversions.

ACCURACY.—Stage-discharge relation changed during winter and again during later part of April. Rating curves well defined. Operation of water-stage recorder satisfactory except August 20 to September 2 when inlet pipe gave trouble. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph; shifting-control method used April 19 to May 1. Records good except for March and April, for which they are fair.

COOPERATION.—Gage-height record furnished by Oakley Canal Co.

Discharge measurements of Goose Creek above Trapper Creek, near Oakley, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 18	A. G. Fiedler.....	2.97	154	June 6	C. G. Paulsen.....	2.81	116
May 2	do.....	2.94	136	July 25	A. G. Fiedler.....	2.10	36.3
17	do.....	3.02	149	Sept. 11	C. G. Paulsen.....	1.80	14.9

Daily discharge, in second-feet, of Goose Creek above Trapper Creek, near Oakley, Idaho, for the year ending September 30, 1923

Day	Oct.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	23		111	145	151	67	22	20
2.....	23		111	136	133	64	21	20
3.....	23		107	134	124	62	21	19
4.....	22		99	133	116	57	20	19
5.....	•22		•110	138	117	54	19	•19
6.....	23		•121	147	116	52	19	•18
7.....	24		133	155	111	48	19	•17
8.....	25		144	163	112	45	18	•16
9.....	25		134	170	111	44	17	•15
10.....	26		123	173	106	43	17	14
11.....	26		116	178	113	40	16	15
12.....	26		113	•179	112	31	16	14
13.....	28		117	•180	102	30	16	12
14.....	30		132	181	96	31	16	12
15.....	30		•138	170	94	30	16	12
16.....	29		•145	158	90	40	16	12
17.....	29		•152	148	83	31	•18	12
18.....	29		158	148	90	29	•19	12
19.....	29		159	150	91	27	20	14
20.....	29		150	148	93	26	22	14
21.....	29		156	155	94	26	23	14
22.....	29		158	166	108	26	24	14
23.....	29		153	153	110	27	25	14
24.....	30		142	129	100	32	24	16
25.....	30		132	117	99	36	22	17
26.....	31		123	113	91	35	20	19
27.....	31		120	108	86	34	19	24
28.....		112	119	106	83	31	19	23
29.....		110	136	104	78	27	18	28
30.....		104	142	108	73	24	19	27
31.....		103		133		23	20	

• Discharge interpolated.

Monthly discharge of Goose Creek above Trapper Creek, near Oakley, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October 1-27.....	31	22	27.0	1,450
March 28-31.....	112	103	107	849
April.....	159	99	132	7,860
May.....	181	104	146	8,980
June.....	151	73	103	6,130
July.....	67	23	37.8	2,320
August.....	25	16	19.4	1,190
September.....	28	12	16.9	1,010

TRAPPER CREEK NEAR OAKLEY, IDAHO

LOCATION.—In sec. 33, T. 14 S., R. 21 E., 1½ miles above Nelson ranch, 1 mile from east boundary of Minidoka National Forest, 5 miles above Oakley Dam, and 9 miles southwest of Oakley, Cassia County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 1, 1911, to September 30, 1916; March 28, 1919, to September 30, 1923.

GAGE.—Friez water-stage recorder on left bank; installed April 8, 1913; inspected by employees of Oakley Canal Co.

DISCHARGE MEASUREMENTS.—Made by wading. Since summer of 1921, flow past station has been augmented somewhat by flow from two artesian wells 1 mile above gage.

CHANNEL AND CONTROL.—Bed composed of small boulders and coarse gravel. Control shifting. Banks brushy; not likely to be overflowed.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 2.90 feet at 11 p. m. June 10 (discharge 51 second-feet); minimum stage, 2.08 feet at noon September 15 (discharge, 10.8 second-feet).

1911-1916; 1919-1923: Maximum stage recorded, 3.44 feet May 28 and June 8, 1921 (discharge, 98 second-feet); minimum discharge probably occurs during winter.

ICE.—Stage-discharge relation seriously affected by ice. Observations discontinued during winter.

DIVERSIONS.—No diversions of consequence above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curves fairly well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph; shifting-control method used June 14 to September 4 and September 21-30. Records good, except for periods of shifting control, for which they are fair.

COOPERATION.—Gage-height record furnished by Oakley Canal Co.

Discharge measurements of Trapper Creek near Oakley, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 18	A. G. Fiedler.....	2.48	24.3	June 6	C. G. Paulsen.....	2.49	24.2
May 1	do.....	2.43	23.2	July 25	A. G. Fiedler.....	2.20	17.2
16	do.....	* 2.60	30.9	Sept. 11	C. G. Paulsen.....	2.10	11.3

* Obtained from recorder graph referred to inside staff gage, corresponding to 2.58 feet on outside staff actually observed.

Daily discharge, in second-feet, of Trapper Creek near Oakley, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	14	14	-----	21	22	30	19	14	13
2.....	13	14	-----	20	22	30	19	13	13
3.....	13	14	-----	19	23	28	19	13	12
4.....	13	15	-----	18	24	27	18	13	13
5.....	13	14	-----	19	25	27	18	13	12
6.....	14	14	-----	25	28	26	18	13	12
7.....	14	14	-----	22	30	25	17	14	12
8.....	14	14	-----	20	31	27	17	13	12
9.....	13	-----	-----	19	32	25	17	13	12
10.....	13	-----	-----	20	33	26	17	13	12
11.....	14	-----	-----	21	33	30	16	13	12
12.....	14	-----	-----	21	33	26	17	13	11
13.....	14	-----	-----	22	33	26	17	13	12
14.....	14	-----	-----	21	32	26	17	13	12
15.....	14	-----	-----	22	31	25	17	13	12
16.....	14	-----	-----	23	31	24	17	13	12
17.....	14	-----	-----	25	31	25	15	13	12
18.....	14	-----	-----	25	32	25	15	13	12
19.....	14	-----	-----	25	33	24	15	14	12
20.....	14	-----	-----	24	33	25	15	15	12
21.....	14	-----	-----	25	35	28	15	14	12
22.....	14	-----	-----	24	34	26	15	15	12
23.....	14	-----	-----	23	32	24	15	14	12
24.....	14	-----	-----	21	32	24	15	13	12
25.....	14	-----	-----	21	32	23	16	13	12
26.....	14	-----	-----	21	32	22	15	12	13
27.....	14	-----	-----	21	32	22	15	12	13
28.....	14	-----	19	22	32	22	15	12	13
29.....	14	-----	19	24	30	21	14	13	13
30.....	14	-----	19	23	32	20	15	15	13
31.....	14	-----	-----	-----	32	-----	14	13	-----

NOTE.—Discharge interpolated on account of lack of gage-height record Apr. 10 and 11, July 3-5, and Aug. 23.

Monthly discharge of Trapper Creek near Oakley, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	14	13	13.8	848
November 1-8.....	15	14	14.1	224
March 28-31.....	20	19	19.2	152
April.....	25	18	21.9	1,300
May.....	35	22	30.5	1,880
June.....	30	20	25.3	1,510
July.....	19	14	16.3	1,000
August.....	15	12	13.3	818
September.....	13	11	12.2	726

P. A. LATERAL NEAR MILNER, IDAHO

LOCATION.—In sec. 22, T. 10 S., R. 21 E., Jerome County, 200 yards below pumping station and $2\frac{1}{2}$ miles northeast of Milner, Twin Falls County.

RECORDS AVAILABLE.—April 29, 1919, to September 30, 1923.

GAGE.—Vertical staff near left bank; read by employees of North Side Canal Co. (Ltd.).

DISCHARGE MEASUREMENTS.—Made from foot plank at rating flume just below gage.

CHANNEL AND CONTROL.—Canal section in earth; often obstructed by growth of moss. Concrete rating flume below gage contracts section, forming permanent control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.04 feet on numerous dates in May, June, and July (discharge, 61 second-feet); canal reported dry on numerous occasions.

1919-1923: Maximum discharge, 64 second-feet May 11-13, 1920; canal dry on numerous occasions.

ICE.—No records obtained during winter.

DIVERSIONS.—One small diversion between pumping station and gage furnishes water for pumpman's garden.

REGULATION.—Flow regulated by pumps at head of canal.

ACCURACY.—Stage-discharge relation changed during season. Standard curve well defined; one parallel curve used. Gage read to hundredths twice daily; account taken of all periods when pumps were not operated. Daily discharge ascertained by applying mean daily gage height to rating table or by shifting-control method, except as noted in footnote to table of daily discharge. Records good.

COOPERATION.—Gage-height record and five discharge measurements furnished by North Side Canal Co. (Ltd.).

P. A. lateral diverts water pumped from right bank of Snake River above Milner Dam, in sec. 22, T. 10 S., R. 21 E. Water is used for irrigating part of the North Side Twin Falls project.

Discharge measurements of P. A. lateral near Milner, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 31	McClelland and McConnel	1.18	13.1	June 1	W. N. McConnel	2.02	60.8
May '2	W. N. McConnel	1.18	14.3	20	Bryan and McConnel	2.01	58.7
3	L. T. Burdick	1.50	29.1	July 10	Burdick and McConnel	1.98	55.8
9	W. N. McConnel	1.76	44.4	21	W. N. McConnel	2.02	57.8
9	do	2.00	56.8	Aug. 9	L. T. Burdick	1.75	43.0
16	do	2.00	58.1	15	W. N. McConnel	1.76	44.9
24	Burdick and McConnel	1.98	55.0	25	L. T. Burdick	1.73	42.5
				Sept. 4	W. N. McConnel	1.73	42.8

* Employee of Twin Falls Canal Co.

† Employee of North Side Canal Co.

Daily discharge, in second-feet, of P. A. lateral near Milner, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.	47	0		13	14	61	60	60	42
2.	47	0		13	14	59	60	60	42
3.	47	0		12	26	59	60	59	42
4.	16	0		12	30	59	59	59	42
5.	0	0		9	29	59	60	60	42
6.	0	0		0	29	54	59	60	42
7.	0	0		0	31	59	59	59	43
8.	0	0		0	45	59	60	59	42
9.	0	0		0	53	56	60	43	42
10.	0	0		0	58	57	60	43	41
11.	0	0		0	58	57	58	43	43
12.	0	0		0	58	57	59	43	43
13.	0	6		0	59	57	59	43	43
14.	0	11		0	59	57	59	43	34
15.	0	13		0	58	59	59	43	30
16.	0	13		0	58	59	59	43	30
17.	0	15		0	58	59	59	43	30
18.	0	15		0	58	59	61	43	30
19.	0	15		0	58	59	60	43	30
20.	0	4		0	58	59	61	43	30
21.	0			0	58	59	45	43	30
22.	0			0	58	59	45	44	30
23.	0			0	58	59	21	43	30
24.	0			0	58	59	9	42	30
25.	0			0	57	59	42	42	30
26.	0			0	61	59	60	43	30
27.	0		9	0	59	59	59	43	30
28.	0		13	0	59	60	59	42	30
29.	0		13	0	60	61	59	42	30
30.	0		13	9	60	60	59	42	29
31.	0		13		61		60	43	

NOTE.—No record Nov. 21 to Mar. 26. Canal presumably dry during period of no record. Mean discharge used Oct. 4, Nov. 13, 20, Mar. 27, Apr. 5, 30, May 3, 7, 8, June 6, 9, July 23, 24, 25, and Sept. 14, when pumps were operated part time.

Monthly discharge of P. A. lateral near Milner, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	47	0	5.06	311
November 1-20	15	0	4.60	182
March 27-31	13	9	12.2	121
April	13	0	2.27	135
May	61	14	50.3	3,090
June	61	54	58.6	3,490
July	61	9	55.1	3,390
August	60	42	47.1	2,900
September	43	29	35.4	2,110

MILNER LOW LIFT CANAL, NEAR MILNER, IDAHO

LOCATION.—In sec. 32, T. 10 S., R. 21 E., one-eighth mile below pumping station at head of canal and $1\frac{1}{2}$ miles southeast of Milner post office, Cassia County.

RECORDS AVAILABLE.—June 1, 1921, to September 30, 1923.

GAGE.—Vertical staff attached to concrete stilling well near right bank; read by employees of Milner Low Lift Irrigation District and W. N. McConnel.

DISCHARGE MEASUREMENTS.—Made from foot plank at gage.

CHANNEL AND CONTROL.—Canal section in earth; banks clean. Control poorly defined and shifting.

* Published in previous reports as Murtaugh Canal.

EXTREMES OF DISCHARGE.—Maximum stage, 2.90 feet at numerous times during June, July, and August (discharge, 100 second-feet); canal dry on numerous occasions.

1921-1923: Maximum discharge recorded, that of irrigation season of 1923; canal dry on numerous occasions.

ICE.—No records obtained during winter; pumps not operated.

DIVERSIONS.—None above station.

REGULATION.—Flow regulated by pumps at head of canal.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curves well defined above 15 second-feet. Two fairly well defined parallel curves used. Gage read to hundredths twice daily; account taken of all periods when pumps were not operated. Daily discharge ascertained by applying mean daily gage height to rating table, or by shifting-control method, except as noted in footnote to daily discharge table. Records good.

COOPERATION.—Part of gage-height record furnished by Milner Low Lift Irrigation District.

Milner Low Lift Canal diverts water by pumping from the south side of Snake River in the backwater above Milner Dam and furnishes water for irrigation of lands within Milner Low Lift Irrigation District.

Discharge measurements of Milner Low Lift Canal near Milner, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
May 14	W. N. McConnel *	1.04	17.1	July 13	W. N. McConnel.....	2.89	99.5
19	do.....	1.90	52.1	20	do.....	2.87	97.0
24	do.....	2.63	84.9	26	do.....	2.88	97.5
30	do.....	2.55	81.3	Aug. 4	do.....	2.91	99.5
June 1	do.....	2.52	79.3	8	do.....	2.88	97.7
8	do.....	2.55	82.3	15	do.....	2.89	98.6
14	do.....	2.79	94.2	23	do.....	2.37	72.8
18	do.....	2.80	94.5	28	do.....	2.38	73.4
21	Bryan and McConnel.....	2.83	97.4	Sept. 3	do.....	2.30	67.3
25	W. N. McConnel.....	2.87	98.7	14	do.....	1.86	49.2
July 9	do.....	2.89	103	22	do.....	1.86	47.8

* Employee of Twin Falls Canal Co.

Daily discharge, in second-feet, of Milner Low Lift Canal near Milner, Idaho, for the year ending September 30, 1923

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1.....	80		78	90	91	71	16.....		31	94	78	98	49
2.....			81	95	100	70	17.....		32	95	95	95	48
3.....			81	88	100	68	18.....		2	95	100	90	48
4.....			73	93	98	68	19.....		48	95	99	67	48
5.....			80	99	98	68	20.....		55	95	89	78	48
6.....			67	100	98	68	21.....		71	91	78	89	48
7.....			67	99	98	68	22.....		66	91	95	88	48
8.....		0	67	100	98	68	23.....		71	97	73	76	48
9.....		6	77	100	98	54	24.....		79	92	78	73	48
10.....		7	82	93	98	48	25.....		84	61	99	73	46
11.....		7	63	89	98	48	26.....		84	87	99	73	46
12.....		8	81	76	98	48	27.....		70	81	99	73	38
13.....		10	90	90	86	48	28.....		4	85	100	73	34
14.....		28	86	65	98	49	29.....		53	97	98	72	47
15.....		31	94	86	98	48	30.....		67	97	97	72	44
							31.....		79		49	66	

NOTE.—No record obtained Oct. 2 to May 8, when canal was presumably dry. Mean daily discharge obtained by averaging hourly discharge May 9, 10, 11, 14, 15, 17, 18, 21, 27, 28, 30, June 4, 6-9, 11-14, 21, 22, 24-28, July 1, 3, 4, 10-17, 19-21, 23-25, 31, Aug. 1, 2, 13, 17, 19, 20, 23, 31, Sept. 2, 9, 25-28, when pumps were operated part time.

*Monthly discharge of Milner Low Lift Canal near Milner, Idaho, for the year
ending September 30, 1923*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 8-31.....	84	0	41.4	1,970
June.....	97	61	84.0	5,000
July.....	100	49	90.0	5,530
August.....	100	66	87.5	5,380
September.....	71	34	52.7	3,140

NOTE.—See footnote to table of daily discharge.

NORTH SIDE TWIN FALLS CANAL AT MILNER, IDAHO

LOCATION.—In sec. 20, T. 10 S., R. 21 E., Jerome County, half a mile north of Milner post office, Twin Falls County, and three-fourths of a mile below head gates at Milner Dam.

RECORDS AVAILABLE.—May 10, 1909, to September 30, 1923.

GAGE.—Stevens 8-day water-stage recorder on right bank; installed April 1, 1918; inspected by McConnell and Gilham.

DISCHARGE MEASUREMENTS.—Made from cable at gage.

CHANNEL AND CONTROL.—Channel is a permanent concrete-lined section. Growth of moss heavy during summer, and stage-discharge relation is seriously affected. Control apparently indeterminate.

EXTREMES OF DISCHARGE.—Maximum mean discharge, 3,090 second-feet August 1. Canal dry June 26.

1909-1923: Maximum mean discharge 3,200 second-feet occurred July 5-7 and 29-31, 1921. Canal dry many times when head gates were closed.

ICE.—Stage-discharge relation not seriously affected by ice.

DIVERSIONS.—None between gage and head gates and none for some distance below. Surplus water may be discharged into river through waste gates about 200 feet below head of canal.

REGULATION.—Flow regulated by head and waste gates.

ACCURACY.—Stage-discharge relation not permanent; changes due largely to growth of aquatic plants. Two standard rating curves used, well defined; several parallel curves used. Operation of water-stage recorder satisfactory except for few days when clock stopped; staff gage read to hundredths once daily October 1 to March 31; twice daily for remainder of year. Daily discharge ascertained by applying to rating table mean daily gage height obtained from staff reading or by inspecting recorder graph; or by shifting-control method except as noted in footnote to daily-discharge table. Records excellent.

COOPERATION.—Gage-height record and 31 discharge measurements furnished by North Side Canal Co. (Ltd.)

The North Side Twin Falls Canal diverts water from the north side of Snake River at Milner Dam and furnished water for stock and irrigation on about 240,000 acres of land in Jerome, Lincoln, and Gooding Counties. The distribution system comprises about 100 miles of main canal and 625 miles of laterals.

Discharge measurements of North Side Twin Falls Canal at Milner, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Feb. 10	W. N. McConnel *	2.70	489	July 10	Burdick and McConnel	8.62	3,050
Mar. 26	do	4.38	1,010	12	W. N. McConnel	8.29	2,910
30	McClelland and McConnel	3.44	694	20	L. T. Burdick	8.31	2,850
Apr. 9	W. N. McConnel	5.07	1,300	21	W. N. McConnel	8.22	2,830
20	do	6.34	1,820	25	L. T. Burdick	8.62	2,980
26	do	6.83	2,040	30	W. N. McConnel	8.75	3,080
May 1	do	7.80	2,480	Aug. 2	L. T. Burdick	8.73	3,010
3	L. T. Burdick *	8.03	2,550	9	Burdick and Finklenburg *	7.77	2,470
9	W. N. McConnel	8.57	2,860	10	W. N. McConnel	7.77	2,510
16	do	8.66	2,950	15	do	7.80	2,540
24	L. T. Burdick	8.67	2,860	25	L. T. Burdick	7.29	2,310
25	W. N. McConnel	8.65	2,910	29	W. N. McConnel	7.33	2,350
June 1	do	8.67	2,890	Sept. 4	do	6.96	2,180
8	do	8.65	2,890	14	do	4.46	1,060
18	do	8.58	2,930	17	L. T. Burdick	4.43	1,040
20	Bryan and McConnel	8.62	2,990	30	W. N. McConnel	4.36	997
29	W. N. McConnel	8.61	3,000				

* Employee of Twin Falls Canal Co.

* Employees of North Side Canal Co. (Ltd.).

Daily discharge, in second-feet, of North Side Twin Falls Canal at Milner, Idaho for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,070	603	630	452	483	489	709	2,390	2,920	3,000	3,090	2,260
2	564	612	640	469	483	486	674	2,550	2,940	3,000	3,070	2,240
3	442	615	640	464	484	492	307	2,600	2,940	3,000	3,050	2,180
4	372	609	668	458	485	489	965	2,600	2,930	3,000	3,040	2,150
5	353	606	683	464	487	494	1,100	2,630	2,920	3,000	2,940	2,130
6	366	621	683	461	488	492	1,290	2,700	2,920	3,000	2,940	2,140
7	471	621	690	469	489	494	1,180	2,760	2,920	3,000	2,940	2,130
8	513	618	702	466	492	492	1,170	2,780	2,920	3,000	2,900	2,130
9	510	621	682	466	486	497	1,240	2,820	2,920	3,040	2,520	2,110
10	507	621	663	469	481	494	1,280	2,840	2,900	3,010	2,530	2,120
11	501	621	643	469	475	489	1,270	2,830	2,920	2,920	2,530	2,130
12	498	624	621	464	489	500	1,300	2,900	2,890	2,850	2,520	2,110
13	498	615	627	464	478	494	1,360	2,900	2,910	2,880	2,500	2,080
14	263	615	602	469	494	494	1,440	2,860	2,900	3,000	2,520	1,190
15	529	615	577	466	483	494	1,510	2,900	2,900	3,060	2,540	1,040
16	523	618	552	466	469	483	1,520	2,920	2,910	3,040	2,540	1,030
17	591	615	585	466	472	497	1,570	2,900	2,900	3,050	2,540	1,030
18	637	612	546	469	480	503	1,650	2,900	2,900	3,050	2,550	1,040
19	630	624	549	466	483	514	1,660	2,920	2,900	3,050	2,530	1,040
20	627	615	512	464	483	817	1,820	2,930	2,900	2,880	2,500	1,040
21	640	615	480	464	480	1,120	1,800	2,940	2,900	2,800	2,500	1,040
22	652	615	464	480	480	1,130	1,830	2,940	2,900	2,810	2,500	1,040
23	658	612	441	486	483	1,170	1,830	2,940	2,900	2,830	2,450	1,040
24	661	615	441	392	483	1,040	1,680	2,930	2,900	2,880	2,360	1,020
25	661	618	441	489	483	1,020	1,910	2,930	2,700	3,020	2,320	1,020
26	661	615	444	486	492	1,020	2,010	2,860	0	3,030	2,320	1,020
27	615	615	441	492	486	940	2,160	2,940	2,010	3,030	2,310	1,050
28	615	615	436	506	486	838	2,220	2,940	3,000	3,030	2,300	1,040
29	609	624	433	523	-----	734	2,250	2,940	3,010	3,020	2,310	1,020
30	609	624	444	475	-----	690	2,280	2,940	3,000	3,050	2,290	976
31	606	-----	439	478	-----	693	-----	2,900	-----	2,990	2,260	-----

NOTE.—Mean discharge used Oct. 14, Apr. 2, 3, June 27, and Sept. 14. Discharge interpolated Dec. 9, 10, and Mar. 20.

Monthly discharge of North Side Twin Falls Canal at Milner, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	1, 070	263	563	34, 600
November.....	624	603	616	36, 700
December.....	702	433	561	34, 500
January.....	523	452	473	29, 100
February.....	494	469	483	26, 800
March.....	1, 170	483	664	40, 800
April.....	2, 280	307	1, 500	89, 300
May.....	2, 940	2, 390	2, 830	174, 000
June.....	3, 010	0	2, 790	166, 000
July.....	3, 060	2, 300	2, 980	183, 000
August.....	3, 090	2, 260	2, 590	159, 000
September.....	2, 260	976	1, 520	90, 400
The year.....	3, 090	0	1, 470	1, 060, 000

SOUTH SIDE TWIN FALLS CANAL AT MILNER, IDAHO

LOCATION.—In sec. 29, T. 10 S., R. 21 E., at wagon bridge one-eighth of a mile below head gates at Milner, Twin Falls County.

RECORDS AVAILABLE.—May 10, 1909, to September 30, 1923.

GAGE.—Friez water-stage recorder at left bank, at site and datum of vertical staff gage installed early in summer of 1912; the latter has been used since that time for stages above 5.3 feet. Inspected by McConnel and Gilham.

DISCHARGE MEASUREMENTS.—Made from cable 50 feet above gage or by wading.

CHANNEL AND CONTROL.—Channel at gage blasted out of rock; practically permanent. Occasional slight changes in control are due to deposition of silt.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 10.60 feet at 10 a. m. July 16 (discharge, 3,670 second-feet); minimum stage, 1.52 feet at 5 p. m. December 12 (discharge, 60 second-feet).

1909-1923: Maximum discharge recorded, 4,600 second-feet August 12, 1918; canal dry September 20, 1920.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—None above gage and none of consequence for several miles below.

REGULATION.—Flow regulated by head gates.

ACCURACY.—Stage-discharge relation not permanent; affected by ice December 17, 18, 21-23, January 28 to February 6, and February 8-21. Standard rating curve well defined. Several fairly well-defined parallel curves used. Operation of water-stage recorder satisfactory except for period December 10-15 when staff gage was read twice daily to hundredths. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph or from staff gage readings, or by shifting-control method except as noted in footnote to daily-discharge table. Records excellent except October to March, for which they are good.

COOPERATION.—Gage-height record and 18 discharge measurements furnished by Twin Falls Canal Co.

South Side Twin Falls Canal diverts water from south side of Snake River at Milner Dam and furnishes water for stock and irrigation on about 200,000 acres of land near Twin Falls. The distribution system comprises about 110 miles of main canal and 590 miles of laterals.

Discharge measurements of South Side Twin Falls Canal at Milner, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 23	W. N. McConnell •	1.58	66.6	May 4	W. N. McConnell	9.28	2,790
Feb. 7	do.	4.80	708	8	do.	9.48	2,990
23	do.	4.28	719	15	do.	10.03	3,340
Mar. 12	do.	1.55	65.7	25	do.	9.91	3,290
26	do.	3.86	572	June 15	do.	9.55	3,000
30	McClelland and Mc-Connel	2.83	301	20	L. L. Bryan	9.66	3,160
Apr. 11	W. N. McConnell	6.04	1,250	29	W. N. McConnell	8.93	2,670
18	do.	8.49	2,450	July 26	do.	10.39	3,570
25	do.	6.18	1,300	Sept. 4	do.	9.15	2,800
May 2	do.	8.75	2,580	29	do.	7.80	2,020

• Employee of Twin Falls Canal Co.

† Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of South Side Twin Falls Canal at Milner, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.		
1.-----	2,700	580	530	661	705	690	306	2,500	3,200	2,950	3,620	2,960		
2.-----	2,720	580	500	652		590	545	2,600	3,160	3,270	3,540	2,940		
3.-----	2,720	610	670	630		530	708	2,780	3,130	3,350	3,530	2,800		
4.-----	2,550	620	630	630		850	805	2,880	3,100	3,350	3,530	2,800		
5.-----	2,450	540	650	633		440	1,210	2,890	3,080	3,340	3,440	2,770		
6.-----	2,390	510	580	630	708	390	1,430	2,930	3,110	3,370	3,430	2,780		
7.-----	2,280	480	560	612		350	1,120	2,990	3,130	3,400	3,430	2,790		
8.-----	2,240	480	420	606		490	1,250	2,990	3,080	3,370	3,430	2,780		
9.-----	2,220	470	600	752		580	1,180	3,030	3,020	3,430	3,470	2,770		
10.-----	2,240	470	610	1,030		580	1,010	3,280	2,030	3,450	3,470	2,780		
11.-----	2,320	480	610	896	706	500	1,180	3,300	3,360	3,470	3,520	2,790		
12.-----	2,360	490	590	862		390	1,280	3,140	3,060	3,410	3,500	2,790		
13.-----	2,350	480	660	798		760	1,090	3,230	3,330	3,370	3,380	2,790		
14.-----	2,320	490	740	808		650	934	3,240	3,240	3,590	3,460	2,770		
15.-----	2,330	460	1,280	805		540	945	3,280	3,060	3,580	3,540	2,730		
16.-----	2,320	490	1,340	720	704	530	962	3,340	3,140	3,570	3,320	2,770		
17.-----	2,280	480	680	621		630	1,530	3,330	3,220	3,530	3,300	2,790		
18.-----	2,250	490	680	592		580	2,360	3,250	3,100	3,510	3,320	2,690		
19.-----	2,230	520	679	517		570	2,470	3,200	3,030	3,540	3,320	2,670		
20.-----	709	490	686	468		560	2,330	3,200	3,100	3,510	3,340	2,640		
21.-----	76	470	680	416	704	580	2,060	3,250	2,890	3,450	3,350	2,540		
22.-----	79	400		373		690	1,970	3,260	2,780	3,450	3,350	2,460		
23.-----	707	420		288		701	1,340	1,950	2,900	2,780	3,480	3,220	2,420	
24.-----	585	440		689		139	673	580	1,600	3,250	2,790	3,540	2,990	2,390
25.-----	548	440		689		521	568	580	1,310	3,250	2,670	3,540	2,990	2,360
26.-----	789	620	670	1,370	335	574	1,310	3,220	2,580	3,500	2,880	2,290		
27.-----	538	560	655	912	320	762	1,330	3,270	2,660	3,500	2,780	2,260		
28.-----	558	630	645	710	700	879	1,740	3,240	2,710	3,500	2,770	2,220		
29.-----	644	640	645		498	2,180	3,190	2,690	3,490	2,820	2,100			
30.-----	571	650	633		306	2,270	3,200	2,690	3,540	2,990	2,030			
31.-----	550	636	636		306	3,200	3,200	3,200	3,510	3,040	2,020			

NOTE.—Stage-discharge relation affected by ice Dec. 17, 18, 21–23, Jan. 28 to Feb. 6, and Feb. 8–21; discharge estimated from study of one discharge measurement, weather records, and observer's notes on head-gate changes and ice conditions. Mean daily discharge obtained by averaging hourly discharge Oct. 20 to Dec. 16, Jan. 25–27, Feb. 26 to Nov. 23, and June 10. Braced figures show mean discharge for periods indicated.

Monthly discharge of South Side Twin Falls Canal at Milner, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	2,720	76	1,670	103,000
November.....	650	400	516	30,700
December.....	1,340	420	677	41,600
January.....	1,370	139	670	41,200
February.....		320	672	37,300
March.....	1,340	306	590	36,300
April.....	2,470	306	1,410	83,900
May.....	3,340	2,500	3,120	192,000
June.....	3,360	2,030	2,960	176,000
July.....	3,550	2,950	3,450	212,000
August.....	3,620	2,770	3,290	202,000
September.....	2,960	2,080	2,620	156,000
The year.....	3,620	76	1,810	1,310,000

ROCK CREEK NEAR TWIN FALLS, IDAHO

LOCATION.—On south line of sec. 36, T. 9 S., R. 16 E., at highway bridge, 3 miles above confluence with Snake River and $3\frac{1}{2}$ miles northwest of Twin Falls, Twin Falls County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 27, 1922, to September 30, 1923.

GAGE.—Friez water-stage recorder on right bank, installed July 31, 1922; inspected by H. T. Henderson and T. T. Rutledge.

DISCHARGE MEASUREMENTS.—Made from highway bridge at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of lava rock covered with boulders, gravel, and silt. One channel at all stages. Banks high; covered with brush. Control formed by lava reef covered in part by boulders and brush growth; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year from water-stage recorder, 3.43 feet at 7 p. m. July 23 (discharge, about 589 second-feet); minimum discharge, 95 second-feet at 1 a. m. March 15.

1922-1923: Extremes of discharge during period of record occurred in 1923.

ICE.—Stage-discharge relation slightly affected by ice.

DIVERSIONS.—After spring floods normal flow is entirely diverted for irrigation several miles upstream. Flow past gage derived largely from waste and seepage water from the South Side Twin Falls tract.

REGULATION.—At times waste water from South Side Twin Falls Canal which crosses Rock Creek 10 miles above causes appreciable changes in stage.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve fairly well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height determined from inspection of recorder graph; shifting-control method used October 3 to November 25, March 9 to April 11, and May 7-30. Records good except during estimated periods for which they are fair.

COOPERATION.—Gage-height record furnished by Murtaugh Irrigation District.

Discharge measurements of Rock Creek near Twin Falls, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 30	C. G. Paulsen	1.58	146	May 15	A. G. Fiedler	1.78	202
Mar. 5	L. L. Bryan	2.02	219	June 7	C. G. Paulsen	2.13	269
Apr. 14	A. G. Fiedler	1.25	115	July 24	A. G. Fiedler	1.96	233
29	C. G. Paulsen	1.56	159	30	C. G. Paulsen	1.94	233
May 5	A. G. Fiedler	1.72	181	Aug. 31	do	1.85	227

Daily discharge, in second-feet, of Rock Creek near Twin Falls, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	234	182	146	152		217	104	267	373	278	221	223
2	238	180	150	149		228	105	267	426	355	217	223
3	228	180	154	152		215	103	177	390	310	217	215
4	224	180	149	149		210	205	175	366	207	223	210
5	226	177	154	146		223	108	174	344	234	221	210
6	217	175	160	158		175	195	247	247	207	219	210
7	224	177	146	146		119	223	238	267	193	223	208
8	228	177	142	136		114	224	180	321	187	219	208
9	226	177	138	136	200	108	203	190	299	182	215	210
10	228	172	142	136		104	125	191	288	180	245	214
11	230	169	139	160		104	118	200	234	180	224	215
12	243	164		174		104	117	217	234	183	207	215
13	243	164		172		105	110	212	232	182	208	214
14	241	161		171		99	113	206	236	177	210	215
15	243	158		171		185	112	200	234	185	205	214
16	247	158	140	171		121	109	208	228	187	202	215
17	247	164		180	223	118	114	208	238	182	203	215
18	239	169		321	228	116	175	299	257	180	205	221
19	230	168		247	215	113	158	310	332	177	214	221
20	222	167	138	278	196	111	139	278	321	177	230	221
21	214	166	136	267	180	108	149	288	378	185	226	221
22	198	158	148	257	239	106	143	278	402	193	245	223
23	188	247	140	257	241	108	148	299	426	257	239	221
24	183	247	139	257	238	101	140	278	450	288	234	219
25	183	226	138	257	221	101	132	224	426	257	224	219
26	185	146	133	214	200	100	118	187	414	247	217	
27	185	149	138		221	104	119	188	462	247	215	
28	187	155	167		221	110	115	191	462	239	212	240
29	183	158	160	210		110	148	195	450	236	212	
30	180	149	154			106	156	267	355	236	217	
31	183		158			104		320		223	219	

NOTE.—Discharge estimated on account of ice Dec. 12-19 and Jan. 27 to Feb. 16; estimated because of lack of gage-height record Sept. 26-30. Braced figures show mean discharge for periods indicated.

Monthly discharge of Rock Creek near Twin Falls, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	247	180	217	13,300
November	247	146	174	10,400
December	167		145	8,920
January	321	136	196	12,100
February			208	11,600
March	228	90	130	7,990
April	224	103	141	8,390
May	320	174	231	14,200
June	462	228	336	20,000
July	355	177	218	13,400
August	245	202	219	13,500
September		208	220	13,100
The year	462	99	203	147,000

SALMON FALLS CREEK NEAR SAN JACINTO, NEV.

LOCATION.—In sec. 23, T. 47 N., R. 64 E., in canyon 200 yards below county highway bridge, 250 yards below mouth of Shoshone Creek, and 5 miles north of San Jacinto, Elko County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 17, 1909, to September 30, 1916; October 1, 1918, to September 30, 1923.

GAGE.—Barrett & Lawrence water-stage recorder on right bank; installed November 20, 1911; inspected by employees of Salmon River Canal Co., (Ltd.)

DISCHARGE MEASUREMENTS.—Made from cable 20 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel. Control shifts slightly.

Left bank subject to overflow at high stages. Stage of zero flow determined August 11, 1921, gage height 1.66 feet ± 0.05 foot.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.79 feet at 10 a. m. May 21 (discharge, 524 second-feet); minimum stage, 2.54 feet August 11 (discharge, 30 second-feet).

1909–1916; 1919–1923: Maximum stage recorded, 7.5 feet May 22, 1912 (discharge, 1,280 second-feet); minimum stage, 2.28 feet July 25, 1919 (discharge, 10 second-feet).

ICE.—Stage-discharge relation not seriously affected by ice.

DIVERSIONS.—A large number of diversions on ranches of Utah Construction Co. (formerly owned by Vineyard Land & Stock Co.) above station appropriate a large portion of low-water flow of Salmon Falls and Shoshone Creeks.

REGULATION.—None except that due to diversions. Dam of Salmon River Canal Co. (formerly Twin Falls-Salmon River Land & Water Co.), 15 miles below station, forms a reservoir having a capacity of about 180,000 acre-feet.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Operation of water-stage recorder fairly satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph except as indicated in footnote to table of daily discharge. Records good except during winter and for estimated periods for which they are fair.

COOPERATION.—Gage-height record and several discharge measurements furnished by Salmon River Canal Co. (Ltd.).

Discharge measurements of Salmon Falls Creek near San Jacinto, Nev., during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 19	M. H. Coffin, jr. •	3.05	93	June 29	M. H. Coffin, jr. •	3.58	192
28	do.	3.43	174	July 19	do.	2.83	62
Apr. 9	do.	4.04	300	24	A. G. Fiedler	2.80	58
16	Fiedler and Coffin	4.00	301	30	M. H. Coffin, jr.	2.67	42.8
May 3	do.	4.05	313	Aug. 11	do.	2.54	31.8
8	M. H. Coffin, jr.	4.18	343	Sept. 12	C. G. Paulsen	2.70	42.5
June 10	C. G. Paulsen	4.00	294				

• Employee, Salmon River Canal Co.

Daily discharge, in second-feet, of Salmon Falls Creek near San Jacinto, Nev., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	40	66	62	68	56	88	259	334	370	157	40	42
2	39	63	62	53	53	88	318	333		145	39	
3	39	65	63	74	50	88	364	313	348	141	37	44
4	40	63	58	68	53	74	331	292	342	141	36	
5	40	63	66	62		87	329	287	366	137	35	43
6	41	63	66	83	53	88	337	287	334	135	35	
7	46	63	62	77		88	386	305	310	120	34	44
8	53	63	39	75	53	90	342	342	308	109	34	
9	54	63	55	77		92	321	375	305	99	33	44
10	54	65		72	53	87	282	408	300	90	32	
11	53	65	55	72		87	259	428	361	87	30	44
12	55	66		74	53	87	279	450	331	83	33	
13	56	68	55	72		88	308	465	329	83	37	43
14	58	62		66	53	90	316	450	329	80	38	
15	55	58	55	58		75	310	425	326	74	38	43
16	54	59		61	53	87	303	405	318	72	38	
17	54	63	55	82		92	316	414	297	67	37	44
18	53	65		66	53	94	353	428	287	63	37	
19	53	66	55	68		94	356	430	290	58	46	43
20	53	66		61	53	131	366	450	287	56	50	
21	52	65	55	61		109	372	494	303	53	47	44
22	53	63		62	53	100	364	509	323	54	46	
23	53	62	55	83		95	342	509	321	54	58	44
24	53	58		77	53	124	337	465	326	58	46	
25	52	59	55	80		139	321	402	284	61	41	44
26	52	61		69	53	145	313	380	262	52	45	
27	53	65	55	59		143	313	400	230	47	47	44
28	56	66		69	53	163	313	400	211	45	45	
29	58	66	55	65		176	313	400	193	43	43	44
30	58	55		82	53	204	329	400	172	42	42	
31	61	-----	74	59	-----	232	-----	-----	-----	41	44	-----

NOTE.—Discharge estimated on account of lack of gage-height record Dec. 9-29, Feb. 4-27, May 27 to June 2, Aug. 23-30, Sept. 1-11, and 13-29; interpolated Jan. 29 to Feb. 2, Mar. 30 and 31, July 17, and 18. Braced figures show mean discharge for periods indicated.

Monthly discharge of Salmon Falls Creek near San Jacinto, Nev., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	61	39	51.3	3,150
November	68	55	63.2	3,760
December	82	39	57.7	3,550
January	83	53	68.9	4,240
February	87	-----	58.9	3,270
March	232	74	110	6,760
April	386	259	325	19,300
May	509	287	399	24,500
June	-----	172	304	18,100
July	157	41	82.2	5,050
August	50	30	39.9	2,450
September	-----	-----	42.7	2,540
The year	509	30	134	96,700

BIG WOOD RIVER AT HAILEY, IDAHO

LOCATION.—In sec. 9, T. 2 N., R. 18 E., at steel highway bridge one-fourth mile southwest of Hailey, Blaine County.

DRAINAGE AREA.—640 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 11, 1915, to September 30, 1923.

GAGE.—Vertical staff on right bank, installed April 6, 1920; read by R. F. Bowman.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and sand; clean. Banks low; covered with light brush. Log cribbing along left bank constructed in April, 1922, prevents overflow and confines flood discharge in one channel. Control subject to changes at high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.18 feet at 10 a. m. June 13 (discharge, 2,420 second-feet); minimum discharge probably somewhat less than 1 second-foot during period December 22 to February 17.

1915-1923: Maximum stage recorded, 5.70 feet June 12, 1921 (discharge, 3,560 second-feet); minimum discharge, probably somewhat less than 0.2 second-foot during winter of 1921-22, when practically entire flow of river was diverted through Big Wood slough by power plant above.

ICE.—Stage-discharge relation slightly affected by ice.

DIVERIONS.—A number of small diversions for irrigation, principally from tributaries, are made above station. Hailey power plant, half a mile upstream, utilizes as a tailrace a natural channel on east side of river known as Big Wood Slough. A large amount of water is diverted from main stream in this manner and is returned to river below station. A record of the flow of Big Wood Slough is being obtained (see page 147) and the total flow of Big Wood River is represented by amount of water passing both stations.

REGULATION.—Variation in the amount of water used at Hailey power plant causes some diurnal fluctuation at gage, but as observations on the river and on Big Wood Slough are practically simultaneous each day, the effect of such regulation is probably eliminated.

ACCURACY.—Stage-discharge relation practically permanent during year. Rating curve well defined. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table. Records good except those for December to March which are fair.

COOPERATION.—Several discharge measurements furnished by water master for Big Wood and Little Wood Rivers.

Tables of combined discharge of Big Wood River and Big Wood Slough are published herewith.

Discharge measurements of Big Wood River at Hailey, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 2	L. L. Bryan.....	0.60	4.5	May 26	S. H. Chapman.....	4.65	1,910
Apr. 13	A. G. Fiedler.....	2.10	294	June 24	Berkeley Johnson.....	3.61	1,070
Apr. 30	S. H. Chapman.....	2.58	470	July 9	S. H. Chapman.....	3.60	973
May 2	C. G. Paulsen.....	2.52	439	July 17	A. G. Fiedler.....	3.18	779
May 7	S. H. Chapman.....	3.27	794	Aug. 3	S. H. Chapman.....	2.55	416
May 11	A. G. Fiedler.....	3.72	1,130	Aug. 14	do.....	2.16	301

* Stage-discharge relation affected by ice.

† Water master for Big Wood and Little Wood Rivers.

Daily discharge, in second-feet, of Big Wood River at Hailey, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	16	14	13	}	}	}	18	477	910	1,680	525	298
2.....	16	14	13				37	430	845	1,680	477	290
3.....	16	14	13				36	408	785	1,860	454	282
4.....	16	14	13				34	454	677	1,600	430	68
5.....	16	14	13				33	550	651	1,440	430	266
6.....	15	14	13	}	}	5	41	730	677	1,280	408	118
7.....	15	14	13				37	845	1,120	1,120	387	192
8.....	15	14	13				51	910	1,360	1,050	387	266
9.....	15	14	13				49	1,050	1,440	1,050	349	266
10.....	15	14	13				128	1,200	1,680	1,050	332	250
11.....	15	14	13	}	1	}	166	1,120	2,040	980	282	250
12.....	15	14	13				219	1,050	2,230	980	298	250
13.....	14	13	13				282	980	2,420	910	314	250
14.....	14	10	8				266	910	1,680	910	298	250
15.....	14	13	8				308	910	1,360	845	314	231
16.....	14	12	13	}	1	}	349	910	1,200	845	298	225
17.....	15	13	13				454	910	1,120	785	282	196
18.....	15	13	13				454	980	1,050	651	298	225
19.....	15	13	13				477	1,020	910	600	412	219
20.....	15	13	13				408	1,050	910	575	525	216
21.....	15	13	13	}	3	}	368	1,050	980	550	387	213
22.....	15	13	13				332	1,120	1,050	525	349	219
23.....	14	13	13				282	1,200	1,050	525	332	219
24.....	14	13	13				250	1,280	1,050	477	314	219
25.....	14	13	13				250	1,600	1,120	980	314	219
26.....	14	13	13	}	1	}	266	1,860	1,120	677	306	244
27.....	14	13	13				314	1,520	1,120	550	298	241
28.....	14	13	13				454	1,200	1,280	477	290	238
29.....	12	13	13				477	1,050	1,360	625	282	244
30.....	11	13	13				477	980	1,520	600	298	238
31.....	12	13	13				15	910	-----	550	314	-----

* Discharge interpolated.

NOTE.—Braced figures show mean estimated discharge for periods indicated. Stage-discharge relation affected by ice and discharge estimated Nov. 13–15 and Dec. 7 to Mar. 21.

Monthly discharge of Big Wood River at Hailey, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	16	11	14.5	892
November.....	14	-----	13.1	780
December.....	13	-----	6.7	412
January.....	-----	-----	1.0	61.5
February.....	-----	-----	1.8	100
March.....	15	-----	9.6	590
April.....	477	18	244	14,500
May.....	1,860	408	989	60,800
June.....	2,420	651	1,220	72,600
July.....	1,860	477	917	56,400
August.....	525	282	354	21,800
September.....	298	68	230	13,700
The year.....	2,420	-----	335	243,000

Daily combined discharge, in second-feet, of Big Wood River and Big Wood Slough at Hailey, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	190	219	187	161	180	180	262	677	1,080	1,900	535	312
2.....	190	219	187	161			281	608	1,000	1,900	487	303
3.....	196	207	187	161			302	595	928	2,100	465	294
4.....	202	207	187	161			278	644	835	1,800	438	212
5.....	196	207	187	161			277	778	839	1,640	438	296
6.....	201	207	187	161	151	185	321	1,020	897	1,470	416	244
7.....	195	213	163	163			295	1,070	1,390	1,290	397	266
8.....	208	219	163	163			282	1,150	1,600	1,230	399	237
9.....	201	219	163	163			273	1,340	1,690	1,250	364	235
10.....	189	219	163	163			326	1,430	1,930	1,240	346	268
11.....	195	219	168	161	161	185	353	1,340	2,260	1,170	294	268
12.....	201	204					417	1,250	2,470	1,160	312	266
13.....	207	184					478	1,150	2,660	1,110	329	266
14.....	207	170					447	1,070	1,870	1,110	314	268
15.....	207	170					504	1,080	1,560	1,030	330	248
16.....	207	172	161	161	163	195	560	1,070	1,390	1,040	314	242
17.....	208	173					691	1,080	1,290	981	298	224
18.....	214	173					653	1,150	1,220	855	314	255
19.....	208	173					695	1,200	1,110	804	432	249
20.....	208	173					595	1,230	1,110	763	549	246
21.....	208	173	175	175	163	198	555	1,230	1,200	738	415	243
22.....	201	175					198	519	1,320	1,290	713	273
23.....	200	175					198	469	1,400	1,300	713	347
24.....	200	175					198	437	1,500	1,330	665	329
25.....	207	175					198	461	1,820	1,390	1,200	329
26.....	207	181	175	161	161	198	453	2,110	1,340	873	320	281
27.....	213	181	161				199	532	1,710	1,340	730	312
28.....	219	181	161				225	650	1,370	1,520	673	304
29.....	211	187	161				232	658	1,240	1,610	635	296
30.....	210	187	161				246	658	1,180	1,810	610	312
31.....	217	187	161				252	1,100	1,100	560	328	273

Monthly combined discharge of Big Wood River and Big Wood Slough at Hailey, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	219	189	204	12,500
November.....	219	170	191	11,400
December.....	161	172	172	10,600
January.....	161	161	161	9,900
February.....	156	156	156	8,660
March.....	193	193	193	11,900
April.....	456	456	456	27,100
May.....	1,190	595	1,190	73,200
June.....	1,440	835	1,440	85,700
July.....	1,100	560	1,100	67,600
August.....	294	294	294	22,700
September.....	312	212	264	15,700
The year.....	2,660	493	493	357,000

BIG WOOD RIVER NEAR BELLEVUE, IDAHO

LOCATION.—In sec. 20, T. 1 S., R. 18 E., three-eighths mile below Blair ranch, $1\frac{3}{4}$ miles above flow line of Magic Reservoir, and 10 miles southwest of Bellevue, Blaine County. Camas Creek enters reservoir about 3 miles below station.

DRAINAGE AREA.—823 square miles (measured on topographic and Land Office maps).

RECORDS AVAILABLE.—July 6, 1911, to September 30, 1923.

GAGE.—Gurley water-stage recorder on right bank; reinstalled September 24, 1923, over new concrete stilling well at same location and datum as gage installed July 8, 1921; inspected by assistants of Wood River water master.

DISCHARGE MEASUREMENTS.—Made from cable 150 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel. Control of same material; shifts occasionally. Banks clean; may be overflowed at extremely high stages.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.55 feet at 1 p. m. June 13 (discharge, 1,970 second-feet); minimum discharge, 71 second-feet from 8 to 10 p. m. August 12. A lower discharge may have occurred during period of no record.

1911–1923: Maximum stage recorded, 6.07 feet at 7 p. m. June 16, 1921 (discharge, 3,660 second-feet); minimum discharge, 25 second-feet April 22–24, 1920; lower flow may have occurred on a day of no record.

ICE.—Stage-discharge relation seldom affected by ice. Observations discontinued during winter.

DIVERSIONS.—Numerous diversions for irrigation above station. Flood waters stored in Magic Reservoir.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curves well-defined. Operation of water-stage recorder not entirely satisfactory because of occasional trouble with inlet. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph; shifting-control method used July 6 to August 2. Records fair.

COOPERATION.—Gage-height record and several discharge measurements furnished by water master for Big Wood and Little Wood Rivers.

Discharge measurements of Big Wood River near Bellevue, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 11	A. G. Fiedler	1.64	185	Aug. 3	S. H. Chapman *.....	1.59	153
30	C. G. Paulsen	2.25	507	13	do.....	1.34	80.9
May 7	S. H. Chapman *.....	2.61	816	27	do.....	1.41	96.2
July 16	do.....	2.23	488				

* Water master for Big Wood and Little Wood Rivers.

Daily discharge, in second-feet, of Big Wood River near Bellevue, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	109	137	126	-----	205	474	681	1,510	231	141
2	107	137	126	-----	272	455		1,580	205	148
3	107	123	129	-----	222	431		1,580	162	144
4	102	123	129	-----	193	437		1,470	144	138
5	104	120	131	-----	201	487	578	1,260	131	141
6	104	115	134	-----	282	625	541	1,010	125	144
7	107	90	131	-----	227	780	702	877	109	148
8	107	90	126	-----	201	855	965	800	98	144
9	107	99	126	-----	185	998	1,100	712	95	141
10	107	115	126	-----	177	1,120	1,270	650	90	138
11	104	117	126	-----	181	1,120	1,550	633	76	138
12	109	117	-----	-----	209	1,050	1,700	683	74	138
13	109	120	-----	-----	267	998	1,840	• 596	79	134
14		131	-----	-----	291	866	1,470	• 560	81	138
15		134	-----	-----	296	800	1,070	• 524	90	138
16		110	-----	-----	-----	-----	-----	-----	-----	-----
17	-----	137	-----	-----	322	780	899	487	90	138
18	-----	140	-----	-----	406	790	866	• 448	90	144
19	-----	143	-----	-----	474	811	722	• 410	92	• 146
20	112	143	-----	-----	501	866	702	• 372	100	148
21	107	140	-----	-----	514	888	676	333	125	144
22	104	137	-----	-----	481	910	659	• 314	144	144
23	120	129	-----	-----	• 424	987	702	• 296	122	144
24	126	126	-----	-----	366	987	899	277	112	144
25	126	123	-----	-----	343	1,040	1,120	263	106	144
26	131	126	-----	-----	322	1,210	1,160	530	103	158
27	131	126	-----	-----	322	1,460	1,110	514	98	185
28	131	131	-----	-----	• 368	1,330	1,120	349	95	193
29	137	131	-----	-----	• 415	1,030	1,150	296	98	185
30	131	131	-----	-----	462	811	1,230	277	95	185
31	129	-----	-----	169	494	762	1,390	282	95	179
								263	106	-----

• Discharge interpolated.

NOTE.—Braced figures show mean estimated discharge for periods indicated. Discharge estimated July 25 and Sept. 30.

Monthly discharge of Big Wood River near Bellevue, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	137	102	115	7,070
November	143	90	125	7,440
December 1-11	134	126	128	2,790
March 31	169	169	169	335
April	514	177	321	19,100
May	1,460	431	868	53,400
June	1,840	541	995	59,200
July	1,580	263	649	39,900
August	231	74	112	6,890
September	193	134	150	8,930

MAGIC RESERVOIR NEAR RICHFIELD, IDAHO

LOCATION.—In NE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 18, T. 2 S., R. 18 E., Blaine County, 18 miles northwest of Richfield, Lincoln County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—February 3, 1909, to September 30, 1923. Prior to April 4, 1909, gage-height record only is available. Practically no storage prior to July 14, 1909, when first stop logs were placed in tunnel entrance.

GAGE.—All readings made by measuring with a weighted steel tape from tower on east side of dam. Below elevation 4,855 feet readings obtained by measuring from a well-defined offset in walls of tower; when stages are above that elevation measurements are made in a 5½-inch well casing which serves as a stilling well, bolted to face of tower. Readings made by attendants at the dam. Observations are referred to an assumed datum which is about 137 feet lower than sea level.

COOPERATION.—Gage-height record furnished by water master for Big Wood and Little Wood Rivers.

Stored water from this reservoir is used for irrigation on about 69,000 acres of land, under Carey Act project of the Big Wood Canal Co. (Ltd.), operated prior to 1921 by Idaho Irrigation Co. The reservoir is formed by a gravity earth and rock fill dam several hundred feet long at crest and 127 feet above bottom of outlet gates. Concrete lip spillway 400 feet long is provided, crest of which is 15 feet below top of dam. Elevation of bottom of outlet gates corresponds to 4,818.5 feet on gage which is about 3 feet lower than the actual stage of zero storage. At times, however, the stage may fall below 4,821.5 feet, depending upon the amount of normal flow passing through reservoir. Elevation of concrete lip spillway crest corresponds to 4,930 feet on gage. Use of a system of flashboards extends the actual elevation of spillway crest to 4,935 feet with respect to gage datum, at which stage the capacity of the reservoir is about 191,000 acre-feet, as determined by latest capacity table, based upon inflow and outflow records; about 4,000 acres being submerged at this stage.

Daily contents, in acre-feet, of Magic Reservoir near Richfield, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	35,916	35,617	40,458	48,714	58,277	61,420	71,583	144,009	142,072	164,438	100,102	26,456
2.....	36,236	35,884	40,794	49,060	58,470	61,635	72,415	144,380	143,298	164,612	97,332	24,608
3.....	36,524	36,204	41,083	49,406	58,682	61,929	74,213	144,627	144,844	165,132	94,662	22,835
4.....	36,732	36,540	41,372	49,791	58,797	62,165	77,357	144,442	146,877	165,306	91,827	20,990
5.....	36,284	36,828	41,695	50,122	58,547	62,400	80,774	144,164	148,392	165,340	89,315	19,108
6.....	35,180	37,116	42,069	50,490	58,161	62,655	85,398	144,009	149,991	164,785	86,841	17,191
7.....	33,938	37,372	42,428	51,024	57,660	62,930	93,869	144,071	151,343	163,742	84,191	15,340
8.....	32,690	37,648	42,809	51,374	57,525	63,225	102,049	144,287	151,182	162,531	81,587	13,468
9.....	31,307	37,975	43,190	51,653	57,737	63,540	108,032	144,534	151,085	160,478	79,139	11,607
10.....	30,479	38,206	43,449	52,025	57,910	63,816	112,439	144,998	151,279	158,440	76,525	9,719
11.....	30,189	38,631	43,754	52,341	58,084	64,013	115,520	145,307	151,504	156,268	73,946	7,731
12.....	29,884	38,943	44,058	52,676	58,277	64,249	118,036	145,774	152,150	154,118	71,502	5,867
13.....	30,146	39,273	44,356	52,974	58,470	64,565	120,447	145,995	153,036	151,826	68,843	4,183
14.....	30,436	39,557	44,726	53,255	58,605	64,843	122,748	145,964	154,446	149,574	66,290	2,632
15.....	30,682	39,907	44,937	53,555	58,721	65,159	125,075	145,900	154,741	147,034	63,658	912
16.....	30,914	40,258	45,113	53,819	58,797	65,417	127,234	145,648	154,282	144,534	60,970	902
17.....	31,117	40,609	45,289	54,119	58,893	65,694	129,328	145,245	153,790	141,768	58,508	1,038
18.....	31,411	40,964	45,430	54,440	59,067	66,031	131,329	144,751	152,970	139,201	55,861	1,369
19.....	31,722	41,287	45,588	54,761	59,319	66,369	133,345	144,318	152,052	136,386	53,405	1,805
20.....	31,975	41,644	45,801	55,025	59,552	66,628	135,601	144,071	151,021	133,572	51,134	2,254
21.....	32,273	41,984	46,014	55,272	59,688	66,886	137,124	143,793	149,830	130,648	48,969	2,600
22.....	32,556	42,308	46,176	55,538	59,843	67,225	138,429	143,453	149,092	127,816	46,802	2,904
23.....	32,857	42,636	46,337	55,823	60,017	67,503	139,679	143,298	149,734	124,856	44,584	3,228
24.....	33,176	42,965	46,551	56,281	60,232	67,783	140,860	143,298	151,343	121,987	42,498	* 3,611
25.....	33,480	43,293	46,748	56,663	60,446	68,083	141,768	143,237	151,021	118,971	40,542	* 3,994
26.....	33,739	43,675	46,945	56,950	60,680	68,423	142,557	143,515	156,602	116,839	38,385	4,377
27.....	34,091	43,328	47,106	57,237	60,951	68,763	142,959	144,071	158,948	114,207	36,444	* 4,760
28.....	34,400	41,984	47,285	57,506	61,185	69,145	143,082	144,422	161,330	111,482	34,400	5,042
29.....	34,681	40,342	47,608	57,737	-----	69,567	143,237	144,071	162,531	108,792	32,496	5,391
30.....	34,946	40,124	48,059	57,891	-----	70,090	143,515	143,298	163,916	105,967	30,436	5,784
31.....	35,289	-----	48,387	58,122	-----	70,753	-----	142,374	-----	103,033	28,231	-----

* Interpolated.

BIG WOOD RIVER BELOW MAGIC DAM, NEAR RICHFIELD, IDAHO

LOCATION.—In sec. 18, T. 2 S., R. 18 E., Blaine County, half a mile below Magic Dam and 18 miles northwest of Richfield, Lincoln County. No tributaries between dam and station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 19, 1911, to September 30, 1923.

GAGE.—Gurley water-stage recorder on right bank; installed April 20, 1916; inspected by Ed Dayton.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Bed and control composed of clean coarse gravel and small boulders; somewhat shifting. Banks high and brushy. Point of zero flow determined September 17, 1921, as at gage height 0.85 foot \pm 0.05 foot.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, from water-stage recorder, 5.57 feet at 4 p. m. July 7 (discharge, 1,800 second-feet); minimum discharge, estimated 6 second-feet February 8–22.

1911–1923: Maximum stage recorded, 9.2 feet May 18, 1911 (discharge, 5,070 second-feet); no flow reported February 3, 1915.

ICE.—Stage-discharge relation seldom affected by ice.

DIVERSIONS.—No diversions made by Big Wood Canal Co. above this station, but numerous ranch diversions are made in the upper drainage area, the largest quantity of water probably being used in the district below Halley. Flood waters are stored in Magic Reservoir just above station, and the first diversion by the company is Richfield Canal, about 2 miles below.

REGULATION.—Flow past station completely regulated by gates in outlet tunnel at Magic Dam.

ACCURACY.—Stage-discharge relation changed slightly during winter. Rating curves well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph or for days having considerable range in stage by averaging discharge for intervals of the day. Records excellent except for estimated periods, for which they are fair.

COOPERATION.—Gage-height record and several discharge measurements furnished by water master for Big Wood and Little Wood Rivers.

Discharge measurements of Big Wood River below Magic Dam, near Richfield, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 24	Chapman* and Dayton..	2.91	253	July 7	S. H. Chapman.....	5.20	1,540
28	Paulsen and Chapman..	3.80	702	10	do.....	5.48	1,760
May 8	Fiedler and Chapman...	4.35	1,070	17	A. G. Fiedler.....	5.55	1,850
25	S. H. Chapman.....	4.63	1,220	Sept. 8	S. H. Chapman.....	4.42	1,110
June 8	C. G. Paulsen.....	4.84	1,360	30	F. M. Veatch.....	1.72	14.9
25	Berkeley Johnson.....	1.90	32.7				

* Water master for Big Wood and Little Wood Rivers.

Daily discharge, in second-feet, of Big Wood River below Magic Dam, near Richfield, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	15	14	11	11	12	7	10	658	582	1,430	1,630	1,100
2.....	15	14	11				10	664	28	1,460	1,570	1,100
3.....	15	14	11				12	743	28	1,460	1,520	1,100
4.....	252	14	11				215	821	28	1,460	1,520	1,130
5.....	491	14	11				228	862	28	1,520	1,430	1,130
6.....	643	14	11	11	344	7	13	930	28	1,570	1,430	1,130
7.....	751	14	11				11	1,030	694	1,570	1,430	1,130
8.....	758	14	11				11	1,060	1,370	1,630	1,400	1,130
9.....	660	14	11				12	1,100	1,370	1,680	1,430	1,160
10.....	302	14	11				13	1,160	1,370	1,740	1,400	1,160
11.....	302	14	11	11	6	8	14	1,250	1,370	1,740	1,400	1,100
12.....	164	14	11				14	1,220	1,370	1,800	1,400	1,100
13.....	14	14	11				14	1,220	1,400	1,800	1,400	1,060
14.....	14	14	11				15	1,190	1,400	1,800	1,400	930
15.....	13	14	11				16	1,160	1,400	1,800	1,370	400
16.....	13	14	11	12	7	8	17	1,190	1,400	1,800	1,340	143
17.....	13	14					17	1,250	1,400	1,800	1,340	110
18.....	13	14					17	1,310	1,400	1,740	1,340	36
19.....	15	14					17	1,220	1,370	1,740	1,310	34
20.....	14	13					204	1,310	1,370	1,740	1,250	34
21.....	14	13	11	12	7	8	324	1,280	1,310	1,740	1,220	30
22.....	14	13					311	1,280	930	1,740	1,220	14
23.....	14	13					262	1,220	572	1,740	1,190	13
24.....	14	13					8	262	1,220	226	1,740	13
25.....	14	13					8	302	1,250	35	1,740	13
26.....	14	131	11	12	7	8	425	1,310	149	1,740	1,060	13
27.....	14	674					8	577	1,340	266	1,680	13
28.....	14	925					8	682	1,340	435	1,680	13
29.....	14	581					8	670	1,340	733	1,680	14
30.....	14	13					8	652	1,370	1,160	1,680	14
31.....	14	-----	11	12	7	9	-----	1,190	-----	1,630	1,130	-----

NOTE.—Discharge estimated on account of lack of gage-height record Dec. 17 to Mar. 23; based on information furnished by water master for Big Wood and Little Wood Rivers; flow largely leakage through gates at Magic Dam except for occasional release of water. Discharge estimated Feb. 4–7, based on reservoir action. Interpolated Dec. 10–11. Braced figures show mean discharge for periods indicated.

Monthly discharge of Big Wood River below Magic Dam, near Richfield, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	758	13	149	9,160
November.....	925	13	88.9	5,290
December.....	-----	-----	11.0	676
January.....	-----	-----	11.7	719
February.....	344	-----	42.3	2,350
March.....	-----	-----	7.7	473
April.....	682	10	178	10,600
May.....	1,370	658	1,140	70,100
June.....	1,400	28	841	50,000
July.....	1,800	1,430	1,680	108,000
August.....	1,630	1,060	1,310	80,600
September.....	1,160	13	546	32,500
The year.....	1,800	-----	506	365,000

BIG WOOD RIVER ABOVE NORTH GOODING CANAL, NEAR SHOSHONE, IDAHO

LOCATION.—In sec. 10, T. 4 S., R. 18 E., 1 mile above heading of North Gooding Canal, 13 miles below Magic Dam, and 14 miles northeast of Shoshone, Lincoln County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 21, 1921, to September 30, 1923.

GAGE.—Vertical staff on right bank; read by J. H. Gilmore. Datum raised 5.0 feet April 16, 1923.

DISCHARGE MEASUREMENTS.—Made from cable 300 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of lava rock partly covered with gravel.

Control formed by lava-rock riffle 100 feet below gage; fairly permanent.

One channel at all stages. Point of zero flow occurs at a gage height of approximately -0.5 foot (new datum).

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.93 feet (new datum) July 18 (discharge, 675 second-feet); channel reported dry most of nonirrigation season.

1921-1923: Maximum stage recorded, 12.79 feet (old datum) June 13, 1921 (discharge, 3,330 second-feet); channel practically dry except during irrigation seasons each year.

ICE.—Channel practically dry during winter.

DIVERSIONS.—Numerous diversions for irrigation made above and below station.

Richfield Canal of Big Wood Canal Co. (operating Idaho Irrigation Co.'s project) is main diversion between station and Magic Dam.

REGULATION.—Flow regulated by operation of head gates at Magic Dam 13 miles above, except when water is wasted over spillway.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined above 100 second-feet. Gage read to hundredths twice daily.

Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

COOPERATION.—Gage-height record and several discharge measurements furnished by water master for Big Wood and Little Wood Rivers.

Discharge measurements of Big Wood River above North Gooding Canal, near Shoshone, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 24	S. H. Chapman*-----	0.79	112	June 18	S. H. Chapman-----	2.52	548
28	C. G. Paulsen-----	2.00	407	July 18	do-----	2.93	680
May 8	A. G. Fiedler-----	2.68	595	Aug. 21	do-----	2.24	463

* Water master for Big Wood and Little Wood Rivers.

Daily discharge, in second-feet, of Big Wood River above North Gooding Canal, near Shoshone, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Feb.	Apr.	May	June	July	Aug.	Sept.
1					422	336	571	639	422
2					451	48	604	604	422
3					480		571	604	422
4					510		604	604	451
5				163			604	540	451
6	32		210	82	510		604	540	451
7	281				571		604	540	451
8	361				571	510	604	540	451
9	238				571	571	639	540	451
10	158				571	604	639	540	480
11	158				604	604	639	540	422
12	158				604	604	675	540	422
13					604	604	675	540	422
14					604	604	675	540	322
15					604	571	675	540	200
16					604	571	675	510	40
17					604	540	675	510	40
18					639	540	675	510	20
19					604	510	675	510	
20					639	510	639	480	
21				144	639	510	675	451	
22				168	639	451	675	451	
23				137	604	226	675	451	
24				118	604		675	451	
25				130	604		675	422	
26				246	571		675	422	
27		58		364	604	40	675	422	
28		346		393	604	79	675	422	
29		312		393	639	100	675	422	
30				393	571	350	675	422	
31					571		675	422	

* Discharge interpolated.

NOTE.—Braced figures show estimated mean discharge for periods indicated. Channel reported dry during periods for which no discharge is given.

Monthly discharge of Big Wood River above North Gooding Canal, near Shoshone, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October				* 2,750
November				* 1,420
December				0
January				0
February				* 1,670
March				0
April	393	0	91.0	5,410
May	639		575	35,400
June	604	0	316	18,800
July	675	571	650	40,000
August	639	422	505	31,100
September	480	0	211	12,600
The year				149,000

* From estimates furnished by water master for Big Wood River.

BIG WOOD RIVER BELOW NORTH GOODING CANAL, NEAR SHOSHONE, IDAHO

LOCATION.—In sec. 15, T. 4 S., R. 18 E., 300 yards below heading of North Gooding Canal, 13 miles northeast of Shoshone, Lincoln County, and 14 miles below Magic Dam.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 1, 1911, to September 30, 1923.

GAGE.—Gurley 7-day water-stage recorder on right bank installed July 5, 1920; inspected by James Devanney. Prior to July 8, 1918, datum was about 6 feet lower than present datum.

DISCHARGE MEASUREMENTS.—Made from cable 100 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of lava rock; practically permanent; rough. At extreme high stages water overflowed above North Gooding diversion dam into secondary channel to left of gage. Control fairly well defined.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.80 feet at 2 a. m. May 8 (discharge, 299 second-feet); channel reported dry frequently.

1911–1923: Maximum stage recorded, 15.0 feet (old datum) May 18, 1911 (discharge, 3,180 second-feet); no flow during several periods since establishment of station.

ICE.—Stream reported dry during winter except for occasional flow released from Magic Reservoir. Stage-discharge relation affected slightly by ice.

DIVERSIONS.—Station is below all diversions of Big Wood Canal Co. North Gooding and Richfield Canals divert between station and Magic Dam.

REGULATION.—Flow past station is regulated by gates at Magic Dam and head gates of North Gooding and Richfield Canals.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined between 45 and 900 second-feet and fairly well defined above. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph except for days having considerable range in stage for which the discharge was averaged for intervals of the day. Records good.

COOPERATION.—Gage-height record and discharge measurements furnished by water master for Big Wood and Little Wood Rivers.

Discharge measurements of Big Wood River below North Gooding Canal, near Shoshone, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
Apr. 28	S. H. Chapman •-----	<i>Feet</i> 3. 13	<i>Sec.-ft.</i> 192	July 18	S. H. Chapman •-----	<i>Feet</i> 3. 59	<i>Sec.-ft.</i> 287
May 9	do-----	3. 67	268	Aug. 21	do-----	2. 62	124

• Water master for Big Wood and Little Wood Rivers.

Daily discharge, in second-feet, of Big Wood River below North Gooding Canal, near Shoshone, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Feb.	Apr.	May	June	July	Aug.	Sept.
1					210	38	208	225	100
2					206		272	223	100
3					206		247	215	106
4					231		242	218	133
5				147	247		233	175	134
6	15		195	13	233		225	165	134
7	92				256		229	168	134
8	153				272	170	239	167	136
9	197				256	264	239	168	137
10	138				256	247	237	168	138
11	138				241	245	244	170	108
12	137				242	256	256	170	99
13	5				244	264	256	171	99
14					247	264	256	170	95
15					242	229	272	167	84
16					242	206	264	152	20
17					239	202	264	145	20
18					264	196	264	149	10
19					256	191	245	147	
20					256	178	234	140	
21					264	179	231	122	
22					264	168	236	122	
23					256	99	239	121	
24					247		239	121	
25					247		237	111	
26				75	245		236	104	
27				178	247	18	236	102	
28		29		203	256	36	236	101	
29		143		228	256	38	239	98	
30				206	247	196	241	99	
31					190		234	100	

NOTE.—Water master reported channel dry for days for which no discharge is shown in table. Flow Sept. 16-18 estimated by water master.

Monthly discharge of Big Wood River below North Gooding Canal, near Shoshone, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October				1,740
November				591
December				0
January				0
February				1,550
March				0
April	228	0	35.0	2,080
May	272	190	244	15,000
June	264	0	123	7,320
July	272	208	243	14,900
August	225	98	151	9,280
September	138	0	59.6	3,550
The year				56,000

NOTE.—See footnote to daily-discharge table.

BIG WOOD RIVER AT GOODING, IDAHO

LOCATION.—In sec. 29, T. 5 S., R. 15 E., Gooding County, 30 feet below highway bridge and half a mile north of Gooding station on Oregon Short Line Railroad.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 1, 1921, to September 30, 1923. From June 2, 1896, to October 31, 1899, at approximately same site but known as "Malade River at Toponis."

GAGE.—Gurley water-stage recorder on left bank; inspected by James Devaney.

DISCHARGE MEASUREMENTS.—Made from cable 600 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of lava rock overlain with gravel. Control formed by lava-rock riffle 300 feet below gage; permanent. One channel at all stages. Zero flow would occur at gage height of 0.80 foot \pm 0.10 foot, as determined April 27, 1923.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.04 feet April 6 (discharge, 112 second-feet); channel reported dry October 1–19; October 25 to sometime in March, April 19–22, 28, June 3–9, 25–30, July 1, and September 17–30.

1921–1923: Maximum stage recorded, 5.80 feet May 7, 1922 (discharge, 2,340 second-feet); channel reported dry for long periods each year.

ICE.—Channel generally dry during winter.

DIVERSIONS.—Numerous diversions for irrigation above and below station.

REGULATION.—Flow regulated by operation of head gates at Magic Dam and by diversions above.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Operation of water-stage recorder satisfactory. Daily staff gage readings to hundredths used April 3–15. Daily discharge ascertained by applying to rating table daily staff gage height or mean daily gage height determined by inspection of recorder graph. Records good.

COOPERATION.—Gage-height record and several discharge measurements furnished by water master for Big Wood and Little Wood Rivers.

Discharge measurements of Big Wood River at Gooding, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 9	A. G. Fiedler	1.58	31.8	July 6	S. H. Chapman	1.77	54.4
27	C. G. Paulsen	1.10	2.0	12	Burdick ^b and Henderson ^b	1.78	55.6
May 4	S. H. Chapman ^a	1.47	18.9				
10	A. G. Fiedler	1.69	45.1				

^a Water master for Big Wood and Little Wood Rivers.

^b Employees of North Side Canal Co. (Ltd.)

Daily discharge, in second-feet, of Big Wood River at Gooding, Idaho, for the year ending September 30, 1923

Day	Oct.	Apr.	May	June	July	Aug.	Sept.
1			38	52	0	69	7.2
2			33	1.0	21	61	7.2
3		32	27		84	53	6.0
4		16	20		80	45	4.8
5		24	33		76	48	18
6		112	37	0	65	26	9.2
7		72	32		55	21	12
8		35	58		61	23	13
9		37	55		65	29	16
10	0	28	40	36	63	32	16
11		32	41	72	58	31	21
12		21	40	69	67	30	20
13		14	50	74	67	29	7.2
14		9.2	58	89	65	27	6.8
15		8.0	51	78	69	29	5.2
16		7.6	50	55	80	28	1.2
17		2.8	48	50	76	25	
18		.7	59	41	82	21	
19			65	35	76	24	
20	2.7		63	32	61	23	
21		0	47	27	51	20	
22	.6		59	41	56	16	
23	8.6	52	67	33	59	12	0
24	1.5	31	59	5.8	72	12	
25		5.6	51		59	16	
26		1.0	44		74	11	
27		1.3	53	0	67	4.8	
28		0	61		69	3.7	
29		24	65		70	5.6	
30		65	78		76	4.4	
31			72		82	5.6	

NOTE.—See paragraph "Extremes of discharge."

Monthly discharge of Big Wood River at Gooding, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 3-30.....	112	0	22.5	1,250
May.....	78	20	50.1	3,080
June.....	89	0	26.4	1,570
July.....	84	0	64.7	3,980
August.....	69	3.7	25.3	1,560
September.....	21	0	5.69	339
The period.....				11,800

NOTE.—Discharge Oct. 20-24 totaled 46.4 acre-feet.

BIG WOOD RIVER NEAR GOODING, IDAHO

LOCATION.—In sec. 21, T. 6 S., R. 14 E., at Cleek ranch, $3\frac{1}{2}$ miles above bridge on upper road between Bliss and Hagerman, 5 miles above diversion dam for King Hill project, and 6 miles southwest of Gooding, Gooding County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 26, 1916, to September 30, 1923.

GAGE.—Stevens 8-day water-stage recorder on right bank; installed April 13, 1921; inspected by E. F. McDowell and K. R. Sayre.

DISCHARGE MEASUREMENTS.—Made from cable a short distance above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of lava rock, boulders, and coarse gravel. Control practically permanent. Banks are overflowed at high stages. One channel at gage; several channels above gage during high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year from water-stage recorder, 3.80 feet at midnight April 6 (discharge, 494 second-feet); channel reported dry December 17-20.

1916-1923: Maximum stage recorded, 9.00 feet March 17, 1922 (discharge, 3,680 second-feet); channel reported dry several times each year.

ICE.—Stage-discharge relation affected by ice at times.

DIVERSIONS.—Below all diversions of North Side Canal Co. (Ltd.) and above the Big Malad Springs. Justice and Croco ditches (combined capacity about 15 second-feet) divert about 3 miles below gage; a few second-feet are occasionally wasted into river about 2 miles below gage.

REGULATION.—Flow regulated by dams and diversions above station.

ACCURACY.—Stage-discharge relation practically permanent during year. Rating curve well defined above 10 second-feet. Staff gage read to hundredths once daily October 1 to January 7 and twice daily thereafter except April 3-18, 22, 26-30, May 1-9, 12-31, June 1-5, 9-30, July to August 5, 12-20, and September when water-stage recorder was operated. Daily discharge ascertained by applying daily gage height to rating table. For days water-stage recorder was operated mean daily gage height determined by inspection of recorder graph. Records good.

COOPERATION.—Gage-height record and several discharge measurements furnished by water master for Big Wood and Little Wood Rivers.

Discharge measurements of Big Wood River near Gooding, Idaho, during the year ending September 30, 1923.

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
Mar. 3	L. L. Bryan.....	Feet 2.14	Sec.-ft. 144	July 6	S. H. Chapman.....	Feet 1.13	Sec.-ft. 21.5
Apr. 7	A. G. Fiedler.....	2.76	248	Sept. 28	F. M. Veatch.....	1.88	103
25	Chapman* and Bowler ^b	1.36	41.0				

* Water master for Big Wood and Little Wood Rivers.

^b Chapman's assistant.

Daily discharge, in second-feet, of Big Wood River near Gooding, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	20	19	146	143	-----	-----	231	33	88	10	40	3
2.....	10	18	162	94	-----	-----	231	22	31	13	24	3
3.....	8	23	130	91	-----	146	164	18	26	24	22	4
4.....	2	25	100	44	-----	-----	144	11	35	25	9	3
5.....	6	28	154	68	-----	-----	152	6	8	26	8	3
6.....	5	36	146	63	-----	-----	287	22	2	24	12	2
7.....	4	51	123	-----	-----	-----	334	16	4	13	7	2
8.....	7	66	117	-----	-----	-----	185	23	5	16	8	1
9.....	7	75	130	-----	-----	-----	165	57	11	22	9	1
0.....	6	79	-----	-----	-----	-----	160	26	11	21	12	1
11.....	9	81	65	-----	-----	-----	148	32	72	12	14	1
12.....	6	80	-----	-----	-----	-----	144	57	57	23	12	1
13.....	3	110	-----	-----	-----	-----	138	68	39	24	14	1
14.....	2	130	-----	-----	-----	-----	128	77	42	20	15	1
15.....	6	146	4	-----	-----	-----	108	63	57	23	15	1
16.....	24	105	-----	-----	-----	-----	88	36	29	31	16	3
17.....	45	105	-----	-----	-----	-----	80	28	28	28	18	1
18.....	20	105	0	-----	-----	-----	54	39	27	40	18	10
19.....	16	105	-----	-----	-----	-----	29	105	31	39	18	55
20.....	11	123	-----	-----	-----	-----	19	229	28	23	40	61
21.....	14	110	-----	-----	-----	-----	32	74	34	8	40	55
22.....	8	130	-----	-----	-----	-----	24	88	67	4	28	57
23.....	6	130	-----	-----	-----	-----	47	97	91	10	16	62
24.....	13	123	80	-----	-----	-----	83	77	81	22	7	65
25.....	15	146	-----	-----	-----	-----	51	30	134	22	10	72
26.....	6	138	-----	-----	-----	-----	25	18	84	20	9	101
27.....	5	146	-----	-----	-----	-----	8	17	67	28	5	108
28.....	11	118	118	-----	-----	-----	5	28	53	26	3	105
29.....	15	91	130	-----	-----	-----	4	46	44	23	3	114
30.....	12	130	162	-----	-----	-----	30	53	44	27	3	154
31.....	14	-----	130	-----	-----	-----	-----	59	-----	44	3	-----

NOTE.—Discharge estimated because of ice, based on weather records and observer's notes Dec. 10-16 and 21-27; estimated account of missing gage height Nov. 7. Channel reported dry Dec. 17-20. Braced figures show mean discharge for periods indicated.

Monthly discharge of Big Wood River near Gooding, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	45	2	10.8	664
November.....	146	18	92.4	5,500
December.....	162	0	83.2	5,120
January 1-6.....	143	44	83.8	997
April.....	334	4	110	6,550
May.....	229	6	50.2	3,090
June.....	134	2	44.3	2,640
July.....	44	4	22.3	1,370
August.....	40	3	14.8	910
September.....	154	1	35.0	2,080

BIG WOOD SLOUGH AT HAILEY, IDAHO

LOCATION.—In sec. 9, T. 2 N., R. 18 E., at highway bridge one-eighth mile northeast of steel highway bridge across Big Wood River and one-eighth mile southwest of Hailey, Blaine County.

RECORDS AVAILABLE.—June 11, 1915, to September 30, 1923.

GAGE.—Vertical staff on left bank 3 feet below highway bridge; installed August 3, 1923. A temporary gage on left bank 40 feet below at independent datum and above different control used May 13 to August 2, 1923. From November 9, 1921, to May 12, 1923, a vertical staff on right bank set in concrete opposite present gage. Gage datum unchanged except during period temporary staff was in use. Gage read by R. F. Bowman.

DISCHARGE MEASUREMENTS.—Made from footbridge or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and gravel. Banks covered with brush and subject to overflow. One channel at all stages. Control formed by a wood-stave water pipe, laid in bed 15 feet below gage; changes slightly.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.08 feet (temporary gage) at 8 a. m. June 7 (discharge, 305 second-feet); minimum discharge, 8 second-feet August 4-6.

1915-1923: Maximum stage recorded, 3.00 feet June 6, 1921 (discharge, 419 second-feet); minimum discharge, 0.9 second-foot, March 21-24, 1919.

ICE.—Stage-discharge relation seldom affected by ice.

DIVERSIONS.—None.

REGULATION.—The amount of water passing gage is affected by load at power plant half a mile upstream, and there is considerable fluctuation. The main river station is affected inversely by any such regulation, so that the accuracy of the summation of the two records is presumably affected but slightly by this factor.

ACCURACY.—Stage-discharge relation not permanent. Rating curves poorly defined. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table. Records fair except during period January to July, for which they are poor.

COOPERATION.—Six discharge measurements furnished by water master for Big Wood and Little Wood Rivers.

Big Wood Slough is a natural channel of Big Wood River that is utilized also as a tailrace for Hailey power plant. Record from this station represents a portion of the natural flow of Big Wood River and taken in conjunction with the record at the near-by station on the main river, will show the entire flow of the river at this point. For record from station on the river see page 131. For record of combined flow of Big Wood River and Big Wood Slough see page 134.

Discharge measurements of Big Wood Slough at Hailey, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height ^a	Dis-charge	Date	Made by—	Gage height ^a	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 2	L. L. Bryan.....	^b 2.05	176	July 3	S. H. Chapman.....	^d 1.68	233
Apr. 13	A. G. Fiedler.....	^c 2.10	188	16	A. G. Fiedler.....	^d 1.47	200
May 2	C. G. Paulsen.....	^c 2.02	178	20	S. H. Chapman.....	^d 1.42	181
11	A. G. Fiedler.....	^c 2.12	208	20	A. G. Fiedler.....	^d 1.42	202
14	S. H. Chapman.....	^d 1.21	140	20	S. H. Chapman.....	^d 1.32	178
June 11	-----do-----	^d 1.60	214	Aug. 3	-----do-----	^f .87	11.3
24	Berkeley Johnson.....	^c 2.41	290				

^a See paragraph on "Gage."

^b Right bank gage.

^c Left bank gage.

^d Pier gage reading.

^e Right bank gage.

^f Well gage.

^g Water master for Big Wood and Little Wood Rivers.

Daily discharge, in second-feet, of Big Wood Slough at Hailey, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	174	205	174	160	150	175	244	200	173	220	10	14
2	174	205	174	160			244	178	158	220		*13
3	180	193	174	160			266	187	143	237	11	12
4	186	193	174	160			244	190	158	204	8	144
5	180	193	174	160			244	228	188	204	8	30
6	186	193	174	160	150	175	280	292	220	188	8	126
7	180	199		162			258	228	272	173	10	*74
8	193	205		162			231	244	237	180	12	21
9	186	205		162			224	292	254	196	15	19
10	174	205		162			198	231	254	188	14	18
11	180	205			160	185	187	218	220	188	12	18
12	186	190					198	196	237	180	*14	16
13	193	174					196	173	237	196	15	16
14	193	160	160				181	158	188	196	16	18
15	193	160					*196	166	204	188	16	17
16	193	160			160	185	211	158	188	196	16	17
17	193	160					237	166	166	196	16	28
18	199	160					199	173	166	204	16	30
19	193	160					218	*176	204	204	*20	30
20	193	160					187	180	204	188	24	*30
21	193	160		160	160	185	187	180	220	*188	28	30
22	186	162	174				187	204	237	188	24	30
23	186	162	174				187	196	254	188	15	30
24	186	162	174				187	220	284	188	15	30
25	193	162	174				211	220	272	220	15	30
26	193	168	174		160	185	187	254	220	196	*14	37
27	199	168	160				218	188	220	180	14	*36
28	205	168	160				196	173	237	196	*14	35
29	199	174	160				218	181	188	254	14	37
30	199	174	160				231	181	204	290	10	35
31	205		160				237	188			14	

* Discharge interpolated.

NOTE.—Braced figures show mean estimated discharge for periods indicated. Discharge estimated May 1.

Monthly discharge of Big Wood Slough at Hailey, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	205	174	189	11,600
November	205	160	178	10,600
December			165	10,100
January			160	9,840
February			155	8,610
March	237		184	11,300
April	280	181	212	12,600
May	292	158	202	12,400
June	290	143	219	13,000
July	237		178	10,900
August	28		14.6	898
September	144	12	34.0	2,020
The year	292		158	114,000

CAMAS CREEK NEAR BLAINE, IDAHO

LOCATION.—In sec. 15, T. 1 S., R. 16 E., 500 feet below sheep bridge, a quarter of a mile north of Macon siding on Hill City branch of Oregon Short Line Railroad, $1\frac{1}{2}$ miles below railroad bridge, $2\frac{1}{4}$ miles above backwater of Magic Reservoir, and 4 miles southeast of Blaine, Camas County. No tributaries or diversions between station and Magic Reservoir.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 9, 1912, to September 30, 1923. Results of discharge measurements made in 1911 by Idaho Irrigation Co. are also available. Discharge measurements only are available for 1922.

GAGE.—Gurley water-stage recorder on left bank; reinstalled September, 1922, over new concrete stilling well; inspected by deputy water masters.

DISCHARGE MEASUREMENTS.—Made from sheep bridge or by wading.

CHANNEL AND CONTROL.—Bed rocky. Control somewhat shifting. One channel at all stages. Point of zero flow determined August 24, 1921, as at gage height 0.52 foot \pm 0.05 foot.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period from water-stage recorder, 9.8 feet from 6 p. m. April 6 to midnight April 7 (discharge, 2,910 second-feet); minimum stage, 1.10 feet at 4 a. m. September 17 (discharge, 3.5 second-feet). A higher and lower discharge may have occurred during period of no record.

1911–1923: Maximum stage recorded, 10.76 feet April 12, 1916 (measured discharge, 5,240 second-feet); minimum stage, 0.89 foot 4 to 6 p. m. August 17, 1920 (discharge, 2.3 second-feet); probably not actual extremes.

ICE.—Observations discontinued during winter.

DIVERSIONS.—Many small diversions are made above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined between 10 and 1,300 second-feet. Operation of water-stage recorder satisfactory except during short periods in April, May, and September. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph. Records good.

COOPERATION.—Gage-height record and several discharge measurements furnished by water master for Big Wood and Little Wood Rivers.

Discharge measurements of Camas Creek near Blaine, Idaho, during the years ending September 30, 1922–23

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
1922		<i>Feet</i>	<i>Sec.-ft.</i>	1923		<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 27	Johnson and Bowler ^a	5	2,840	Apr. 3	Chapman and De- vaney ^a	4.03	596
May 24	Berkeley Johnson.....	5	716	Apr. 10	Fiedler and Bowler.....	4 6.04	1,290
June 19	S. H. Chapman.....	2.84	220	May 22	Chapman and Bowler.....	3.72	459
June 26	.....do.....	2.26	90.9	May 30	C. G. Paulsen.....	3.32	348
July 5	Berkeley Johnson.....	1.67	35.9	June 18	S. H. Chapman.....	2.82	218
July 7	S. H. Chapman.....	1.64	29.9	July 9	Berkeley Johnson.....	2.71	178
July 11	Bert Bowler.....	1.53	21.2	July 16	S. H. Chapman.....	2.08	67.6
July 13	S. H. Chapman.....	1.24	6.9	Aug. 20	.....do.....	1.72	34.3
Aug. 25	.....do.....	1.36	11.1	Sept. 6	Bert Bowler.....	1.62	27.0
Aug. 8	.....do.....	1.30	9.1	Sept. 30	F. M. Veatch.....	1.31	10.0
Sept. 6	G. T. Parkinson ^a	1.09	5.0				
Sept. 21	Berkeley Johnson.....	1.08	4.1				

^a Assistant to water master for Big Wood and Little Wood Rivers.

^b Gage had been washed out and reference points were never referred to gage datum.

^c Water master for Big Wood and Little Wood Rivers.

^d Outside staff corrected to inside hook gage reading.

Daily discharge, in second-feet, of Camas Creek near Blaine, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1.....		340	188	148	8.1	7.8	16.....	755	230	175	35	8.4	3.8
2.....		311	195	136	8.1	6.7	17.....	686	218	179	32	7.8	3.8
3.....	790	283	191	125	7.4	6.0	18.....	652	220	179	29	7.0	
4.....	1,060	274	177	115	7.4	5.8	19.....	669	220	166	26	20	
5.....	1,430	274	156	104	7.8	5.8	20.....	585	225	158	22	26	
6.....	2,800	294	154	95	8.1	5.2	21.....	568	212	158	21	21	5.2
7.....		308	171	87	8.8	5.0	22.....	520	202	186	20	19	
8.....	2,500		208	77	10	4.8	23.....	472	202	205	17	16	
9.....	1,890		244	69	11	4.5	24.....	411	198	241	13	13	
10.....	1,430		218	61	12	4.5	25.....	384	191	277	13	11	6.7
11.....	1,120	286	193	56	12	4.2	26.....	352	186	258	14	9.5	
12.....	1,010		191	49	9.2	4.2	27.....	334	184	225	12	8.8	
13.....	898		188	44	8.4	4.0	28.....	331	184	193	11	8.1	
14.....	898	263	186	41	8.4	4.0	29.....	337	171	182	10	7.8	
15.....	844	247	179	38	8.8	4.0	30.....	346	169	162	8.8	7.4	
							31.....		175		8.4	7.8	

NOTE.—Discharge estimated on account of lack of gage-height record Apr. 6, 7, May 8-13, and Sept. 18-24. Braced figures show mean discharge for periods indicated.

Monthly discharge of Camas Creek near Blaine, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 3-30.....		331	960	53,300
May.....	340	169	242	14,900
June.....	277	154	193	11,500
July.....	148	8.4	49.6	3,050
August.....	26	7.0	10.8	664
September 1-25.....	7.8		5.09	252
The period.....				83,700

LITTLE WOOD RIVER NEAR CAREY, IDAHO

LOCATION.—In SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 35, T. 2 N., R. 20 E., at Campbell ranch, $\frac{3}{4}$ mile below dam site of proposed Little Wood Reservoir, on Carey-Muldoon road, $1\frac{1}{2}$ miles below mouth of High Five Creek, $2\frac{1}{2}$ miles below mouth of Muldoon Creek, 11 miles due east of Bellevue, and 12 miles northwest of Carey, Blaine County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—February 22, 1920, to September 30, 1923. Records available for station 8 miles downstream, April 28, 1904, to May 31, 1905.

GAGE.—Friez water-stage recorder on left bank, installed February 22, 1920; inspected by J. H. Nelson.

DISCHARGE MEASUREMENTS.—Made from cable 100 feet above gage, by wading, or from highway bridge 4 miles below gage.

CHANNEL AND CONTROL.—Bed composed of gravel. One channel at all stages. Control formed by well-defined gravel and boulder riffle 25 feet below gage; subject to change.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.53 feet from 6 to 9 a. m. May 26 (discharge, 765 second-feet); minimum stage, 0.89 foot from midnight October 3–4 to 4 a. m. October 5 (discharge, 46 second-feet). Lower flow may have occurred during ice-affected period.

1920–1923: Maximum discharge recorded, 1,030 second-feet June 12, 1921, and May 26, 1922; minimum stage, 0.80 foot August 17, 1920 (measured discharge, 25.8 second-feet); actual minimum may have occurred during period of no record.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—Practically no diversions above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Two well-defined rating curves and curves parallel thereto were used. Staff gage read to hundredths about once a week during winter. Operation of water-stage recorder during remainder of year not wholly satisfactory owing to clock trouble. Daily discharge ascertained by applying gage height to rating table, except as noted in footnote to daily-discharge table. During periods water-stage recorder was operated, mean daily gage height determined by inspection of recorder graph. Records good except for estimated periods, for which they are fair.

COOPERATION.—Gage-height record furnished by Little Wood Reservoir Association.

Discharge measurements of Little Wood River near Carey, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 1	L. L. Bryan.....	1.25	69.9	May 12	A. G. Fiedler.....	2.64	405
Apr. 12	A. G. Fiedler.....	2.58	418	June 19	Berkeley Johnson.....	2.15	297
May 1	C. G. Paulsen.....	2.19	284	July 19	A. G. Fiedler.....	1.75	190

* Stage-discharge relation affected by ice. Measurement made at highway bridge 4 miles below gage.

Daily discharge, in second-feet, of Little Wood River near Carey, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	50	54	59	55	50	70	226	283	425	458	126	79
2.....	49		58					254	371	458	116	80
3.....	48	54	58	55	50	65	226	239	318	442	110	65
4.....	46		58					259	303	393	105	
5.....	47	56	58	60	50	65	226	320	306	362	100	65
6.....	48							359	344	335	94	
7.....	49	56		60	50	65	226	393	442	297	90	65
8.....	49		55					425	544	292	86	
9.....	49	56		60	50	65	226	458	510	286	82	65
10.....	50							475	544	270	77	
11.....	49	56		60	50	65	226	458	598	265	76	65
12.....	51							425	409	616	257	
13.....	54	62		60	50	65	226	442	425	616	249	65
14.....	54							458	371	475	272	
15.....		68	50	60	50	65	226	458	335	409	239	65
16.....												
17.....		67		60	50	65	226	527	323	362	74	50
18.....	54	66							329	315	207	50
19.....		64		60	50	65	226	458	289		65	51
20.....								442	286	175		51
21.....		63		60	50	65	226	425	281	170		51
22.....	54							425				52
23.....		62		60	50	65	226	544	320	173		47
24.....								562	335	168		47
25.....	54	61		60	50	65	226	580	475	175		47
26.....			55					652	409	275	72	48
27.....		61		60	50	65	226	284				56
28.....	54							708	387	239		61
29.....		61		60	50	65	226	598	365	179		59
30.....	54							297	492	368	173	59
31.....		60		60	50	65	226	353	425	409	149	59
								140	329	409	458	59
				60	50	65	226	177	393	140		59

NOTE.—Discharge estimated because of ice Dec. 6 to Mar. 18 based on observer's notes, weather records, and one measurement; on account of missing gage heights, Oct. 15-21, 23-27, 30-31, Nov. 1-3, 5-10, 12-14, 16-17, 19-20, 22-24, 26-28, 30, Dec. 1, 3-4, Mar. 20-23, 25-27, 29-30, Apr. 1-6, 8-11, 17-21, 23-27, July 16-18, Aug. 19-31, Sept. 1, 3-15, and 30; interpolated Apr. 13 and June 16. Shifting control method used Apr. 18-21 and May 23-25. Braced figures show mean discharge for periods indicated.

Monthly discharge of Little Wood River near Carey, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....			52.0	3,200
November.....			60.1	3,580
December.....			53.9	3,310
January.....			50.1	3,450
February.....			55.7	3,090
March.....			75.7	4,650
April.....			349	20,800
May.....	708	239	427	26,300
June.....	616	281	406	24,200
July.....	458	140	252	15,500
August.....	126		80.4	4,940
September.....			59.9	3,560
The year.....	708		161	117,000

LITTLE WOOD RIVER NEAR RICHFIELD, IDAHO

LOCATION.—In sec. 30, T. 4 S., R. 20 E., half a mile above heading of Dietrich Canal and 1 mile east of railroad station at Richfield, Lincoln County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 1, 1911, to September 30, 1923.

GAGE.—Gurley water-stage recorder on right bank; installed April 14, 1920; inspected by employees of water master. Records prior to September 30, 1918, referred to datum 1.0 foot lower than present gage.

DISCHARGE MEASUREMENTS.—Made from a suspension footbridge at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and small rocks; rough. Control subject to slight change. Stage-discharge relation may be affected during summer by light growth of aquatic plants.

EXTREMES OF DISCHARGE.—Maximum discharge recorded, 307 second-feet, at 9 a. m. April 19 and 10 a. m. April 20 (gage height, 2.49 feet). Minimum stage, 1.30 feet from 8 to 10 a. m. July 11 (discharge, 66 second-feet).

1911-1923: Maximum stage recorded, 4.5 feet (original datum) May 17 and 18, 1911 (discharge, 722 second-feet); minimum stage, 0.52 foot June 24 and 25, 1920 (discharge, 7.6 second-feet).

ICE.—Stage-discharge relation affected by ice; observations discontinued during winter.

DIVERIONS.—Small ranch diversions are made above station. Dietrich Canal diverts a short distance below.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed slightly during winter. Rating curves well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspection of recorder graph. Records fair.

COOPERATION.—Gage-height record and four discharge measurements furnished by water master for Big Wood and Little Wood Rivers.

Discharge measurements of Little Wood River near Richfield, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 9	A. G. Fiedler	2.31	262	July 8	E. F. McDowell *	1.48	93.0
May 9	S. H. Chapman *	2.33	273	19	A. G. Fiedler	1.44	85.0
10	A. G. Fiedler	2.35	262	Aug. 17	E. F. McDowell	1.69	117
June 6	S. H. Chapman	1.63	114				

* Associated with office of water master for Big Wood and Little Wood Rivers.

Daily discharge, in second-feet, of Little Wood River near Richfield, Idaho, for the year ending September 30, 1923

Day	Oct.	Dec.	Apr.	May	June	July	Aug.	Sept.
1.....	159	-----	-----	263	155	147	115	147
2.....	159	-----	-----	250	186	151	112	147
3.....	163	155	257	240	176	151	110	147
4.....	157	153	296	232	151	143	110	147
5.....	153	153	293	230	127	139	107	149
6.....	157	155	279	237	113	127	107	147
7.....	159	155	282	250	117	110	109	147
8.....	159	153	285	255	149	91	109	151
9.....	165	145	260	260	186	78	113	155
10.....	165		250	268	209	74	113	153
11.....	165		247	271	216	70	117	153
12.....	167	150	247	271	222	74	115	151
13.....	167		247	276	227	70	113	149
14.....	172		255	285	230	70	115	145
15.....	174	-----	271	271	209	77	117	145
16.....	-----	-----	274	252	153	81	120	149
17.....	-----	-----	279	240	123	85	123	151
18.....	-----	-----	293	250	106	88	125	153
19.....	-----	150	299	274	77	85	130	153
20.....	-----		301	279	75	86	139	153
21.....	-----	-----	290	271	79	89	134	155
22.....	-----	-----	282	260	81	86	139	157
23.....	-----	-----	268	268	81	86	145	155
24.....	-----	-----	257	266	96	91	143	157
25.....	-----	-----	244	257	112	95	136	-----
26.....	-----	-----	240	252	165	100	137	162
27.....	-----	-----	232	257	167	106	137	
28.....	-----	-----	232	255	153	106	139	
29.....	-----	-----	242	216	141	106	139	-----
30.....	-----	-----	252	176	134	107	139	167
31.....	-----	-----	-----	151	-----	110	143	-----

NOTE.—Stage-discharge relation affected by ice Dec. 9-20 and flow estimated by use of weather records. Gage-height record missing Sept. 25-29; discharge estimated. Braced figures show mean discharge for periods indicated.

Monthly discharge of Little Wood River near Richfield, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October 1-15.....	174	153	163	4,850
December 3-20.....	-----	-----	149	5,320
April 3-30.....	301	232	266	14,800
May.....	285	151	251	15,400
June.....	230	75	147	8,750
July.....	151	70	99.3	6,110
August.....	145	107	124	7,620
September.....	-----	-----	153	9,100

LITTLE WOOD RIVER AT SHOSHONE, IDAHO

LOCATION.—In sec. 35, T. 5 S., R. 17 E., just above diversion dam for town water-supply, 200 feet north of water tower, and 400 feet above highway bridge on Shoshone-Richfield road in Shoshone, Lincoln County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 1, 1922, to September 30, 1923.

GAGE.—Gurley water-stage recorder on left bank; inspected by assistants to water master for Big Wood and Little Wood Rivers.

DISCHARGE MEASUREMENTS.—Made from cable a quarter of a mile above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of lava rock partly overlain with sand and gravel. Banks steep. One channel at all stages. Control for low and medium stages formed by crest of concrete diversion dam. No well-defined control for high stages.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 1.85 feet from 10 p. m. May 11 to 4 a. m. May 12 (discharge, 387 second-feet); minimum stage, 0.78 foot at 2.30 a. m. June 5 (discharge, 26 second-feet).

1922-1923: Maximum stage recorded, 2.26 feet June 18, 1922 (discharge, 664 second-feet); minimum stage, 0.61 foot September 19-20, 1922 (discharge, 1 second-foot).

ICE.—Station not operated during winter.

DIVERSIONS.—Numerous irrigation diversions above and below. A small ditch for the Shoshone water supply diverts from left bank directly below gage.

REGULATION.—None except that due to diversions.

ACCURACY—Stage-discharge relation changed May 13-20, owing to washing of silt and debris from control. Rating curve used October 1-10 fairly well defined; curve used May 21 to September 30 well defined between 40 and 350 second-feet; parallel curve used April 1 to May 12. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph, using shifting-control method May 13-20. Records good, except October, for which they are fair.

COOPERATION.—Gage-height record and two discharge measurements furnished by water master for Big Wood and Little Wood Rivers.

Discharge measurements of Little Wood River at Shoshone, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 5	Chapman * and Wheeler	1.57	260	June 7	S. H. Chapman.....	0.88	45.1
May 15	A. G. Fiedler.....	1.74	345	July 21	A. G. Fiedler.....	1.68	331
				Sept. 29	F. M. Veatch.....	1.26	158

* Water master for Big Wood and Little Wood Rivers.

* Assistant water master for Big Wood and Little Wood Rivers.

Daily discharge, in second-feet, of Little Wood River at Shoshone, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.	41						203	291	364	256	340	295
2.	46						227	278	278	313	336	295
3.	50						240	265	118	308	322	291
4.	91						261	265	45	313	322	282
5.	94						265	304	43	336	318	282
6.	97						256	304	47	322	318	278
7.	103						256	340	49	326	313	282
8.	140						261	340	162	308	308	282
9.	126						244	326	345	322	318	286
10.	136						215	336	378	322	318	282
11.							211	373	359	326	308	291
12.							207	387	326	336	295	295
13.							203	364	318	345	300	291
14.							207	359	331	354	304	295
15.							227	345	318	359	304	286
16.							240	326	322	354	304	180
17.							244	318	308	368	313	139
18.							248	345	313	364	313	135
19.							261	373	300	354	318	135
20.							265	331	308	345	349	135
21.							269	382	313	340	313	135
22.							261	378	308	340	308	135
23.							256	368	199	345	313	135
24.							244	349	172	349	318	135
25.							227	331	118	340	295	142
26.							215	336	128	345	265	150
27.							203	359	132	345	265	146
28.							199	382	125	340	265	150
29.							236	368	115	326	278	154
30.							286	364	157	345	269	154
31.								368		349	291	

NOTE.—Discharge interpolated Oct. 2.

Monthly discharge of Little Wood River at Shoshone, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October 1-10.	140	41	92.4	1,830
April.	286	199	238	14,200
May.	387	265	340	20,900
June.	378	43	237	13,500
July.	368	256	335	20,600
August.	340	265	306	18,800
September.	295	135	210	12,900

FISH CREEK ABOVE DAM, NEAR CAREY, IDAHO

LOCATION.—In sec. 2, T. 1 N., R. 22 E., $1\frac{3}{4}$ miles above confluence of West Fork of Fish Creek, 2 miles above dam of Carey Valley Reservoir Co. and 14 miles northeast of Carey, Blaine County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 3, 1920, to September 30, 1923.

GAGE.—Vertical staff on right bank; read by V. P. Knight.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of coarse sand and gravel. Left bank may be overflowed at high stages. Control formed by 18-foot Cippoletti weir set in concrete, 8 feet below gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.02 feet May 12 (discharge, 68 second-feet); minimum stage, 0.28 foot July 18 (discharge, 9.1 second-feet). Actual extremes no doubt occurred during period of no record.

1920-1923: Maximum stage recorded from water-stage recorder, 1.78 feet 9 a. m. to 1 p. m. May 6, 1922 (discharge, 158 second-feet); minimum stage, 0.10 foot August 24 and 25, 1920 (discharge, 1.9 second-feet). Actual extremes no doubt occurred during period of no record.

ICE.—Stage-discharge relation affected by ice; records discontinued during winter.

DIVERSIONS.—Several small diversions above gage.

REGULATION.—None except as affected by diversions above.

ACCURACY.—Stage-discharge relation permanent. Rating curve well-defined. Gage read to hundredths nearly every day after June 2, prior to that date gage was read about once a week. Daily discharge determined by applying daily gage height to rating table except for days of missing gage heights for which it was interpolated or estimated as noted in footnote to table of daily discharge. Records for estimated periods poor; others good.

COOPERATION.—Gage-height record furnished by water master for Fish Creek.

Discharge measurements of Fish Creek above dam, near Carey, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>
May 12	A. G. Fiedler.....	1.02	67.1
June 19	Berkeley Johnson.....	.60	28.9
July 18	A. G. Fiedler.....	.28	9.42

Daily discharge, in second-feet, of Fish Creek above dam, near Carey, Idaho, for the year ending September 30, 1923

Day	May	June	July	Day	May	June	July	Day	May	June	July
1			22	11		36	14	21		27	
2		40	21	12	68	36		22	62	28	
3		46	20	13		33		23		28	
4		36	20	14		30	12	24		30	
5		36	20	15		30		25	55	31	
6		40	20	16	65	24		26		27	
7		43	19	17		25		27		25	
8		40	18	18		25	9.1	28	48	26	
9		36	17	19		30		29		25	
10		36	14	20		28		30	50	22	
								31	52		

NOTE.—Discharge estimated on account of missing gage height record, May 13-20, 22-27, 29-30, June 1-2, and July 12-17; interpolated June 6, 8, 11, 20, 22, 24, July 3, and 8. Braced figures show mean discharge for periods indicated.

Monthly discharge of Fish Creek above dam, near Carey, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 12-31			59.0	2,340
June 1-18		22	32.6	1,940
July 1-18	22	9.1	15.9	568
The period				4,850

FISH CREEK NEAR CAREY, IDAHO

LOCATION.—In sec. 22, T. 1 N., R. 22 E., $1\frac{1}{2}$ miles below dam of Carey Valley Reservoir Co. and 11 miles northeast of Carey, Blaine County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 10, 1919, to September 30, 1920; May 12 to September 30, 1923.

GAGE.—Vertical staff on left bank; read by V. P. Knight.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of lava rock covered by gravel, sand, and silt. One channel at all stages. Control formed by Cippoletti weir set in concrete, located immediately below gage; weir crest is 17.64 feet in length. Zero of gage set to agree with average elevation of weir crest.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.46 feet August 3 and 5 (discharge, 108 second-feet); minimum stage, 0.16 foot May 12 (measured discharge, 4.0 second-feet). Probably not actual extremes. 1919-1920; 1923: Maximum stage and discharge recorded, August 3 and 5, 1923; minimum stage recorded, 0.08 foot February 15, 16, and 21, 1920 (discharge, 1.5 second-feet). Probably not actual extremes.

ICE.—Stage-discharge relation probably affected by ice; records discontinued during winter.

DIVERSIONS.—None between station and dam.

REGULATION.—Flow completely regulated by operation of gates in dam above.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined between 0 and 80 second-feet, above which it is extended nearly parallel to curve based on standard weir formula. Gage read to hundredths once daily except as noted in footnote to table of daily discharge. Daily discharge determined by applying daily gage height to rating table except for days of missing gage height for which it was estimated or interpolated. Records fair.

COOPERATION.—Gage-height record furnished by water master for Fish Creek.

Discharge measurements of Fish Creek near Carey, Idaho, during the years ending September 30, 1922 and 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
1922		Feet	Sec.-ft.	1923		Feet	Sec.-ft.
July 6	Berkeley Johnson	1.03	63.2	May 12	A. G. Fiedler	0.16	3.95
Sept. 20	do	.29	9.71	June 19	Berkeley Johnson	.65	31.8
				July 18	A. G. Fiedler		59.6

Daily discharge, in second-feet, of Fish Creek near Carey, Idaho, for the year ending September 30, 1923

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1		37	22	81	34	16		35	53	82	
2		22	26	88	33	17		35	60	79	
3		22	34	108	28	18		31	60	75	
4		26	41	108	28	19		35	62	72	
5		26	36	108	27	20	4.4	39	65	67	
6		28	38	104	27	21		42	65	62	
7		30	40	100	20	22		44	78	55	
8		35	45	97	13.3	23		47	83	48	
9		33	50	93	6.4	24	4.8	50	87	45	
10		33	54	94	6.4	25	6.0	36	92	34	
11		32	53	96	6.4	26	7.3	34	89	34	
12	4.0	31	56	97	6.4	27	13.4	32	86	34	
13		30	55	84		28		30	83	34	
14	4.4	33	58	83		29	34	26	80	35	
15		33	55	82		30	36	26	77	35	
						31	37		74	35	

NOTE.—Discharge estimated on account of missing gage height May 13-23; interpolated May 25, 30, June 6, 11, 22, July 3, 6, 23-24, 26-30, Aug. 1, 4, 6-8, 10-11, 14, 17-18, 20, 22, 26-30, Sept. 1, 4-5, 7-8, 10-11. Braced figures shows mean discharge for period indicated.

Monthly discharge of Fish Creek near Carey, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 12-31.....	37	4.0	10.4	413
June.....	50	22	33.1	1,970
July.....	92	22	59.9	3,680
August.....	108	34	72.5	4,460
September 1-12.....	34	6.4	19.7	469
The period.....				11,000

SILVER CREEK NEAR PICABO, IDAHO

LOCATION.—In sec. 1, T. 2 S., R. 20 E., at Brett ranch, 1½ miles below mouth of drain ditch of Blaine County Drainage District No. 1, and 3 miles south of Picabo, Blaine County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 25, 1920, to September 30, 1923.

GAGE.—Gurley water-stage recorder on left bank 450 feet below Brett ranch house; installed July 29, 1922; inspected by E. F. McDowell.

DISCHARGE MEASUREMENTS.—Made from footbridge 150 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of rock overlain with fine gravel. Control of same material; subject to slight changes due to aquatic growth.

EXTREMES OF DISCHARGE.—Maximum stage during period from water-stage recorder, 3.29 feet at 4 p. m. April 3 (discharge, 312 second-feet); minimum stage, 1.00 foot at noon May 29 (discharge, 66 second-feet).

1920-1923: Maximum discharge recorded, April 3, 1923; minimum stage, 0.48 foot June 2, 1920 (discharge, 26 second-feet).

ICE.—Stage-discharge relation somewhat affected by ice. Observations discontinued during winter.

DIVERSIONS.—Numerous irrigation diversions above. During part of year some water diverted around gage on right bank through a small slough which heads about 300 feet above gage.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed several times owing to aquatic growth below gage. Standard rating curve well defined between 20 and 200 second-feet. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph. Records of the actual flow past gage, good. Part of the time, however, some additional flow was diverted around gage on right bank through a small slough which heads about 300 feet above gage. A fairly accurate record of this flow was obtained from May to September, which is covered in footnote to table of monthly discharge.

COOPERATION.—Gage-height record and several discharge measurements furnished by water master for Big Wood and Little Wood Rivers.

Discharge measurements of Silver Creek near Picabo, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 13	A. G. Fiedler.....	2.18	188	June 19	E. F. McDowell.....	1.34	98
May 2	S. H. Chapman *.....	1.86	144	25	do.....	2.25	177
3	C. G. Paulsen.....	1.82	150	July 7	do.....	1.51	116
11	Fiedler and McDowell.....	1.78	149	11	do.....	1.41	106
19	E. F. McDowell *.....	1.76	136	19	A. G. Fiedler.....	1.56	125
19	do.....	1.76	139	26	E. F. McDowell.....	1.72	136
24	do.....	1.45	110	Aug. 4	do.....	1.80	144
26	S. H. Chapman.....	1.31	94	15	do.....	1.92	157
June 1	E. F. McDowell.....	1.48	109	22	do.....	2.16	c 177
7	do.....	1.40	104	Sept. 23	do.....	2.21	d 183
17	do.....	1.39	96				

* Associated with water master's office for Big Wood and Little Wood Rivers.

b 2.0 sec.-ft. additional estimated flow around gage.

c 4.0 sec.-ft. additional estimated flow around gage.

d 5.0 sec.-ft. additional estimated flow around gage.

Daily discharge, in second-feet, of Silver Creek near Picabo, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1.....		151	117	145	155	176	16.....	170	139	96	127	157	179
2.....		150	110	138	153	176	17.....	166	140	102	124	160	177
3.....	309	149	107	125	148	178	18.....	164	153	96	119	160	178
4.....	282	150	104	121	147	182	19.....	160	139	98	125	164	178
5.....	264	150	93	130	145	185	20.....	155	135	105	124	171	178
6.....	273	151	99	120	150	184	21.....	158	133	111	125	177	182
7.....	284	149	104	115	150	184	22.....	160	130	110	124	177	182
8.....	245	149	111	111	152	183	23.....	160	117	118	128	175	183
9.....	222	149	111	110	151	182	24.....	158	106	147	131	172	184
10.....	212	148	106	107	150	182	25.....	156	103	185	133	168	187
11.....	202	147	105	107	146	183	26.....	153	91	192	134	168	192
12.....	198	145	107	103	140	183	27.....	150	83	175	138	167	204
13.....	186	150	98	108	144	179	28.....	148	80	164	146	167	209
14.....	178	154	99	115	148	177	29.....	153	71	151	143	168	204
15.....	173	145	95	120	156	178	30.....	152	71	148	144	171	199
							31.....		94		152	174	

NOTE.—Discharge interpolated May 31 on account of missing gage height.

Monthly discharge of Silver Creek near Picabo, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 3-30.....	309	148	193	10,700
May.....	154	71	130	7,990
June.....	192	93	119	7,080
July.....	152	103	126	7,750
August.....	177	140	159	9,780
September.....	209	176	184	10,900
The period.....				54,200

NOTE.—Prior to May 1 amount of water flowing in slough which diverts water around gage is unknown. The amount of this flow from May to September, which was obtained by means of actual measurements and frequent estimates by water master for Big Wood and Little Wood Rivers is approximately as follows: May, 70 acre-feet; June, 20 acre-feet; July, none; August, 125 acre-feet; September, 345 acre-feet.

SUCKER CREEK NEAR HOMEDALE, IDAHO

LOCATION.—In NW. $\frac{1}{4}$ sec. 22, T. 23 S., R. 46 E., Malheur County, Oreg., 100 yards below house on Isaac ranch and 12 miles southwest of Homedale, Owyhee County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 13, 1919, to September 30, 1923, when station was discontinued.

GAGE.—Friez water-stage recorder on left bank installed August 1, 1919; inspected by Mrs. W. A. Riley and Mrs. N. Hammons. Gage datum raised 6.00 feet November 23, 1919.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of sand and gravel. Control of same material; shifting. Channel winding. Right bank overflowed at medium stages; left bank high and not subject to overflow except at extremely high stages. Point of zero flow determined January 22, March 13, and June 24, 1923, as at about gage height 0.80 foot.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.25 feet at 5 p. m. June 7 (discharge, about 500 second-feet); stream practically dry October 1 to November 30 and July 22 to September 30.

1919-1923: Maximum stage recorded, 6.23 feet at 8.15 p. m. January 16, 1920 (discharge from extension of rating curve, 1,080 second-feet); stream practically dry several months each year.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Small ranch diversions above divert practically entire flow during late irrigation season. Gem Irrigation District diversion heads about 10 miles below gage.

REGULATION.—None.

ACCURACY.—Stage-discharge relation probably shifted slightly during year. Standard rating curve well defined between 10 and 50 second-feet. Operation of water-stage recorder not entirely satisfactory at times because of faulty action of inlet pipe. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspection of recorder graph, except as noted in footnote to daily-discharge table. Indirect method for shifting control used June 26 to July 9. Records fair.

COOPERATION.—Gage-height record furnished by Succor Creek Irrigation District.

Discharge measurements of Sucker Creek near Homedale, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Jan. 22	C. G. Paulsen.....	1.00	2.3	Apr. 21	C. G. Paulsen.....	1.81	46
Feb. 14	Berkeley Johnson.....	1.09	2.8	May 9	Berkeley Johnson.....	1.47	19.3
Mar. 13	C. G. Paulsen.....	1.27	9.2	30	do.....	1.42	16.7
26	A. G. Fiedler.....	1.31	10.8	June 24	C. G. Paulsen.....	1.79	43.5
Apr. 3	do.....	1.94	56	July 11	Berkeley Johnson.....	.80	1.6
10	Berkeley Johnson.....	1.88	52				

* Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Sucker Creek near Homedale, Idaho, for the year ending September 30, 1923

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1.				36	62	23	241	14
2.	1.1	4		60	74	24	233	9.9
3.				35	55	19	213	6.4
4.			2.5	18	45	16	185	4.6
5.				19	34	13	113	4.1
6.	.7	4.1		23	68	13	175	3.9
7.		26		26	62	18	213	4.4
8.		28		22	51	22	145	3.4
9.	.3	21		16	57	25	107	2.5
10.	.8	15		11	49	41	85	2.3
11.	.3	10	3.0	8.9	52	35	72	1.9
12.		6.7		8.5	53	38	55	1.3
13.				9.2	59	34	40	1.1
14.				9.2	52	28	38	.8
15.	3		7	6.2	47	29	33	3.6
16.				7.4	49	62	30	2.1
17.		5	11	28	50	54	31	.3
18.				24	59	70	44	
19.				18	51	57	45	
20.	20		18	20	44	61	34	.2
21.				20	43	44	36	
22.		3.2		14	39	38	145	
23.	55	3.2	25	12	31	33	66	
24.	45	3.2		12	27	25	45	
25.		2.5		16	23	19	39	
26.	60		22					
27.		2.7		14	16	15	33	
28.	78	2.1		27	9.9	15	28	
29.	92		20	47	9.6	16	25	
30.	51			57	19	13	21	
31.	10	2		58	34	22	18	
	6			64		44		

NOTE.—Discharge estimated on account of lack of gage-height record Dec. 3-8, 12-23, 25, 26, 31, Jan. 1-5, 13-21, Feb. 15, 16, 18-22, and 24-27; estimated because of ice Jan. 28 to Feb. 14; interpolated Dec. 10 and 29. Channel practically dry Oct. 1 to Nov. 30 and July 22 to Sept. 30. Braced figures show mean discharge for periods indicated.

Monthly discharge of Sucker Creek near Homedale, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
December 2-31	92		19.4	1,150
January	36		6.50	418
February			10.2	566
March	64	6.2	24.0	1,480
April	74	9.6	44.2	2,630
May	70	13	30.5	1,890
June	241	18	86.3	5,140
July 1-21	14		3.21	134
The period				13,400

OWYHEE RIVER NEAR GOLD CREEK, NEV..

LOCATION.—In W. $\frac{1}{2}$ sec. 24, T. 44 N., R. 54 E., an eighth of a mile below Wild Horse dam site, 9 miles west of Gold Creek, Elko County, and 65 miles north of Elko.

DRAINAGE AREA.—209 square miles (measured on map compiled by irrigation service of United States Office of Indian Affairs).

RECORDS AVAILABLE.—March 26, 1916, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder on left bank; inspected by Emery Johnson.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of rocks and loose sand. Control is gravel riffle in each of two channels where stream is divided by small island 500 feet below gage; subject to change by work of beavers. Left bank high and rocky; right bank is overflowed at extreme high stages. One channel at all stages. Dense growth of willows along banks.

EXTREMES OF DISCHARGE.—Maximum stage recorded during the year from water-stage recorder, 3.91 feet at 9 a. m. April 17 (discharge, 282 second-feet); minimum discharge not recorded.

1916-1923: Maximum stage recorded, 10.11 feet at 2 a. m. May 5, 1922 (discharge, by extending rating curve, 1,810 second-feet). Minimum discharge probably less than 1 second-foot in August, 1918.

ICE.—River freezes over during winter.

DIVERSIONS.—Wild hay meadows above station practically only crop irrigated.

ACCURACY.—Stage-discharge relation affected October 1 to November 18, 1922, because of backwater caused by moss on control. Stage-discharge relation permanent the rest of year except for shift in August. Rating curve fairly well defined. Operation of water-stage recorder satisfactory October 1 to November 18, April 2 to August 14 except for several short periods. Discharges during winter and during periods when no gage heights were taken, were interpolated or estimated from one measurement, observer's notes, and comparison with flow of Owyhee River at station near Owyhee. Records fair.

Discharge measurements of Owyhee River near Gold Creek, Nev., during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 3	R. R. Rowe.....	1.57	6.3	May 8	R. R. Rowe.....	2.65	88.9
3	do.....	1.57	6.2	Sept. 30	W. E. Dickinson.....	1.64	6.8
Mar. 26	do.....	*1.79	13.6				

* Backwater from snowdrift.

Daily discharge, in second-feet, of Owyhee River near Gold Creek, Nev., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	6	7					8	96	65	22	5	
2	6	7					7	85	73	20	4	
3	6	6					10	78	71	17	4	5
4	6	6					12	78	55	15	4	
5	7	7					18	88	52	14	4	4
6	7	7					44	93	72	13	4	
7	7	8					63	91	83	13	5	
8	7	8				6	59	85	62	13	4	
9	7	10					69	83	56	12	4	
10	7	10	7				107	90	46	11	4	
11	7	10					124	78	52	10	4	
12	10	10					183	69	37	10	4	4
13	8	8					176	69	34	9	4	
14	8	8					151	70	32	9	5	
15	8	10			6		158	60	34	7		
16	7	8		6			189	65	30	7		
17	6	8					217	70	45	7		
18	6	8					191	75	60	7		4
19	6						152	65	72	7		4
20	6						105	60	97	7		4
21	6		7			10	100	95	75	7		4
22	5						127	130	103	6		4
23	5						123	106	79	7	6	5
24	5						126	83	87	7		5
25	5	8					163	62	79	8		5
26	5					14	156	49	56	7		6
27	6						128	40	47	6		8
28	6						112	40	39	6		8
29	6					10	120	37	33	6		7
30	6						124	40	25	5		7
31	6							50		5		

Monthly discharge of Owyhee River near Gold Creek, Nev., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	10	5	6.4	394
November			8.1	422
December			7.0	430
January			6.0	369
February			6.0	333
March			8.2	504
April	217	7	111	6,600
May	130	37	73.5	4,520
June	103	25	58.4	3,480
July	22	5	9.7	596
August			5.2	320
September	8		4.8	286
The year	217		25.3	18,300

OWYHEE RIVER NEAR OWYHEE, NEV.

LOCATION.—In sec. 21, T. 46 N., R. 53 E., 40 feet above mouth of Jones Brook, half a mile above J. P. Jones's ranch, 4 miles below Mountain City, and 8 miles southeast of Owyhee, Elko County.

DRAINAGE AREA.—380 square miles (measured on United States Forest Service map).

RECORDS AVAILABLE.—November 29, 1913, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder on right bank; inspected by P. W. Davidson.

DISCHARGE MEASUREMENTS.—Made from cable 125 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed consists of ledge rock and boulders filled in with sand and gravel. Permanent except for slight changes at very low stages. One channel at all stages. Banks covered with willows and brush; subject

to overflow. At low stages a riffle just below gage forms control. At high stages a secondary control becomes effective.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.49 feet at 10 p. m. April 17 (discharge, 435 second-feet); minimum stage 1.57 feet Sept. 13 (discharge, 8 second-feet).

1914-1923: Maximum discharge, 2,600 second-feet May 5, 1922; minimum discharge less than 2 second-feet September 7, 1918.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—A number of ranches above station divert water from main stream and tributaries for irrigation—mainly of hay meadows.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed for low stages. Two rating curves fairly well defined. Operation of water-stage recorder satisfactory except October 28 to January 15, June 6, 7, and July 4 to August 11. Daily discharge ascertained by applying mean daily gage height to rating table. Estimates of discharge were made for periods when no gage heights were taken and during ice-affected period by comparison with record for station near Gold Creek, observer's gage readings at Mountain City, and one discharge measurement. Records good where daily gage heights were available; estimates fair.

Discharge measurements of Owyhee River near Owyhee, Nev., during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
Oct. 4	R. R. Rowe.....	<i>Feet</i> 1.68	<i>Sec.-ft.</i> 9.4	Mar. 30	R. R. Rowe.....	<i>Feet</i> 2.86	<i>Sec.-ft.</i> 101
Jan. 16	do.....	2.28	21.3	May 7	do.....	3.68	238

* Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Owyhee River near Owyhee, Nev., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	9	24					152	203	184	61		14
2	9						152	188	193	56		13
3	9						154	174	177	51		12
4	9						140	182	170			12
5	10						138	193	167			11
6	11						215	227	200		9	10
7	11						229	232	220			9
8	12			20		20	175	232	197			9
9	14						162	229	182	25		9
10	15						182	238	162			9
11	16						201	225	168			9
12	22						269	201	148		9	8
13	26						297	205	131		9	8
14	25						257	217	124		12	8
15	25				20		257	180	115	9	12	8
16	25	22	20	21		25	278	179	110	9	11	8
17	25					25	356	190	136	9	11	9
18	25					25	364	199	148	9	10	10
19	26					40	301	180	170	9	12	10
20	26					42	229	170	163	9	17	10
21	26					38	213	217	162	9	22	10
22	26					34	225	278	193		18	10
23	26					34	217	205	157		15	11
24	26			20		37	217	170	155		15	11
25	25					51	249	151	152		13	11
26	24					56	246	138	120	9	11	11
27	23					72	225	134	101		9	14
28	23					84	221	130	90		9	17
29	23					85	244	121	82		9	18
30	24					108	257	127	74		11	17
31	24					137		157			14	

*Monthly discharge of Owyhee River near Owyhee, Nev., for the year ending
September 30, 1923*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	26	9	20.0	1,230
November.....			22.1	1,320
December.....			20	1,230
January.....			20	1,230
February.....			20	1,110
March.....	137		38.8	2,390
April.....	364	140	227	13,500
May.....	278	121	189	11,600
June.....	220	74	152	9,040
July.....	61		19.2	1,180
August.....	22		11.2	689
September.....	18	8	10.9	649
The year.....	364	8	62.5	45,200

OWYHEE RIVER NEAR OWYHEE, OREG.

LOCATION.—In sec. 2, T. 21 S., R. 46 E., at county bridge, $1\frac{1}{2}$ miles southwest of Owyhee, Malheur County, 3 miles above mouth of river, and 10 miles southwest of Nyssa.

DRAINAGE AREA.—About 11,100 square miles. Watershed not well defined on available maps.

RECORDS AVAILABLE.—March 26, 1890, to December 31, 1893; January 1, 1895, to October 3, 1896; August 28, 1903, to September 30, 1916; May 17 to October 9, 1920; March 8, 1921, to September 30, 1923.

GAGE.—Chain gage on upstream side of highway bridge; read by Alvon McGinnis and Archie Cantrall.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed consists of gravel; may shift during high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.7 feet April 8 (discharge, 5,080 second-feet); minimum stage, 1.50 feet July 30 (discharge, 1 second-foot.)

1890-1892; 1903-1916; and 1920-1923: Maximum stage recorded, 12.9 feet March 2, 1910 (discharge, 23,200 second-feet); minimum discharge, 1 second-foot in 1920, 1921, and 1923.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Owyhee Canal, the principal diversion immediately above station, heads about 6 miles above gage. The canal diverts practically all of the natural low-water flow of river. (See p. 173.)

REGULATION.—Variation in the flow may be caused by manipulation of the gates at the head of Owyhee Canal.

ACCURACY.—Stage-discharge relation permanent during year; affected by ice December 12 to February 19. Rating curve fairly well defined. Gage read to half-tenths once a day. Daily discharge ascertained by applying daily gage height to rating table. Records good except December to February, for which they are fair.

*Discharge measurements of Owyhee River near Owyhee, Oreg., during the year ending
September 30, 1923*

Date	Made by—	Gage height	Dis- charge
		<i>Feet</i>	<i>Sec.-ft.</i>
Feb. 23	Canfield and Kennard *	2.94	329
May 1	do.....	3.80	994
July 9	H. G. Kennard.....	2.30	98

* Water master, Malheur County.

Daily discharge, in second-feet, of Owyhee River near Owyhee, Oreg., for the year ending September 30, 1923

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	14	176	141			740	3,080	1,060	820	740	14	14
2.....	18	176	141			670	3,420	900	820	670	14	18
3.....	18	176	141			740	3,600	900	980	600	14	14
4.....	18	176	141			740	3,420	820	3,600	600	14	14
5.....	18	176	141			740	2,940	740	2,040	470	14	18
6.....	18	176	141			670	2,150	740	1,720	350	18	14
7.....	18	176	141			600	2,800	740	1,720	240	18	22
8.....	18	176	141			470	5,080	820	1,720	125	14	22
9.....	18	176	141			470	3,420	980	1,620	72	11	28
10.....	18	176	141		160	470	2,800	900	1,620	50	8	28
11.....	42	176	176			470	2,560	820	1,720	50	6	34
12.....	141	176				470	2,270	740	1,620	34	8	34
13.....	42	141				470	2,270	820	1,620	34	6	34
14.....	61	141				410	2,390	820	1,620	34	8	34
15.....	61	141				410	2,270	740	1,520	50	6	34
16.....	84	141		150		410	2,150	900	1,420	97	4	34
17.....	84	141				410	1,930	900	1,150	34	4	34
18.....	61	141				350	2,040	820	1,060	22	6	34
19.....	61	141				350	2,040	820	530	22	8	34
20.....	61	141			320	410	1,930	740	410	22	8	34
21.....	61	141	130		320	410	1,930	740	410	22	11	157
22.....	61	141			320	410	1,820	740	600	14	14	157
23.....	61	141			320	530	1,520	670	740	14	14	157
24.....	61	141			320	530	1,330	670	1,060	8	22	50
25.....	61	141			470	600	1,240	600	940	8	22	50
26.....	61	141			530	470	1,150	600	900	8	22	50
27.....	84	141			600	470	1,100	530	820	8	28	61
28.....	84	141			670	740	1,060	530	740	8	18	61
29.....	84	141				980	1,060	530	670	8	14	61
30.....	84	141				1,620	1,060	600	600	1	14	61
31.....	84					2,520		670		8	14	

NOTE.—Braced figures show mean discharge for periods indicated.

Monthly discharge of Owyhee River near Owyhee, Oreg., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	141	14	53.5	3,290
November.....	176	141	155	9,220
December.....			135	8,300
January.....			• 150	9,220
February.....	670		247	13,700
March.....	2,520	350	637	39,200
April.....	5,080	1,060	2,260	134,000
May.....	1,060	530	761	46,800
June.....	3,600	410	1,230	73,200
July.....	740	1	142	8,730
August.....	28	4	128	787
September.....	157	14	46.6	2,770
The year.....	5,080	1	484	349,000

• Estimated.

SOUTH FORK OF OWYHEE RIVER NEAR DEEP CREEK, NEV.

LOCATION.—In NW. $\frac{1}{4}$ sec. 29, T. 42 N., R. 50 E., at lower end of canyon connecting Spanish Valley and I. L. Valley, $3\frac{1}{2}$ miles above I. L. ranch buildings, and 15 miles southwest of Deep Creek, Elko County.

DRAINAGE AREA.—Not determined.

RECORDS AVAILABLE.—May 10, 1921, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder on right bank; installed November 16, 1921; inspected by J. C. Wilson.

DISCHARGE MEASUREMENTS.—Made by wading or from cable.

CHANNEL AND CONTROL.—Bed of gravel and sand; shifting. Channel crooked. Right bank high and clean at gage; banks covered with willows a short distance below.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year from water-stage recorder, 7.31 feet at 9 a. m. May 22 (discharge, 350 second-feet). Minimum discharge not determined.

1921-1923: Maximum discharge, determined from high-water marks, 1,150 second-feet May 19, 1921.

ICE.—River freezes during winter.

DIVERSIONS.—A considerable area of wild hay meadows is irrigated in Spanish Valley, about 20 miles upstream.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent after May 21. Rating curves fairly well defined. Operation of water-stage recorder satisfactory March 31 to September 30. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph; shifting-control method used March 31 to May 20. Monthly mean discharge for first half of year estimated from climatic records, three current meter measurements, and comparison with flow of Jack Creek. Records where daily discharge is shown are good; estimated periods fair.

Discharge measurements of South Fork of Owyhee River near Deep Creek, Nev., during the year ending September 30, 1923

[Made by R. R. Rowe]

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>
Oct. 5.....	4.42	17.5	Jan. 18.....	4.76	29.6	May 6.....	5.42	95
Oct. 5.....	4.43	18.4	Mar. 31.....	5.49	98.	June 3.....	5.72	137

* Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of South Fork of Owyhee River near Deep Creek, Nev., for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1.....	116	89	214	65	29	22	16.....	97	103	86	61	32	21
2.....	100	84	165	58	29	23	17.....	110	115	89	57	31	20
3.....	88	82	140	53	29	23	18.....	111	137	98	54	29	21
4.....	88	81	126	48	28	22	19.....	106	133	105	51	28	22
5.....	78	87	118	46	28	22	20.....	95	134	103	49	29	22
6.....	132	93	142	45	28	21	21.....	99	195	134	48	30	22
7.....	130	98	131	47	28	21	22.....	98	326	207	48	30	22
8.....	95	101	115	50	27	20	23.....	102	216	156	46	29	23
9.....	83	105	109	49	27	20	24.....	93	159	131	46	28	25
10.....	82	109	105	44	26	19	25.....	88	130	111	44	27	26
11.....	83	107	123	42	26	20	26.....	82	114	95	42	26	29
12.....	93	99	104	46	26	20	27.....	84	108	86	36	25	38
13.....	95	107	97	57	26	20	28.....	89	110	81	32	24	36
14.....	89	109	94	58	29	21	29.....	100	106	78	31	24	34
15.....	90	106	91	59	32	21	30.....	103	123	71	30	24	30
							31.....		151		29	24	

Monthly discharge of South Fork of Owyhee River near Deep Creek, Nev., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....			• 20	1,230
November.....			• 25	1,490
December.....			• 30	1,840
January.....			• 30	1,840
February.....			• 35	1,940
March.....			• 40	2,460
April.....	132	82	96.6	5,750
May.....	326	81	123.	7,560
June.....	214	71	117.	6,960
July.....	65	29	47.5	2,220
August.....	32	24	27.7	1,700
September.....	38	19	23.5	1,400
The year.....	326		50.8	37,100

• Estimated.

JACK CREEK NEAR TUSCARORA, NEV.

LOCATION.—In sec. 35, T. 42 N., R. 52 E., at Woodward ranch on Elko-Mountain City stage road, 8 miles above confluence with South Fork of Owyhee River, and 12 miles northeast of Tuscarora, Elko County.

DRAINAGE AREA.—31 square miles (measured on United States Forest Service map).

RECORDS AVAILABLE.—May 15, 1913, to September 30, 1923.

GAGE.—Vertical staff on right bank 500 feet below Woodward's house; read by R. M. Woodward.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and small boulders; shifting. Banks low and fringed with willows; subject to overflow at extreme high stages.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during the year, 109 second-feet June 11; minimum discharge, 2 second-feet on several days during October, August, and September.

1913-1923: Maximum stage recorded, 3.6 feet at 6 p. m. May 14, 1917 (discharge, 465 second-feet); minimum stage, 0.18 foot September 2 and 3, 1918 (discharge, 0.6 second-foot).

ICE.—Stage-discharge relation affected during winter.

DIVERSIONS.—Small ditches on Woodward ranch practically only diversions above station. They have little effect on flow except during August and September.

REGULATION.—None.

ACCURACY.—No permanent stage-discharge relation during year. Standard rating table was used, shifting to measurements. Staff gage read about every other day except during part of January and February. Daily discharge determined by applying to rating table daily gage readings except during ice-affected periods when mean discharge was estimated from one current meter measurement, observer's notes, and study of climatic records. Discharge for days when gage was not read obtained by interpolation. Records fair.

COOPERATION.—Gage-height record furnished by R. M. Woodward.

Discharge measurements of Jack Creek near Tuscarora, Nev., during the year ending September 30, 1923

[Made by R. R. Rowe]

Date	Gage height	Dis-charge	Date	Gage height	Dis-charge	Date	Gage height	Dis-charge
	Feet	Sec.-ft.		Feet	Sec.-ft.		Feet	Sec.-ft.
Oct 4.....	0.20	2.7	Mar. 29.....	0.62	13.5	June 3.....	1.31	
Jan. 15.....	0.82	2.8	May 6.....	1.22	41.4			

• Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Jack Creek near Tuscarora, Nev., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	3	3				6	10	35	86	55	4	2.
2.....	3	3				6	12	37	93	53	3	2
3.....	3	3				6	12	39	73	53	3	2.
4.....	3	3				6	12	43	70	53	2	2.
5.....	3	3				6	18	45	67	53.	2	2.
6.....	3	3				6	24	49	70	48	2	2
7.....	3	3				6	37	78	60	46	2	2.
8.....	3	3				6	40	89	68	44	2	2.
9.....	3	3				6	42	85	93.	40	2	2.
10.....	3	3				6	45	81	103	34	2	2.
11.....	3	3			4	6	49	83	109	31	2	2.
12.....	3	3				6	49	82	108	28	2	2.
13.....	3	3				6	50	81	107	26	2	2.
14.....	3	3				6	52	83	106	25	2	2.
15.....	3	3		3		6	54	80	105	23.	2	2.
16.....	3	3				6	56	76	104	22	2	2
17.....	3	3				6	58	73	103.	21	2	2.
18.....	3	3				6	60	70	102	19	2	2.
19.....	3	3				6	57	65	101	17	2	2.
20.....	3	4				6	54	60	100	15	3	2.
21.....	3	4			5	7	54	62	93.	13.	3	2.
22.....	2	5			5	7	49	63	85	11	2	2.
23.....	2	5			5	7	47	62	78	10	2	2.
24.....	2	6		4	5	7	40	60	73.	9	2	2.
25.....	3	6			5	7	34	76	69	8	2	3.
26.....	3	6			5	7	27	68	65	7	2	5
27.....	3	7			5	8	28	60	63.	6	2	7
28.....	3	7			6	11	30	63	62	5	2	6.
29.....	3	7				14	34	62	60.	5	2	5
30.....	3	7				12	35	60	58	5	2	5
31.....	3					11		60		4	2	

Monthly discharge of Jack Creek near Tuscarora, Nev., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	3	2	2.9	178
November.....	7	3	4.0	233
December.....			5.0	307
January.....			3.5	215.
February.....	6		4.3	239
March.....	14	6	7.0	439.
April.....	60	10	30.0	2,320.
May.....	89	35	65.5	4,030.
June.....	109	68	84.5	5,080
July.....	55	4	25.5	1,570.
August.....	4	2	2.2	135
September.....	7	2	2.6	155
The year.....	109		20.5	14,800.

JORDAN CREEK AT DANNER, OREG.

LOCATION.—In SW. $\frac{1}{4}$ sec. 16, T. 30 S., R. 44 E., 150 feet above pipe crossing to Parks ranch, one-fourth mile below mouth of Cow Creek, three-fourths of a mile west of Danner, Malheur County, and 8 miles below gaging station on Jordan Creek near Jordan Valley.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—February 1 to June 30, 1920; February 26 to June 1, 1923, when station was discontinued.

GAGE.—Vertical staff on right bank; read by Sidney Cook.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 3.20 feet April 19 (discharge, 735 second-feet); minimum stage, 0.95 foot, from discharge measurement July 8 (discharge, 26 second-feet).

DIVERSIONS.—Jordan Valley feed canal diverts about 18 miles above station.

During the summer water is also diverted above for irrigation by flooding.

REGULATION.—None except that caused by diversions.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined.

Staff gage read to hundredths once a day February 26 to March 31 and twice a day April 1 to June 1. Daily discharge ascertained by applying mean daily gage height to rating table. Records excellent.

Discharge measurements of Jordan Creek at Danner, Oreg., during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>
Feb. 26	G. H. Canfield.....	1.36	76
May 2	.....do.....	2.49	349
July 8	H. J. Kennard.....	.95	26

• Water master.

Daily discharge, in second-feet, of Jordan Creek at Danner, Oreg., for the year ending September 30, 1923

Day	Mar.	Apr.	May	June	Day	Mar.	Apr.	May	June
1.....	42	310	375	310	16.....	48	430	430	-----
2.....	48	328	365	-----	17.....	42	500	430	-----
3.....	55	345	310	-----	18.....	42	585	385	-----
4.....	96	328	280	-----	19.....	48	692	385	-----
5.....	87	295	280	-----	20.....	55	585	345	-----
6.....	78	295	310	-----	21.....	62	500	345	-----
7.....	78	385	345	-----	22.....	62	452	328	-----
8.....	70	430	355	-----	23.....	55	430	310	-----
9.....	62	385	430	-----	24.....	42	385	280	-----
10.....	55	345	430	-----	25.....	37	328	250	-----
11.....	48	345	500	-----	26.....	29	310	198	-----
12.....	42	345	585	-----	27.....	29	295	176	-----
13.....	48	408	555	-----	28.....	48	295	176	-----
14.....	42	452	475	-----	29.....	154	345	176	-----
15.....	42	475	452	-----	30.....	187	385	176	-----
					31.....	223	-----	210	-----

Monthly discharge of Jordan Creek at Danner, Oreg., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March.....	223	29	66.3	4,080
April.....	692	295	400	23,800
May.....	585	176	344	21,200
The period.....				49,100

JORDAN VALLEY FEED CANAL NEAR JORDAN VALLEY, OREG.

LOCATION.—In sec. 15, T. 30 S., R. 46 E., 3 miles below intake, immediately below a short tunnel, and 2 miles southwest of Jordan Valley post office, Malheur County.

RECORDS AVAILABLE.—March 7 to July 31, 1920, and February 27 to July 18, 1923, when water was turned out of canal and station discontinued.

GAGE.—Vertical staff on pier of bridge; read by E. B. Potter.

DISCHARGE MEASUREMENTS.—Made by wading or from bridge at gage.

CHANNEL AND CONTROL.—Canal section in earth; changes in check may affect stage-discharge relation.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 3.25 feet May 8 and 9 (discharge, 102 second-feet). Canal dry at various times.

ICE.—Canal does not divert water during winter.

ACCURACY.—Stage-discharge relation permanent. Rating curve fairly well defined above and poorly defined below 20 second-feet. Staff gage read to hundredths once a day and time noted when water was turned in or out of canal. Daily discharge ascertained by applying daily gage height to rating table. Records good.

COOPERATION.—Gage-height record furnished by Jordan Valley Irrigation district.

Discharge measurements of Jordan Valley feed canal near Jordan Valley, Oreg., during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
Feb. 27	G. H. Canfield.....	<i>Feet</i> 1.70	<i>Sec.-ft.</i> 13.6	May 3	G. H. Canfield.....	<i>Feet</i> 2.94	<i>Sec.-ft.</i> 80
27	.....do.....	1.48	12.0	July 8	H. G. Kennard *.....	2.26	42.3

* Water master.

Daily discharge, in second-feet, of Jordan Valley feed canal near Jordan Valley, Oreg., for the year ending September 30, 1923

Day	Mar.	Apr.	May	June	July	Day	Mar.	Apr.	May	June	July
1-----	27	63	63	84	66	16-----	17	84	40	72	20
2-----	20	84	94	91	66	17-----	55	84	0	72	15
3-----	0	55	81	52	63	18-----	40	78	0	78	
4-----	0	40	91	72	60	19-----	25	75	0	60	
5-----	0	31	91	66	55	20-----	27	72	4	81	
6-----	0	91	98	45	50	21-----	48	91	8	78	
7-----	0	29	84	75	48	22-----	50	66	11	94	
8-----	0	22	102	81	48	23-----	45	52	20	91	
9-----	0	20	68	72	45	24-----	52	84	35	84	
10-----	0	8	0	75	40	25-----	60	88	57	78	
11-----	0	40	0	63	35	26-----	69	91	66	84	
12-----	0	52	0	55	31	27-----	72	94	67	78	
13-----	4	69	23	78	15	28-----	13	78	72	81	
14-----	20	66	27	75	17	29-----	72	94	66	75	
15-----	17	63	33	69	16	30-----	78	78	84	69	
						31-----	52		81		

Monthly discharge of Jordan Valley feed canal near Jordan Valley, Oreg., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March-----	78	0	27.8	1,710
April-----	94	8	64.7	3,850
May-----	102	0	47.3	2,910
June-----	94	45	74.3	4,420
July-----	66	0	22.8	1,370
The period-----				14,300

NOTE.—Water turned out of canal July 18.

OWYHEE CANAL NEAR OWYHEE, OREG.

LOCATION.—In NE. $\frac{1}{4}$ sec. 12, T. 21 S., R. 45 E., 1 mile below head of canal, 6 miles southwest of Owyhee, Malheur County, and 15 miles southwest of Nyssa.

RECORDS AVAILABLE.—October 5, 1911, to September 30, 1916; and irrigation seasons 1904, 1905, and 1920 to 1923.

GAGE.—Vertical staff at right end of footbridge; read by W. H. Beam.

DISCHARGE MEASUREMENTS.—Made from a footbridge at gage.

CHANNEL AND CONTROL.—Bed clean and smooth. Control not well defined but fairly permanent.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 277 second-feet during several days in April, May, and June. Canal dry at times during each winter.

1904-1905, 1911-1916, 1920-1923: Maximum stage recorded, 4.3 feet May 17, 1921, and May 10-11, 1922 (discharge, 333 second-feet); canal dry at various times each year.

ICE.—No record during winter.

DIVERSIONS.—Station is above all diversions. Surplus water is returned to Owyhee River through two wasteways between this station and station on Owyhee River near Owyhee.

REGULATION.—Abrupt changes of stage due to manipulation of head gates not to be expected, as water is kept at nearly constant stage.

ACCURACY.—Stage-discharge relation changed by placing of one to three 4-inch flashboards on check about 1 mile below gage from about July 1 to end of irrigation season. Rating curve for March 28 to June 30 well defined. Corrections applied July 1 to August 31 somewhat uncertain. Gage read to tenths once a day. Daily discharge ascertained by applying daily discharge to rating table. Records good for April to June, fair July to September.

COOPERATION.—Record furnished by I. E. Oakes, manager of Owyhee Canal.

Owyhee Canal diverts water from Owyhee River in sec. 18, T. 21 S., R. 46 E. In 1920 it supplied water for irrigation of 13,397 acres of land near Owyhee, Nyssa, and Ontario.

The following discharge measurement was made by Canfield and Kennard: May 1, 1923: Gage height, 3.63 feet; discharge, 255 second-feet.

Daily discharge, in second-feet, of Owyhee Canal near Owyhee, Oreg., for the year ending September 30, 1923

Day	Mar.	Apr.	May	June	July	Aug.	Day	Mar.	Apr.	May	June	July	Aug.
1.....		135	255	266	244	162	16.....		255	222	266	212	126
2.....		135	266	277	233	162	17.....		255	192	266	222	126
3.....		144	266	277	212	162	18.....		277	101	266	222	126
4.....		144	266	255	212	153	19.....		277	255	266	222	126
5.....		144	266	255	212	153	20.....		277	266	266	222	126
6.....		162	266	255	192	144	21.....		266	277	255	212	126
7.....		244	255	255	192	135	22.....		255	266	255	212	126
8.....		244	266	255	212	135	23.....		255	266	266	212	126
9.....		244	266	255	222	135	24.....		255	277	255	202	126
10.....		244	277	266	244	135	25.....		233	277	266	182	126
11.....		266	222	255	244	135	26.....		244	277	255	182	126
12.....		266	222	255	244	135	27.....		255	277	255	182	135
13.....		277	255	255	244	135	28.....	3	255	266	255	182	135
14.....		277	255	255	244	126	29.....	101	255	266	266	172	144
15.....		277	255	255	212	126	30.....	101	255	255	266	172	153
							31.....	101	255	255	266	172	166

Monthly discharge of Owyhee Canal near Owyhee, Oreg., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March 28-31.....	101	3	76.5	607
April.....	277	135	236	14,000
May.....	277	101	253	15,600
June.....	277	255	260	15,500
July.....	244	172	211	13,000
August.....	162	126	137	8,420
September.....			* 153	9,100
The period.....				76,200

* Estimated.

NOTE.—Record on Owyhee River, immediately below the diversion point of Owyhee Canal, indicates that water was running in canal Oct. 1-31, mean discharge estimated as about 112 second-feet, run-off 6,890 acre-feet; total run-off for year 83,100 acre-feet. Some water may have been run for stock Nov. 1 to Mar. 27; amount probably negligible.

BOISE RIVER NEAR TWIN SPRINGS, IDAHO

LOCATION.—About sec. 23, T. 4 N., R. 6 E. (unsurveyed), a quarter of a mile above Birch Creek, $1\frac{1}{2}$ miles above flow line of Arrowrock Reservoir, 4 miles below Twin Springs, Boise County, and 18 miles above Arrowrock.

DRAINAGE AREA.—830 square miles (measured on topographic maps).

RECORDS AVAILABLE.—March 21, 1911, to September 30, 1923.

GAGE.—Friez water-stage recorder on right bank; installed April 4, 1915; inspected by John Pfoser.

DISCHARGE MEASUREMENTS.—Made from cable 50 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders. Control practically permanent, except under unusually severe ice or flood conditions. Banks not overflowed. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 6.23 feet at 3.30 a. m. May 26 (discharge, 6,080 second-feet); minimum discharge, probably less than 310 second-feet during winter.

1911-1923: Maximum stage recorded, 7.82 feet at 3 a. m. May 15, 1917 (discharge, 9,430 second-feet); minimum stage, 1.73 feet at 10.30 p. m. November 13, 1916 (discharge, about 142 second-feet).

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—No important diversions above stations.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent; affected by ice during portions of December and February. Rating curve well defined. Operation of water-stage recorder satisfactory except for estimated periods as noted in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph. Records good except for estimated periods for which they are fair.

Discharge measurements of Boise River near Twin Springs, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Jan. 18	Berkeley Johnson	2.17	377	June 9	Berkeley Johnson	5.10	4,050
Mar. 7	do	2.28	451	29	do	4.58	3,130
7	do	2.28	438	July 19	Johnson and Veatch	3.02	1,120
7	do	2.28	454	Sept. 18	F. M. Veatch	2.04	331
May. 15	do	4.28	2,630	19	do	2.04	331

Daily discharge, in second-feet, of Boise River near Twin Springs, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	319	375		411		590	1,440	1,820	2,220	3,330	615	380
2.....	314	355		390		615	1,440	1,580	2,130	3,160	599	370
3.....	314	337		375			1,440	1,480	2,060	2,920	583	360
4.....	319	324		375		545	1,220	1,640	2,060	2,620	551	355
5.....	324			380			1,140	2,200	2,260	2,330	535	355
6.....	324			350	300	479	1,170	2,920	2,620	2,200	528	350
7.....	328					453	1,130	3,330	3,080	2,000	514	346
8.....	314			400		435	1,040	3,680	3,500	1,940	500	346
9.....	314			447		395	970	4,220	4,040	1,820	486	337
10.....	314			453		355	1,070	4,220	4,490	1,700	472	332
11.....	310			423		385	1,290	3,680	4,940	1,700	459	337
12.....	328			395		395	1,700	3,240	5,320	1,630	447	332
13.....	385			350		390	1,700	2,920	4,490	1,550	435	328
14.....	346			370	330	370	1,510	2,840	3,330	1,520	453	328
15.....	332		370	370		350	1,600	2,760	2,690	1,410	472	328
16.....	328			365		375	2,060	2,760	2,470	1,390	447	328
17.....	324	350		400	355	400	2,620	2,920	2,330	1,420	429	324
18.....	324			390		375	2,400	3,680	2,260	1,220	417	328
19.....	324			375		390	2,400	3,770	2,620	1,110	429	324
20.....	324			370	400	417	1,940	3,770	2,620	1,030	591	319
21.....	319					390	1,640	3,860	2,840	980	521	314
22.....						405	1,410	3,950	3,160	940	453	319
23.....						411	1,230	4,130	3,000	890	435	324
24.....				360	465	429	1,130	4,400	2,760	1,050	411	328
25.....	325					435	1,120	5,320	2,540	1,130	395	328
26.....					520	459	1,290	6,080	2,470	900	390	385
27.....				355		583	1,640		2,470	820	380	423
28.....						830	2,130		2,620	752	380	375
29.....	332		472			1,140	2,260	3,700	3,000	705	375	355
30.....	328		435	320		1,400	2,060		3,240	669	380	342
31.....	342		423			1,550				651	390	

NOTE.—Discharge estimated because of missing gage heights or ice effect, Oct. 22-28, Nov. 5 to Dec. 28, Jan. 7-8, 21-26, 28-31, Feb. 1-16, 18-23, 25-28, Mar. 1-2, 4-5, May 27 to June 1. Braced figures show mean estimated discharge for periods indicated.

Monthly discharge of Boise River near Twin Springs, Idaho, for the year ending September 30, 1923

[Drainage area, 830 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	385		326	0.393	0.45	20,000
November.....			350	.422	.47	20,800
December.....			377	.454	.52	23,200
January.....			374	.451	.52	23,000
February.....			367	.442	.46	20,400
March.....	1,550	350	545	.657	.76	33,500
April.....	2,620	970	1,570	1.89	2.11	93,400
May.....	6,080	1,480	3,410	4.11	4.74	210,000
June.....	5,320	2,060	2,990	3.60	4.02	178,000
July.....	3,330	651	1,530	1.84	2.12	94,100
August.....	615	375	467	.563	.65	28,700
September.....	423	314	343	.413	.46	20,400
The year.....	6,080		1,060	1.28	17.28	766,000

ARROWROCK RESERVOIR AT ARROWROCK, IDAHO

LOCATION.—In E. $\frac{1}{2}$ sec. 13, T. 3 N., R. 4 E., at Arrowrock, Boise County, 22 miles by road east of Boise.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 1, 1917, to September 30, 1923.

GAGE.—Graduations painted on center of upstream vertical face of concrete dam, in September, 1917; read usually to tenths once daily by E. L. Ballard, superintendent of Arrowrock Dam. Gage is set to sea-level datum.

EXTREMES OF CONTENTS.—Maximum stage recorded, 3,213.5 feet at 8 a. m. May 26 and 27 (contents, 284,000 acre-feet); minimum stage, reservoir drained October 1–22 when sluice gates where open and natural flow of river passing.

1918–1923: Maximum stage recorded, 3,214.1 feet June 14, 1918 (contents, 285,800 acre-feet); natural flow passing through reservoir, September 13–17, September 20 to October 1, 1919, September 13 to October 10, 1920, September 19 to October 22, 1922.

COOPERATION.—Gage-height record and table of storage capacity furnished by United States Bureau of Reclamation.

Stored water from this reservoir is used for irrigation of land in Boise Valley. The reservoir is formed by a concrete dam, gravity section, 348.5 feet high and 1,100 feet long at crest. Base of dam is 223 feet thick and thinnest point near the top is 15.5 feet thick. A 16-foot roadway is carried across on top of the dam. A lip spillway at north end of dam has a carrying capacity of 40,000 second-feet. Elevation of spillway crest referred to gage datum is 3,205 feet, the capacity of the reservoir at that stage being 259,000 acre-feet. A movable crest is provided for the spillway, the top of which is at elevation 3,211 feet. The capacity of the reservoir at that stage is 276,500 acre-feet, and about 2,900 acres of land is submerged. Elevation of center line of sluice gates is 2,967 feet, the capacity of the reservoir at that stage being 131 acre-feet.

Daily contents, in acre-feet, of Arrowrock Reservoir at Arrowrock, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		10,880	16,580	35,530	47,500	51,690	65,200	145,800	281,300	281,200	208,800	87,200
2		11,390	15,300	36,170	48,400	51,470	71,050	146,600	280,700	281,000	204,800	83,600
3		11,690	14,060	36,810	49,490	51,470	76,500	146,000	279,800	280,800	201,200	79,860
4		11,920	12,960	37,880	50,700	51,140	81,500	145,800	279,700	280,400	197,400	76,220
5		12,060	11,820	38,030	52,020	50,700	84,950	146,600	279,700	280,100	193,100	72,480
6		12,190	11,260	38,600	52,790	50,480	88,300	149,800	280,000	279,800	188,800	68,840
7		12,610	11,000	39,900	52,900	50,040	92,620	155,600	280,700	279,500	184,800	65,070
8		13,540	10,200	41,070	53,120	49,600	95,500	162,800	281,400	279,200	181,200	61,170
9		14,520	9,360	41,880	53,560	48,830	97,880	170,700	282,200	278,900	177,100	57,600
10		15,420	8,605	42,600	53,450	48,000	99,920	179,900	282,500	277,700	172,700	54,000
11		16,410	7,890	42,870	53,450	47,100	102,300	189,200	283,000	276,500	168,800	50,480
12		17,320	7,890	42,870	52,900	46,500	106,700	196,900	283,800	275,600	164,900	48,000
13		17,950	7,890	42,420	52,570	45,900	110,000	202,700	283,800	273,500	160,700	45,800
14		18,700	7,890	41,970	52,240	45,000	113,400	207,500	282,800	271,500	156,500	43,500
15		19,280	9,360	41,700	52,130	44,000	116,100	211,800	281,300	269,400	151,800	41,840
16		19,620	10,780	41,250	52,130	42,870	119,200	216,000	280,400	266,200	147,800	39,000
17		20,980	11,920	40,800	51,800	41,970	124,200	220,300	280,400	263,400	143,600	36,570
18		21,730	12,960	40,440	51,800	41,070	130,600	225,500	280,100	260,200	139,400	34,260
19		22,930	14,640	40,080	51,580	40,080	135,800	233,300	280,100	256,800	135,000	32,080
20		24,070	16,240	39,540	51,800	39,000	140,600	240,100	280,100	253,100	131,000	29,960
21		24,710	17,770	38,840	52,130	38,430	143,000	247,200	280,100	249,500	128,200	27,960
22		25,250	19,330	38,190	52,460	37,700	144,200	254,800	281,000	245,400	124,600	26,000
23	1,660	25,250	20,580	37,950	52,900	36,980	144,600	262,800	281,000	241,900	121,000	24,300
24	2,900	24,410	21,890	39,450	53,450	36,410	144,200	271,800	280,700	238,200	117,700	22,600
25	3,960	23,380	23,380	40,800	53,450	36,010	142,600	277,700	280,600	235,100	113,600	20,990
26	5,290	22,160	25,130	42,150	53,230	38,110	141,000	284,000	280,200	231,500	110,100	19,280
27	6,445	21,040	27,030	43,230	52,680	40,620	140,000	284,000	280,100	227,600	106,200	18,090
28	7,610	19,820	29,050	43,900	52,130	43,500	140,400	283,100	280,000	223,900	102,500	17,010
29	9,050	18,610	31,330	44,500	-----	47,700	142,000	282,200	280,200	218,800	98,560	15,780
30	9,825	17,540	32,950	45,200	-----	52,900	144,600	281,600	280,900	216,000	94,700	14,480
31	10,430	-----	34,340	46,500	-----	59,400	-----	281,300	-----	212,200	91,020	-----

NOTE.—Natural flow passing through reservoir, Oct. 1–22.

BOISE RIVER AT DOWLING RANCH, NEAR ARROWROCK, IDAHO

LOCATION.—In sec. 15, T. 3 N., R. 4 E., at Dowling ranch, Elmore County, three-fourths mile above Moore Creek, 2 miles below Highland power dam, and 4 miles below Arrowrock, Boise County.

DRAINAGE AREA.—2,230 square miles (measured on topographic maps).

RECORDS AVAILABLE.—March 12, 1911, to September 30, 1923.

GAGE.—Friez water-stage recorder on left bank; installed March 19, 1915; inspected by J. N. Davis and J. W. Thompson.

DISCHARGE MEASUREMENTS.—Made from cable 50 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders. One channel at all stages. Control shifts slightly. Stage of zero flow as determined December 21, 1921, is at gage height 0.60 foot \pm 0.05 foot.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year from water-stage recorder, 7.50 feet at 7 p. m. May 26 (discharge, 10,300 second-feet); minimum stage, 1.12 feet at 10:30 a. m. March 28 (discharge, 48 second-feet).

1911-1923: Maximum stage recorded, 9.27 feet noon to 4 p. m. June 12, 1921 (discharge, 16,500 second-feet); minimum stage occurred December 15 and 28, 1917, when stage was below gage owing to closing of gates at Arrowrock Dam (estimated discharge, 20 second-feet).

ICE.—Stage-discharge relation slightly affected by ice.

DIVERSIONS.—No important diversions above station. New York Canal of Boise project, United States Bureau of Reclamation diverts 10 miles below and has a maximum capacity of 2,500 second-feet. Several smaller canals, total capacity of about 2,900 second-feet, divert below New York Canal.

REGULATION.—Since February 21, 1915, flow has been regulated at Arrowrock Dam, 4 miles upstream, which has storage capacity of about 280,000 acre-feet. Water is stored during winter and spring and released during irrigation season.

ACCURACY.—Stage-discharge relation changed during ice-affected period December 12-28; used two well-defined rating curves; one applicable October 1 to December 11, the other applicable December 29 to September 30. Operation of water-stage recorder satisfactory except February 2-9 and March 27-29 for which periods staff readings were used. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph except for periods indicated in footnote to table of daily discharge for which it was ascertained from observer's notes, weather records, and record of gate openings at Arrowrock Dam. Records good except for estimated periods for which they are fair.

COOPERATION.—Several discharge measurements furnished by United States Bureau of Reclamation and water master for Boise River.

Discharge measurements of Boise River at Dowling ranch, near Arrowrock, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 25	Kief and Tallman	2.06	313	May 28	Elford and Tuller	6.58	7,660
Nov. 9	do.	2.14	351	June 9	Berkeley Johnson	6.66	7,570
Dec. 1	Johnson and Steward	3.38	1,220	12	do.	7.24	9,570
16	Bryan and Paulsen	1.62	91.2	27	Tuller and Elford	5.56	4,900
Jan. 16	Berkeley Johnson	3.27	1,040	29	Berkeley Johnson	5.80	5,340
Feb. 10	Bryan and Johnson	3.04	871	July 18	Tallman and Tuller	5.22	4,070
Mar. 5	Berkeley Johnson	3.55	1,310	20	Veatch and Johnson	5.14	3,930
16	Johnson and Fiedler	3.65	1,420	26	Tallman and Tuller	5.05	3,690
16	do.	3.65	1,420	Aug. 17	Tuller and Tallman	4.65	2,940
28	A. G. Fiedler	1.12	48.5	20	Paulsen and Veatch	4.67	2,960
Apr. 17	Berkeley Johnson	4.36	2,480	20	Veatch and Paulsen	4.66	3,020
May 3	Tallman and Steward	5.11	3,840	Sept. 14	Tallman and Elford	3.88	1,840
15	Berkeley Johnson	5.08	3,650	20	F. M. Veatch	3.80	1,690
27	C. F. Elford	7.14	8,990				

- Water master for Boise River.
- Employees of U. S. Bureau of Reclamation.
- Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Boise River at Dowling ranch, near Arrowrock, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	709	545	1,220	376	440	1,340	549	3,690	5,440	5,940	3,100	2,580
2	709	568	1,240	478		1,340	699	3,790	4,980	5,810	3,100	2,580
3	688	574	1,200	420		1,340	886	3,790	4,530	5,440	3,100	2,580
4	702	586	1,200	456		1,340	1,230	3,590	4,320	5,090	3,200	2,580
5	716	586	1,200	531		1,340	1,310	3,590	4,420	4,640	3,200	2,580
6	716	556	1,260	600	440	1,340	1,340	3,490	4,750	4,210	3,100	2,580
7	724	375	1,220	840		1,340	1,540	3,390	5,440	4,000	3,100	2,580
8	716	325	1,200	646		1,340	1,660	3,300	6,320	3,790	3,100	2,490
9	695	334	1,180	706		1,330	1,720	3,300	7,160	3,900	3,100	2,410
10	680	361	1,030	846		1,330	1,760	3,390	8,050	3,900	3,010	2,410
11	688	375	824	978	862	1,330	1,850	3,390	8,360	3,690	3,100	2,100
12	716	384		1,040	870	1,360	1,960	3,490	9,300	4,000	3,100	1,820
13	777	343		1,040	854	1,400	2,030	3,690	8,980	4,100	3,100	1,770
14	800	317		1,056	854	1,390	2,180	3,690	7,600	4,000	3,100	1,750
15	746	321		1,060	870	1,420	2,330	3,790	6,060	4,000	3,010	1,800
16	709	321	175	1,070	870	1,460	2,410	3,790	7,900	4,100	3,010	1,850
17	702	330		1,070	870	1,460	2,490	3,790	4,860	4,100	2,920	1,800
18	695	361		1,070	870	1,450	2,580	3,590	4,640	4,000	3,010	1,740
19	702	375		1,080	792	1,430	2,740	3,490	4,750	3,900	3,010	1,700
20	709	398		1,120	699	1,430	2,920	3,490	4,750	3,900	2,920	1,650
21	724	398	175	1,120	699	1,420	3,100	3,490	4,860	3,790	2,920	1,610
22	472	417		995	706	1,420	3,100	3,590	5,440	3,790	2,830	1,540
23	271	754		325	748	1,410	3,100	3,590	5,560	3,790	2,740	1,490
24	300	968		251	978	1,410	3,300	4,530	5,320	3,790	2,660	1,460
25	304	1,130		248	1,180	549	3,390	6,460	5,090	3,690	2,660	1,490
26	283	1,160	118	248	1,270	111	3,490	9,300	4,750	3,690	2,740	1,480
27	259	1,180		425	1,330	80	3,490	9,300	4,750	3,590	2,660	1,460
28	263	1,270		588	1,340	48	3,590	7,600	4,750	3,490	2,660	1,420
29	267	1,240		273	-----	48	3,590	6,460	5,200	3,490	2,660	1,380
30	379	1,200		186	-----	144	3,590	5,940	5,680	3,800	2,580	1,300
31	494	-----	269	112	-----	345	-----	5,560	-----	3,200	2,580	-----

NOTE.—Discharge estimated because of ice Dec. 12-28, Jan. 30 to Feb. 10; on account of missing and incomplete gage-height record Mar. 27, 29, and 30; based on gage openings at Arrowrock Dam.

Monthly discharge of Boise River at Dowling ranch, near Arrowrock, Idaho, for the year ending September 30, 1923

[Drainage area, 2,230 square miles]

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	800	259	591	36,300
November.....	1,270	317	602	35,800
December.....	1,260	-----	527	32,400
January.....	1,120	-----	677	41,600
February.....	1,340	-----	752	41,800
March.....	1,460	48	1,110	68,200
April.....	3,590	549	2,330	139,000
May.....	9,300	3,300	4,430	272,000
June.....	9,300	4,320	5,800	345,000
July.....	5,940	3,200	4,070	250,000
August.....	3,200	2,580	2,940	181,000
September.....	2,580	1,300	1,930	115,000
The year.....	9,300	-----	2,150	1,560,000

BOISE RIVER AT NOTUS, IDAHO

LOCATION.—In sec. 34, T. 5 N., R. 4 W., at steel highway bridge a quarter of a mile south of Notus, Canyon County, and 7 miles northwest of Caldwell.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 1, 1920, to September 30, 1923.

GAGE.—Vertical staff of Steward type bolted to center tubular steel pier on upstream side of highway bridge; read by Mrs. Ida B. Mansell.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of clean gravel and cobbles. One channel during all but extreme high stages. Control formed by well-defined gravel bar; subject to change at extreme high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.40 feet May 27 (discharge, 7,160 second-feet); minimum stage, 0.57 foot August 18 (discharge, 29 second-feet).

1920-1923: Maximum stage recorded, 7.0 feet May 19 and 20, 1921 (discharge, 14,500 second-feet); minimum discharge, 10 second-feet, August 18, 1920.

ICE.—Stage-discharge relation seldom affected by ice; observations discontinued during winter.

DIVERSIONS.—Below practically all diversions for irrigation in Boise Valley. Records during irrigation season show amount of water wasted into Snake River.

REGULATION.—Flow regulated by head gates at Arrowrock Reservoir and by numerous diversions between station and reservoir.

ACCURACY.—Stage-discharge relation permanent during period of record. Rating curve well defined above 50 second-feet. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table. Records good.

Discharge measurements of Boise River at Notus, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 26	A. G. Fiedler	2.32	664	June 3	Berkeley Johnson	3.85	2,850
Apr. 3	do	2.11	594	July 5	do	2.91	1,260
15	Berkeley Johnson	1.48	235	12	do	1.08	120
May 9	do	1.01	82.7	25	Veatoh and Johnson	1.28	165
29	do	4.22	3,630	Aug. 25	F. M. Veatch .....	.69	45.8

• Made during heavy wind and rain, discharge doubtful.

Daily discharge, in second-feet, of Boise River at Notus, Idaho, for the year ending September 30, 1923

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....		695	770	4,130	1,980	70	40
2.....		590	810	3,620	1,810	39	46
3.....		495	695	2,820	1,650	33	52
4.....		410	525	2,330	1,500	33	50
5.....		590	438	1,980	950	37	49
6.....		625	360	2,060	525	57	47
7.....		660	238	1,980	410	85	41
8.....		660	123	2,930	173	57	43
9.....		625	81	3,870	188	49	44
10.....		590	87	4,130	231	52	50
11.....		525	137	4,970	119	52	50
12.....		410	168	5,270	108	53	53
13.....		410	105	6,190	41	52	57
14.....		295	137	5,270	179	65	44
15.....		234	197	3,620	295	58	44
16.....		150	275	3,150	438	49	41
17.....		145	770	1,980	855	34	40
18.....		203	810	1,360	410	29	37
19.....		147	770	1,500	295	33	41
20.....		114	730	1,650	231	114	37
21.....		238	730	1,980	217	142	40
22.....		410	770	2,330	231	110	41
23.....		238	730	3,620	168	97	44
24.....		197	2,240	3,380	191	70	47
25.....		145	2,930	2,930	170	46	53
26.....	660	142	3,870	2,930	203	50	123
27.....		140	7,160	2,820	150	65	385
28.....		163	5,270	2,150	130	68	410
29.....		275	3,620	2,060	105	65	410
30.....		625	3,150	1,980	97	60	360
31.....			3,150		74	61	

Monthly discharge of Boise River at Notus, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April.....	695	114	372	22,100
May.....	7,160	81	1,350	83,000
June.....	6,190	1,360	3,030	180,000
July.....	1,980	41	456	28,000
August.....	142	29	60.8	3,740
September.....	410	37	94.0	5,590
The period.....				322,000

DIVERSIONS FROM BOISE RIVER, IDAHO

Below mouth of Moore Creek and between gaging stations at Dowling ranch and Notus, 27 principal canals and a number of small farm laterals divert water from Boise River for use in irrigation.

Daily gage-height records were obtained, frequent discharge measurements made, and records summarized under direction of A. V. Tallman, water master for Boise River.

Records are available from 1919 to 1923. Record of daily diversions subsequent to 1915 is on file in office of Idaho commissioner of reclamation.

Total amount of water, in acre-feet, diverted by each canal during irrigation season of 1923

Main canal of United States Bureau of Reclamation.....	710,000	Phyllis.....	124,000
Penitentiary.....	3,070	Eureka No. 1.....	5,650
Ridenbaugh.....	135,000	Pioneer.....	7,820
Bubb.....	4,020	Canyon County.....	22,600
Cruzen.....	19,200	Caldwell High Line.....	15,200
Boise City, No. 1.....	1,520	Farmers' Cooperative.....	88,500
Settlers'.....	47,200	Canyon.....	5,200
Thurman's mill.....	9,240	Seibenberg.....	3,570
Farmers' Union (includes Boise Valley diversion).....	66,200	Riverside No. 2.....	54,200
Little Union.....	3,900	Pioneer Dixie.....	9,360
Dry Creek.....	16,800	Eureka No. 2.....	16,300
Ballantine.....	4,190	Upper Center Point.....	3,510
7 Eagle Island canals.....	13,700	Lower Center Point.....	2,820
Middleton Water Co.....	29,300	Miscellaneous.....	9,070
Middleton Mill ditch.....	26,500		
			1,460,000

Combined monthly discharge of canals diverting from Boise River, Idaho, during irrigation season of 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April.....	4,770	1,160	3,320	198,000
May.....	5,190	4,570	4,960	305,000
June.....	4,990	3,680	4,420	263,000
July.....	5,080	4,120	4,740	281,000
August.....	4,100	3,490	3,800	234,000
September.....	3,450	2,180	2,800	167,000
The period.....				1,460,000

SOUTH FORK OF BOISE RIVER NEAR LENOX, IDAHO⁴

LOCATION.—In sec. 24, T. 2 N., R. 6 E., in canyon at R. S. Sandlin's ranch, 1 mile above mouth of Smith Creek, 4 miles above flow line of Arrowrock Reservoir, 4 miles southwest of Lenox post office, Elmore County, 14 miles above mouth, and 18 miles above Arrowrock Dam.

DRAINAGE AREA.—1,090 square miles (measured on topographic maps).

RECORDS AVAILABLE.—March 24, 1911, to September 30, 1923.

GAGE.—Friez water-stage recorder on right bank; installed April 11, 1915; inspected by R. S. Sandlin.

DISCHARGE MEASUREMENTS.—Made from cable 100 feet above gage or by wading

CHANNEL AND CONTROL.—Bed composed of mud and gravel. Control of coarse gravel and rock; practically permanent. One channel at all stages.

⁴ Designated in previous reports as "South Fork of Boise River near Prairie, Idaho."

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 7.42 feet from 10 to 11 a. m. May 26 (discharge, 5,080 second-feet); minimum stage, 2.21 feet at 9 a. m. January 28 (discharge, 245 second-feet); lower flow may have occurred during periods of ice effect.

1911-1923: Maximum stage recorded, 9.53 feet at 11 a. m. May 15, 1917 (discharge, 9,200 second-feet); minimum stage, 1.94 feet at 1 p. m. December 16, 1915 (discharge, 197 second-feet).

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—No important diversions above or below gage.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed between December 12 and 28; affected by ice December 12 to 28 and January 30 to February 20. Rating curves well-defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph except as noted in footnote to daily-discharge table. Records good, except for estimated periods, for which they are fair.

Discharge measurements of South Fork of Boise River near Lenox, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Jan. 19	Berkeley Johnson	2.58	364	June 11	Berkeley Johnson	6.70	3,910
Apr. 5	do	4.39	1,390	30	do	5.61	2,550
5	do	4.39	1,370	July 21	do	3.48	798
May 18	do	6.28	3,400	Sept. 11	F. M. Veatch	2.44	316

Daily discharge, in second-feet, of South Fork of Boise River near Lenox, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	323	374	313	376		425	1,350	2,000	2,480	2,480	576	392
2	320	370	340	342		473	1,390	1,810	2,200	2,420	552	380
3	320	355	370	365		468	1,470	1,720	2,000	2,310	533	365
4	316	337	370	346		421	1,390	1,950	1,950	2,100	514	354
5	320	340	374	380		429	1,430	2,420	2,000	1,950	500	446
6	323	337	397	388		434	1,640	3,000	2,200	1,810	486	342
7	323	351	397	368		434	1,550	3,380	2,590	1,680	473	335
8	320	366	366		320	421	1,430	3,520	2,940	1,550	464	328
9	316	385	326			392	1,350	3,800	3,190	1,470	455	328
10	313	417	348			357	1,430	3,960	3,520	1,390	442	321
11	313	405	344	360		368	1,590	3,660	3,800	1,320	429	315
12	340	374				404	2,000	3,320	4,100	1,280	416	311
13	385	344				416	2,100	3,000	3,960	1,210	404	308
14	370	303		354		412	1,860	2,940	3,120	1,280	404	308
15	359	330		350		400	1,860	2,820	2,590	1,140	425	304
16	351	348		346		408	2,200	2,820	2,260	1,080	412	295
17	348	385		388		464	2,700	2,880	2,150	1,050	396	292
18	348	471		388	340	455	2,590	3,190	2,000	955	372	298
19	348	397		368		434	2,590	3,260	2,000	896	376	301
20	344	348	350	342		464	2,200	3,260	2,000	838	799	301
21	340	348		321	357	486	1,950	3,380	2,050	810	627	301
22	340	306		318	365	468	1,680	3,590	2,310	793	491	298
23	344	297		388	368	486	1,510	3,660	2,310	760	446	298
24	344	300		388	380	509	1,350	3,800	2,260	788	416	301
25	344	310		384	412	514	1,320	4,420	2,200	896	400	304
26	348	320		365	404	519	1,350	4,910	2,050	771	388	354
27	348	348		339	392	591	1,590	4,100	2,100	700	380	416
28	340	355		318	400	727	1,950	3,380	2,050	668	372	380
29	340	389	446	315		896	2,200	2,880	2,200	627	368	365
30	340	381	388			1,140	2,200	2,700	2,420	606	372	350
31	348		384	310		1,320		2,530		606	392	

NOTE.—Estimated because of ice, by means of weather records, observer's notes, and comparison of flow at other stations in the same drainage basin, Dec. 12-28 and Jan. 30 to Feb. 20 and on account of missing gage-height record Jan. 8-13. Braced figures show mean discharge for periods indicated.

Monthly discharge of South Fork of Boise River near Lenox, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	385	313	338	0.310	0.36	20,800
November.....	471	300	356	.327	.36	21,200
December.....			358	.328	.38	22,000
January.....			355	.326	.38	21,800
February.....			342	.314	.33	19,000
March.....	1,320	357	520	.477	.55	32,000
April.....	2,700	1,320	1,770	1.62	1.81	105,000
May.....	4,910	1,720	3,160	2.90	3.34	194,000
June.....	4,100	1,950	2,500	2.29	2.56	149,000
July.....	2,480	606	1,230	1.13	1.30	75,600
August.....	799	368	454	.417	.48	27,900
September.....	416	292	330	.303	.34	19,600
The year.....	4,910		979	.898	12.19	708,000

MOORE CREEK NEAR ARROWROCK, IDAHO

LOCATION.—In sec. 21, T. 3 N., R. 4 E., at highway bridge on Boise-Arrowrock road, a quarter of a mile above mouth and 5 miles southwest of Arrowrock, Boise County.

DRAINAGE AREA.—426 square miles (measured on topographic maps.).

RECORDS AVAILABLE.—October 1, 1914, to September 30, 1923 (discharge measurements only prior to December 1, 1915).

GAGE.—Vertical staff on right bank 15 feet above highway bridge; read by Oliver Call.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of boulders, cobbles, and sand. Control shifts frequently owing to deposition of sand during low stages and scouring out at high stages. Stream usually carries much sand and silt as a result of placer operations in Boise basin. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.90 feet at 7:30 a. m. April 17 (discharge, 1,220 second-feet); minimum stage, 0.40 foot September 8 to 10 and 13 to 22 (discharge, 32 second-feet).

1915-1923: Maximum stage recorded, 6.3 feet April 11, 1916 (discharge, 3,140 second-feet); minimum stage, 0.60 foot August 17, 21-23, 1920 (discharge, 17 second-feet).

ICE.—Stage-discharge relation not seriously affected by ice.

DIVERSIONS.—No important diversions above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent; affected by ice December 12-28 and January 30 to February 9. Standard rating curve well defined; used direct October 1 to January 8; parallel curves and shifting-control method used during remainder of year except for ice-affected periods. Gage read to half-tenths once daily during high water and to hundredths during low water; rough water at high stages makes it difficult to read gage with refinement. Daily discharge obtained by applying daily gage height to rating table using shifting-control method January 9-14, February 10-20, July 2-17, July 27 to August 14, and August 21 to September 30. Records of daily discharge subject to error; monthly records good.

COOPERATION.—Several discharge measurements made by employees of United States Bureau of Reclamation and water master for Boise River.

Discharge measurements of Moore Creek near Arrowrock, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 25	Kief and Tallman	0.55	65.2	May 3	Tallman and Steward	2.10	613
Nov. 9	do	.67	78.2	7	Tuller and Steward	2.50	853
Dec. 16	Bryan and Paulsen	.58	57.3	15	Berkeley Johnson	2.33	622
Jan. 16	Berkeley Johnson	.94	90.9	June 9	do	2.02	486
Feb. 10	Johnson and Bryan	.72	77.6	27	Tuller and Elford	1.87	414
10	do	.76	87.2	29	Berkeley Johnson	1.75	319
10	Bryan and Johnson	.80	103	July 18	Tallman and Tuller	1.04	147
10	do	.84	104	20	Johnson and Veatch	.90	110
Mar. 5	Berkeley Johnson	1.31	190	26	Tallman and Tuller	.91	116
16	Fiedler and Johnson	1.24	191	Aug. 17	Tuller and Tallman	.56	50.5
16	do	1.23	174	20	Veatch and Paulsen	.69	65.4
28	A. G. Fiedler	1.88	385	Sept. 20	F. M. Veatch	.43	33.7
Apr. 17	Berkeley Johnson	2.78	1,060				

* Water master for Boise River.

† Stage-discharge relation affected by ice.

• Employees of U. S. Bureau of Reclamation.

Daily discharge, in second-feet, of Moore Creek near Arrowrock, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	50	71	54	120	65	175	775	615	580	293	71	42
2	50	71	68	91		218	820	549	490	279	68	40
3	52	67	68	96		218	920	490	438	269	66	39
4	54	67	79	120		161	775	549	438	249	64	37
5	54	66	82	120		189	775	615	463	224	62	35
6	55	63	98	120	89	189	920	775	392	221	61	34
7	54	68	100	212		175	775	820	490	212	61	33
8	55	71	82	276		183	775	920	490	200	58	32
9	54	76	62	233		148	730	975	490	183	57	32
10	54	82	79	194		136	820	975	518	175	54	32
11	54	86	68	186	91	161	870	975	549	153	54	34
12	56	81		159	89	148	1,090	775	580	151	50	33
13	62	75		120	82	161	1,030	730	518	153	47	32
14	58	67		95	98	156	920	690	438	169	47	32
15	58	68		102	87	125	920	650	392	148	53	32
16	58	71	85	91	86	161	975	615	370	132	53	32
17	56	82		112	84	148	1,150	615	414	161	50	32
18	56	118		127	91	136	1,090	775	370	143	49	32
19	58	91		122	98	161	1,090	820	392	122	46	32
20	58	96		98	96	161	870	730	392	112	62	34
21	58	79	169	69	104	148	775	820	370	108	64	32
22	62	75		60	110	183	690	775	414	108	63	32
23	62	75		93	118	175	615	775	438	96	56	33
24	62	75		102	136	212	549	730	392	93	54	35
25	62	75		102	161	218	518	775	392	125	53	35
26	63	75	143	102	148	256	549	775	350	114	47	40
27	63	75		76	118	312	580	690	392	102	47	55
28	63	79		69	156	392	730	615	350	91	43	49
29	63	86		52	-----	549	820	490	330	84	42	49
30	64	68		50	-----	650	775	615	312	76	42	48
31	63	-----	138	-----	-----	775	-----	518	-----	74	42	-----

NOTE.—Discharge estimated because of ice, based on gage heights, observer's notes, weather records, and discharge measurements, Dec. 12-28 and Jan. 30 to Feb. 9. Braced figures show mean discharge for periods indicated.

Monthly discharge of Moore Creek near Arrowrock, Idaho, for the year ending September 30, 1923

[Drainage area, 426 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	64	50	57.8	0.136	0.16	3,550
November.....	118	63	76.6	.180	.20	4,560
December.....	-----	-----	88.2	.207	.24	5,420
January.....	276	-----	117	.275	.32	7,190
February.....	161	-----	93.8	.220	.23	5,210
March.....	775	125	232	.545	.63	14,300
April.....	1,150	518	823	1.93	2.15	49,000
May.....	975	490	717	1.68	1.94	44,100
June.....	580	312	431	1.01	1.13	25,600
July.....	293	74	155	.364	.42	9,530
August.....	71	42	54.5	.128	.15	3,350
September.....	55	32	36.3	.085	.09	2,160
The year.....	1,150	32	240	.563	7.66	174,000

MALHEUR RIVER NEAR DREWSEY, OREG.

LOCATION.—In SE. $\frac{1}{4}$ sec. 3, T. 22 S., R. 36 E., half a mile above high-water flow line of Warmsprings Reservoir, 8 miles above dam, and 10 miles below Drewsey, Harney County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 26 to September 30, 1923, when station was discontinued. June 1 to December 29, 1920, and April 11 to September 4, 1921, comparable records at a site 7 miles upstream. March 9 to September 30, 1914, a station was maintained 20 miles upstream, but records are not comparable because of inflow from Griffin, Otis, and Stinking Water Creeks.

GAGE.—Barrett & Lawrence water-stage recorder on left bank, installed May 27, 1923; Stevens 8-day water-stage recorder used April 27 to May 27; inspected by H. G. Kennard and U. S. Yost.

DISCHARGE MEASUREMENTS.—Made by wading or from cable 25 feet above gage.

CHANNEL AND CONTROL.—Bed at riffle is composed of gravel and boulders and is not liable to shift. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage during period from water-stage recorder, 2.18 feet at 9 a. m. April 29 (discharge, 294 second-feet); minimum stage, —0.04 foot August 26 and September 11 (discharge, 8 second-feet). Stage may have gone lower during this period but was not recorded as float was resting on mud in bottom of well.

1920-1921; 1923: Maximum discharge recorded, 2,240 second-feet at 1 a. m. April 14, 1921 (gage height, 5.63 feet); minimum discharge, 2.6 second-feet August 17, 1920 (gage height, 0.62 foot).

ICE.—No gage-height record during winter.

DIVERSIONS.—Several small diversions above station; no diversions around station or between station and Warmsprings Reservoir.

ACCURACY.—Stage-discharge relation permanent. Rating curve fairly well defined. Water-stage recorder operated fairly satisfactorily except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection. Records good except for periods of no gage height record for which they are fair.

Discharge measurements of Malheur River near Drewsey, Oreg., during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge
May 16	H. G. Kennard •	Feet	Sec.-ft.
27	do	1.80	230
		1.67	209

• Water master.

Daily discharge, in second-feet, of Malheur River near Drewsey, Oreg., for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1		250	176	126	24		16		242	149		22	17
2		235	175	124	24		17		242	137		21	18
3		210	170	121	24		18		250	134		20	18
4		210	170	121	24		19		258	133		19	19
5			159	118	24		20		242	130		18	19
6			162	116	25	8	21		242	124	43	17	20
7			156	100	25		22		235	124		17	20
8			153	83	25		23		210			15	20
9			153	66	25		24		212			12	20
10		240	151		25		25		212	140		10	20
11			148		25	8	26		212			8	20
12			153	43	25	12	27	273	212	156	20		20
13			170		25	13	28	281	205	140	20		20
14			176		14	14	29	289	190	131	22	8	20
15			163		24	15	30	258	190	129	22		20
							31		190		24		

NOTE.—Recorder ran down May 5-15; discharge estimated as the mean of the discharge for the maximum and minimum stages indicated by recording pencil. June 23-26, July 7 and 8, no record; discharge interpolated. July 10-26 and Aug. 27 to Sept. 10, float resting on mud in bottom of well; discharge interpolated.

Monthly discharge of Malheur River near Drewsey, Oreg., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May	258	190	229	14,100
June	176	124	149	8,870
July	126	20	58.5	3,600
August	25	8	18.9	1,160
September	20		14.4	857
The period	258		94.1	28,600

WARMSPRINGS RESERVOIR NEAR RIVERSIDE, OREG.

LOCATION.—In SE. $\frac{1}{4}$ sec. 8, T. 23 S., R. 37 E., on Malheur River, 4 miles above junction with South Fork and 4 miles above Riverside, Malheur County.

RECORDS AVAILABLE.—January 24, 1920, to September 30, 1923. Dam completed November 25, 1919.

GAGE.—Tape gage with float set to read depth of water above bottom of tunnel direct. Elevation of bottom of tunnel 3,327.00 feet above mean sea level.

Gage read by U. S. Yost.

EXTREMES OF STAGE.—Maximum stage recorded during year, 69.39 feet May 24 (quantity stored, 150,600 acre-feet); minimum stage, 50.42 feet September 30 (quantity stored, 82,300 acre-feet).

COOPERATION.—Daily gage readings and storage table furnished by Warmsprings Irrigation District, C. L. Batchelder, manager.

Warmsprings Reservoir stores water for the Warmsprings Irrigation District which embraces 31,618 acres of irrigable land on either side of Malheur River, extending from mouth of canyon to Ontario. Capacity of reservoir at spillway level, 74.0 feet, is 170,000 acre-feet.

Monthly stage and contents of Warmsprings Reservoir near Riverside, Oreg., for the year ending September 30, 1923

Date	Gage height	Contents	Loss or gain during month	Date	Gage height	Contents	Loss or gain during month
	<i>Feet</i>	<i>Acre-feet</i>	<i>Acre-feet</i>		<i>Feet</i>	<i>Acre-feet</i>	<i>Acre-feet</i>
Sept. 30.....	52.43	88,300	-----	May 31.....	69.35	150,400	+500
Oct. 31.....	51.70	86,100	-2,200	June 30.....	68.31	146,200	-4,200
Nov. 30.....	52.69	89,100	+3,000	July 31.....	61.90	120,600	-25,600
Dec. 31.....	54.10	93,300	+4,200	Aug. 31.....	55.42	97,300	-23,300
Jan. 31.....	56.13	99,400	+6,100	Sept. 30.....	50.42	82,300	-15,000
Feb. 28.....	57.92	104,800	+5,400				
Mar. 31.....	61.88	120,500	+15,700	The year.....	-----	-----	-6,000
Apr. 30.....	69.23	149,900	+29,400				

MALHEUR RIVER BELOW WARMSPRINGS RESERVOIR, NEAR RIVERSIDE, OREG.

LOCATION.—In SW. $\frac{1}{4}$ sec. 17, T. 23 S., R. 37 E., 1 mile below Warmsprings Dam, 3 miles above mouth of South Fork, and 4 miles northwest of Riverside, Malheur County.

DRAINAGE AREA.—About 1,100 square miles.

RECORDS AVAILABLE.—December 9, 1914, to July 4, 1917; March 18, 1919, to September 30, 1923. From January 3, 1906, to March 31, 1907, and December 15, 1908, to May 25, 1910, records were obtained at a site 4 miles below, at Riverside.

GAGE.—Vertical staff on left bank, read by U. S. Yost. From March 18, 1919, to April 27, 1920, a vertical staff on right bank, 300 feet below dam in SW. $\frac{1}{4}$ sec. 8, T. 23 S., R. 37 E.

DISCHARGE MEASUREMENTS.—Made by wading or from highway bridge one-fourth mile below dam.

CHANNEL AND CONTROL.—Concrete control 200 feet below gage. There is some disintegration of concrete during winter because of poor quality. Above a medium stage, concrete control is submerged and contraction and riffle 200 feet farther downstream acts as control for gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.75 feet from 8 a.m. July 18 to 8 p.m. July 19 (discharge, 468 second-feet); seepage was estimated at 1 second-foot when gates to reservoir were closed October 7–15 and November 3 to April 23.

1906–1923: Maximum discharge recorded, 5,490 second-feet March 2, 1910 (gage height on Riverside gage, 10.0 feet); minimum discharge recorded prior to construction of dam, practically no flow during August, 1910; determined by subtracting discharge of South Fork from discharge of main river below South Fork. Minimum discharge since construction of dam; somewhat less than 1 second-foot when gates are closed; stream was dry August 1 to September 16, 1919, while dam was being constructed.

ICE.—No water released from dam during winter.

DIVERSIONS.—A large area of bottom land is irrigated with flood water above station.

REGULATION.—Flow past station entirely controlled by operation of gates in dam above beginning with November, 1919.

ACCURACY.—Stage-discharge relation changed during winter probably due to cutting down of crest of concrete control by ice. Rating curves fairly well defined. Staff gage read to hundredths once a day and also after making any change in gate opening at dam. Daily discharge ascertained by applying to rating table the daily gage height, or, for days of considerable change in gate opening and stage, by averaging results obtained by applying gage heights for periods of day before and after change. Records excellent.

COOPERATION.—Record furnished by Warm Springs Irrigation District and water master of Malheur County.

Discharge measurements of Malheur River below Warm Springs Reservoir, near Riverside, Oreg., during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
May 15	H. G. Kennard •	<i>Feet</i> 4.25	<i>Sec.-ft.</i> 255	May 25	H. G. Kennard •	<i>Feet</i> 4.00	<i>Sec.-ft.</i> 172
16	do	4.15	222	July 12	do	4.56	357

• Water master.

Daily discharge, in second-feet, of Malheur River below Warm Springs Reservoir, near Riverside, Oreg., for the year ending September 30, 1923

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	226	20	1	205	174	289	379	296
2	226	7	1	205	174	334	379	296
3	226	1	1	205	174	388	379	296
4	194	1	1	205	174	402	375	296
5	194	1	1	205	174	402	358	296
6	98	1	1	205	168	402	358	296
7	1	1	1	229	145	402	358	296
8	1	1	1	272	145	402	358	296
9	1	1	1	296	154	402	358	296
10	1	1	1	288	160	402	329	296
11	1	1	1	258	160	402	316	296
12	1	1	1	258	160	411	329	296
13	1	1	1	258	177	445	337	296
14	1	1	1	258	205	445	337	284
15	1	1	1	258	222	445	337	276
16	13	1	1	243	222	445	337	276
17	85	1	1	222	222	445	337	276
18	40	1	1	222	222	458	337	265
19	40	1	1	232	215	463	337	259
20	40	1	1	239	205	445	337	259
21	40	1	1	219	196	445	329	259
22	40	1	1	145	174	445	316	259
23	40	1	1	162	174	419	316	259
24	40	1	45	174	174	402	316	259
25	40	1	118	174	174	402	316	222
26	33	1	118	174	174	402	316	140
27	20	1	132	174	174	402	316	118
28	20	1	145	174	174	389	316	118
29	20	1	94	174	199	379	308	118
30	20	1	123	174	239	379	296	118
31	20			174		379	296	

NOTE.—Gate in dam closed Oct. 7 to 15 and Nov. 3 to Apr. 23; estimated leakage, 1 second-foot.

Monthly discharge of Malheur River below Warm Springs Reservoir, near Riverside, Oreg., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	226	1	55.6	3,420
November.....	20	1	1.8	107
December.....			1.0	61
January.....			1.0	61
February.....			1.0	56
March.....			1.0	61
April.....	145	1	26.6	1,580
May.....	296	145	216	13,300
June.....	239	145	183	10,900
July.....	463	269	408	25,100
August.....	379	296	336	20,700
September.....	296	118	250	14,900
The year.....	463	1	124	90,200

MALHEUR RIVER NEAR NAMORF, OREG.

LOCATION.—In SE. $\frac{1}{4}$ sec. 2, T. 21 S., R. 40 E., at Froman ranch, 1 mile south of east portal of tunnel No. 1 on Oregon & Eastern Railroad, 3 miles west of Namorf flag station, and 15 miles west of Harper post office, Malheur County. North Fork of Malheur River enters near Juntura, 20 miles above.

DRAINAGE AREA.—2,560 square miles (measured on United States Land Office map).

RECORDS AVAILABLE.—May 24, 1913, to December 31, 1923, when station was discontinued.

GAGE.—Inclined staff on right bank, 300 feet above Froman ranch house; read by William Fenton.

DISCHARGE MEASUREMENTS.—Made by wading or from cable 300 feet above gage.

CHANNEL AND CONTROL.—Control, 400 feet below gage, consists of cobbles and coarse gravel; clean. Channel between control and gage and above gage is wide and current is sluggish. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period October 1, 1922, to December 31, 1923, 1.84 feet July 16 and 18 (discharge, 500 second-foot); minimum discharge estimated at 70 second-foot December 9–31, 1923.

1913–1923: Maximum stage recorded, 10.7 feet February 6, 1916 (discharge indeterminate on account of ice jam); maximum open-water stage recorded, 9.1 feet during night of February 7, 1916 (discharge, 8,450 second-foot); minimum discharge, 4 second-foot July 25, 1919 (gage height, 0.60 foot). Highest stage in recent years 11.3 feet, March 1, 1910, determined by leveling to high-water marks pointed out by F. J. Froman June 4, 1919 (discharge, estimated from extension of rating curve, 12,600 second-foot). The floods of March 7 and 9, 1894, are said to have been about 0.3 foot higher.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Many small diversions are made from the river and its branches above the gage, the largest being made near Drewsey and from North Fork near Beulah.

REGULATION.—Flow controlled to a large extent by Warm Springs Dam beginning November, 1919.

ACCURACY.—Stage-discharge relation permanent. Rating curve fairly well defined. Staff gage read to hundredths once a day except as indicated in footnote to daily-discharge table; gage-height record June 24–30 appears too low and July 1–7 too high in comparison with records for station near Hope plus Harper canals and was assumed to be erroneous. Daily discharge ascertained by applying daily gage height to rating table except for periods of no gage-height record and June 24 to July 7, when discharge was estimated by comparison with hydrograph for station near Hope plus Harper canals. Record good except for periods when discharge was estimated for which they are fair.

The following discharge measurements were made by G. H. Canfield:

February 20, 1923: Gage height, 0.91 foot; discharge, 99 second-feet.

April 27, 1923: Gage height, 1.38 feet; discharge, 282 second-feet.

Daily discharge, in second-feet, of Malheur River near Namorf, Oreg., for the period October 1, 1922, to December 31, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	320	120	87	109	85	114	243	243	293				138	79	83
2.....	320	109	87	120	85	109	251	259	284				138	79	79
3.....	320	109	87	132	85	103	251	267	293				125	76	83
4.....	311	109	83	120	85	103	243	267	284				109	76	83
5.....	293	109	87	122	85	94	251	293	284	400			109	73	83
6.....	302	103		233	88	98	267	311	293				103	71	83
7.....	259	103	109	306	88	98	365	311	293				98	71	79
8.....	109	98		247	92	94	342	311	284	415		300	90	76	79
9.....	87	98		158	92	90	320	267	284	415			83	71	79
10.....	79	103		135	92	94	311	320		442			83	71	70
11.....	79	103	110	128	92	94	293	365		442			87	76	
12.....	76	98		128	96	94	293	390		415			90	73	
13.....	76	98		122	101	87	267	390		415			83	73	
14.....	73	98	109	122	101	87	251	390		470			87	73	
15.....	79	98	103	128	112	87	275	415		442			83	76	
16.....	79	98	103	106	112	87	275	442		500	340	293	87	76	70
17.....	203	103	94	101	117	90	193	415		442		284	83	76	
18.....	125	103	94	101	112	138	320	390		500		275	79	76	
19.....	120	98	94	117	117	132	311	390		470		275	79	76	
20.....	120	98	87	117	103	125	311	415	310	442		259	79	76	
21.....	120	94	87	112	158	120	293	415		415		243	76	76	
22.....	120	94	87	112	165	114	251	390				243	73	73	
23.....	120	94	87	106	173	132	219	311				243	73	73	
24.....	120	90	94	101	173	138	203	311				251	76	71	
25.....	120	83	98	92	151	165	188	311				243	73	73	
26.....	120	83	103	92	145	188	267	293		400		227	71	73	70
27.....	109	87	109	88	125	211	267	275				211	73	76	
28.....	109	87	109	88	114	243	267	251				180	76	76	
29.....	103	83	120	88		251	320	243				158	76	79	
30.....	109	83	109	92		267	259	311				158	79	87	
31.....	109		103	92		259		293					83		

NOTE.—Dec. 7–13, 1922, discharge estimated because of ice; Mar. 14 and 15, discharge interpolated because of no gage-height record. June 10 to July 7, because of no gage-height record June 10–23 and apparent erroneous record June 24 to July 7, discharge estimated from comparison with hydrograph for station near Hope plus Harper canals. July 22–31 and Sept. 1–15, because of no gage-height record, discharge estimated at practically the same as that for station near Hope. Dec. 4–5 and 9–31, 1923, discharge estimated because of ice.

Monthly discharge of Malheur River near Namorf, Oreg., for the period October 1, 1922, to December 31, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1922-23				
October.....	220	73	151	9,280
November.....	120	83	97.8	5,820
December.....		83	100	6,150
January.....	306	88	126	7,750
February.....	173	85	112	6,220
March.....	267		132	8,120
April.....	320	188	276	16,400
May.....	442	243	331	20,400
June.....			303	18,000
July.....	500		420	25,800
August.....			340	20,900
September.....		158	268	15,900
The year.....	500	73	222	161,000
1923				
October.....	138	71	88.6	5,450
November.....	87	71	75.0	4,460
December.....	83		73.0	4,490
The period.....				14,400

• Estimated.

MALHEUR RIVER NEAR HOPE, OREG.

LOCATION.—In SW. $\frac{1}{4}$ sec. 5, T. 19 S., R. 43 E., half a mile above intake of Vines Canal, half a mile above railroad bridge, 15 miles west of Vale, and $6\frac{1}{2}$ miles west of Hope, Malheur County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 30 to October 26, 1919; May 5 to September 30, 1920; fragmentary record during 1921 and 1922; October 1, 1922, to September 30, 1923. Station maintained half a mile below intake of Vines Canal March 22 to September 30, 1914.

GAGE.—Stevens continuous water-stage recorder on left bank; inspected by John Maddock.

DISCHARGE MEASUREMENTS.—Made by wading or from cable at gage.

CHANNEL AND CONTROL.—Bed composed of sand, gravel, and boulders. One channel at all stages. Subject to shift at high stages.

EXTREMES OF DISCHARGE.—Maximum open-water stage from water-stage recorder, 3.20 feet at 7 a. m. May 10 (discharge, 1,110 second-feet); minimum stage, 1.08 feet October 16-18 (discharge, 80 second-feet).

1919-1923: Maximum discharge recorded, estimated 3,950 second-feet February 11, 1921; minimum stage, 0.02 foot from 5 to 9 p. m. September 2, 1919 (discharge, 3.5 second-feet).

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Several small canals divert water above this point.

REGULATION.—Flow controlled to a large extent by Warsprings Dam 60 miles above.

ACCURACY.—Stage-discharge relation permanent; affected by ice during winter. Rating curve well defined. Operation of water-stage recorder fairly satisfactory except for short periods during winter and July 17 to September 30, when, because of poor connection with river, the gage-height graph was erroneous and was disregarded. Daily discharge ascertained by applying to rating table daily mean gage height determined from recorder graph by inspection. Mean discharges for period July 18 to September 30, estimated from a comparison with hydrograph for station on Malheur River below Warm Springs Reservoir near Riverside. Records good except for periods when discharge was estimated, for which they are fair.

The record at this station shows discharge above the intake of the canals of Warm Springs Irrigation District.

Discharge measurements of Malheur River near Hope, Oreg., during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge
Feb. 16 Apr. 30	Canfield and Batchelder G. H. Canfield	<i>Feet</i> 1.93 1.79	<i>Sec.-ft.</i> 108 260

* Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Malheur River near Hope, Oreg., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar,	Apr.	May	June	July	Aug.	Sept.	
1.....	314	127	95	130		218	360	269	300	269	390		
2.....	305	133				218	350	314	300	277			
3.....	297	140				197	328	341	297	328			
4.....	297	131				160	314	332	305	370			
5.....	270	113				101	135	285	328	318			390
6.....	265	110	108	500		129	285	323	332	390	360	310	
7.....	257	106	127			145	360	314	350	390			
8.....	155	112	105			285	184	425	318	301			395
9.....	110	112	112			225	175	390	360	273			395
10.....	94	112	115			175	148	375	616	261			405
11.....	86	112	105	148	105		341	495	245	415			
12.....	86	112		138			341	440	257	430			
13.....	83	115		119			350	430	245	450			
14.....	83	115		115			341	430	269	500			
15.....	83	105		115			160	332	425	297			572
16.....	80	95	105	125		341	560	289	582	330	300		
17.....	80	103		125		341	455	289	610				
18.....	80	98		115		350	445	293					
19.....	125	105		119		178	350	480	289				
20.....	110			119		211	350	440	289				
21.....	115	95	105	112		225	341	450	297	450		250	
22.....	113			98		204	305	440	350				
23.....	113			90		190	265	341	328				
24.....	117			105		314	184	225	323				314
25.....	121			108		297	204	190	323				301
26.....	121	100	100	103		204	204	314	301	400	180		
27.....	119			184		204	241	305	293				
28.....	117			178		241	237	310	277				
29.....	113					281	273	289	269				
30.....	113					323	265	255	261				
31.....	119					350		300					

NOTE.—Because stage-discharge relation was affected by ice when recorder was operating, mean discharge estimated from a comparison with hydrograph for station at Namof Nov. 20 to Dec. 4, Dec. 11, to Jan. 6, and Jan. 27 to Feb. 23. Because of no gage-height record, mean discharge Mar. 11-18 and discharge June 1 and 2, estimated.

*Monthly discharge of Malheur River near Hope, Oreg., for the year ending
September 30, 1923*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	314	80	147	9, 040
November.....	140	-----	107	6, 370
December.....	127	-----	105	6, 460
January.....	500	90	159	8, 550
February.....	314	-----	128	7, 110
March.....	350	129	193	11, 900
April.....	425	190	315	18, 700
May.....	616	255	380	23, 400
June.....	350	245	283	17, 400
July.....	610	269	423	26, 000
August.....	-----	-----	343	21, 100
September.....	-----	-----	277	16, 500
The year.....	616	80	238	173, 000

BULLY CREEK NEAR WESTFALL, OREG.

LOCATION.—In SW. $\frac{1}{4}$ sec. 20, T. 18 S., R. 41 E., at bridge on Vale-Burns road, three-fourths mile southwest of Westfall post office, Malheur County, and just below Indian Creek.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 21 to July 29, 1911; January 1, 1912, to December 31, 1913, and February 18 to August 7, 1923, when station was discontinued.

GAGE.—Vertical staff gage attached to right masonry abutment of bridge; read by Austin Presley.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed of gravel and sand; subject to shift. Control for medium and high stages at a well-defined and fairly-permanent riffle 200 feet below bridge. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 2.85 feet at 5 p. m. February 21 (discharge, 138 second-feet); minimum discharge, 2 second-feet April 16.

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—Numerous ranch diversions above and below station.

REGULATION.—A small privately owned reservoir on Indian Creek regulates flow to a small extent.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve fairly well defined below and poorly defined above 30 second-feet. Staff gage read to hundredths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

*Discharge measurements of Bully Creek near Westfall, Oreg., during the year ending
September 30, 1923*

Date	Made by—	Gage height	Dis- charge	Date	Made by—	Gage height	Dis- charge
Feb. 18	G. H. Canfield.....	<i>Feet</i> 1.45	<i>Sec.-ft.</i> 7.3	Apr. 23	H. G. Kennard *.....	<i>Feet</i> 1.44	<i>Sec.-ft.</i> 8.4
Mar. 1do.....	1.68	22.9	May 11do.....	1.28	4.6
Apr. 4	H. G. Kennard *.....	1.50	14.0	May 24do.....	1.46	7.5

* Water master for Malheur County.

Daily discharge, in second-feet, of Bully Creek near Westfall, Oreg., for the year ending September 30, 1923

Day	Feb.	Mar.	Apr.	May	June	July	Aug.
1.....		18	21	3	6	9	5
2.....		15	17	3	5	9	5
3.....		15	19	4	5	9	5
4.....		13	14	4	5	8	4
5.....		15	14	4	5	8	4
6.....		13	12	4	6	7	4
7.....		22	8	4	6	7	5
8.....		21	7	3	5	6	
9.....		19	6	3	5	6	
10.....		21	6	4	5	6	
11.....		16	5	4	5	5	
12.....		17	5	4	5	6	
13.....		16	4	4	5	6	
14.....		16	3	4	6	56	
15.....		16	3	5	5	20	
16.....		20	2	5	4	16	
17.....		18	2	6	4	12	
18.....	8	16	3	8	4	11	
19.....	10	15	3	8	4	10	
20.....	72	15	2	9	5	9	
21.....	76	16	2	9	6	9	
22.....	32	15	2	10	6	8	
23.....	30	15	4	12	8	7	
24.....	20	16	6	12	8	7	
25.....	13	16	3	9	9	6	
26.....	15	17	3	8	9	6	
27.....	18	17	3	8	9	6	
28.....	18	17	3	6	10	6	
29.....		16	2	6	10	6	
30.....		17	3	6	9	6	
31.....		17		6		5	

Monthly discharge of Bully Creek near Westfall, Oreg., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
February 18-28.....	76		28.4	620
March.....	22	13	16.7	1,030
April.....	21	2	6.2	371
May.....	12	3	6.0	267
June.....	10	4	6.1	265
July.....	56	5	9.6	591
August 1-7.....	5	4	4.6	66
The period.....				3,410

BULLY CREEK AT WARMSPRINGS, NEAR VALE, OREG.

LOCATION.—In sec. 4, T. 18 S., R. 43 E., a quarter of a mile east of Warm Springs stage station on Vale-Westfall road, a quarter of a mile below mouth of Cottonwood Creek, and 14 miles west of Vale, Malheur County.

DRAINAGE AREA.—569 square miles (measured on Land office map).

RECORDS AVAILABLE.—August 11, 1903, to March 10, 1904; January 24, 1905, to March 31, 1907; January 1, 1911, to May 31, 1917, and March 1, 1922, to June 30, 1923, when station was discontinued. Records are also available for a station 12 miles below, April 8, 1904, to December 31, 1905.

GAGE.—Staff gage on left bank; read by G. W. Jackson

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Bed consists of coarse gravel; shifts during high stages. One channel at all stages. Stage-discharge relation affected at times by growth of aquatic plants in the channel.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period ending June 30, 1.90 feet at 4 p. m. June 7 (discharge, 78 second-feet); minimum stage, 0.60 foot February 15-19 (practically no flow).

1903-1917; 1922-1923: Maximum stage recorded, 8.6 feet March 1, 1910 (discharge, estimated from extension of rating curve, 6,240 second-feet). Creek dry on numerous occasions.

ICE.—Stage-discharge relation seldom affected by ice.

DIVERSIONS.—Numerous small ranch diversions are made both above and below the gage. The reservoir of the Vale-Oregon Irrigation Co. is about 3 miles above gage, but no diversions have yet been made into the company's canals.

REGULATION.—Flow regulated to a certain extent by dam of Vale-Oregon Irrigation Co. since early part of 1915, the effect apparently being to increase the natural summer flow by storage and gradual release of flood waters.

ACCURACY.—Stage-discharge relation probably permanent; affected by aqueous growth May 16 to June 30. Rating curve fairly well defined. Staff gage read twice a day. Daily discharge ascertained by applying daily gage height to rating table directly except May 16 to June 30, when they are applied indirectly owing to aqueous growth. Records fair.

Discharge measurements of Bully Creek at Warm Springs, near Vale, Oreg., during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
Oct. 30	H. G. Kennard *	<i>Feet</i> 0.97	<i>Sec.-ft.</i> 44	Apr. 4	H. G. Kennard	<i>Feet</i> 1.45	<i>Sec.-ft.</i> 40
Feb. 21	G. H. Canfield	1.46	43	May 24	do.	1.32	26

* Water master for Malheur County.

† Moss in measuring section and at control.

Daily discharge, in second-feet, of Bully Creek at Warm Springs, near Vale, Oreg., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.0	6.0	9.0	12	37	49	52	37	19
2	2.4	4.2	9.0	16	37	56	53	37	19
3	2.8	4.2	9.0	16	37	32	52	33	24
4	3.0	3.0	9.0	19	37	32	44	35	37
5	3.0	3.0	9.0	19	37	32	47	28	49
6	3.0	3.6	12	16	6.0	32	43	33	32
7	3.0	4.2	12	63	6.0	37	52	33	49
8	3.0	3.9	12	63	4.5	37	55	32	32
9	3.0	3.9	12	63	2.0	37	49	33	24
10	3.0	4.2	9.0	63	1.0	37	48	48	24
11	3.0	4.2	9.0	63	1.0	37	49	56	19
12	3.0	4.2	9.0	63	1.0	37	49	49	19
13	3.0	5.1	6.0	63	1.0	37	44	49	16
14	3.0	6.0	6.0	63	1.0	28	44	43	12
15	3.3	6.0	6.0	63	1.0	28	44	47	6.0
16	4.2	6.0	6.0	63	1.0	28	44	46	3.0
17	4.2	6.0	6.0	63	1.0	28	37	44	4.5
18	4.2	6.0	6.0	63	1.0	24	37	35	9.0
19	4.2	6.6	6.0	63	1.0	24	43	35	16.0
20	4.2	6.0	9.0	63	12	43	49	26	9.0
21	4.2	6.0	12	63	42	44	49	24	9.0
22	4.2	6.0	12	63	28	32	49	24	6.0
23	4.2	6.0	12	37	28	37	52	24	6.0
24	4.2	6.0	12	43	28	32	53	26	11
25	4.2	4.5	12	49	28	39	47	26	12
26	4.5	6.0	12	49	28	42	50	24	2.6
27	4.5	9.0	12	49	49	43	50	24	2.1
28	4.5	9.0	12	63	49	47	48	23	2.0
29	4.5	9.0	12	63	-----	39	39	23	2.5
30	4.5	9.0	12	63	-----	42	39	26	5.4
31	6.0	-----	12	49	-----	39	-----	23	-----

Monthly discharge of Bully Creek at Warm Springs, near Vale, Oreg., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	6	2.0	3.68	226
November.....	9	3.0	5.56	331
December.....	12	6.0	9.77	601
January.....	63	12	50.7	3,120
February.....	49	1.0	18.0	1,000
March.....	56	24	36.5	2,240
April.....	55	37	47.0	2,800
May.....	56	23	33.7	2,070
June.....	49	2.0	16.0	952
The period.....				13,300

COTTONWOOD CREEK NEAR WESTFALL, OREG.

LOCATION.—In SW. $\frac{1}{4}$ sec. 30, T. 18 S., R. 41 E., 3 miles southwest of Westfall, Malheur County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 1 to June 30, 1922, and January 1 to July 31, 1923, when station was temporarily discontinued.

GAGE.—Stevens 8-day water-stage recorder on left bank; inspected by Cleve Cammann.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Gravel and rock; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage from high-water mark in well, noted by G. H. Canfield on February 17, was 4.1 feet, which from record at station on Bully Creek at Westfall, occurred January 6 (discharge, about 425 second-feet); stream practically dry when recorder was not operated.

1922-1923: Maximum stage recorded, 5.15 feet at 6 p. m. March 23, 1922 (discharge, about 600 second-feet); stream dry at times.

ICE.—Not operated during winter.

DIVERSIONS.—None above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed slightly at low stages during winter. Rating curve well defined below and poorly defined above 200 second-feet. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection. Records fair.

Discharge measurements of Cottonwood Creek near Westfall, Oreg., during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	Sec.-ft.			Feet	Sec.-ft.
Feb. 17	G. H. Canfield.....	0.30	2.5	Apr. 23	H. G. Kennard.....	0.74	11.8
Mar. 2	.....do.....	1.26	33.8	May 11	.....do.....	.78	12.4
Apr. 4	H. G. Kennard.....	1.06	28.0	June 9	.....do.....	.36	2.6

• Water master for Malheur County.

Daily discharge, in second-feet, of Cottonwood Creek near Westfall, Oreg., for the year ending September 30, 1923

Day	Jan.	Feb.	Mar.	Apr.	May	June	July
1.....	1.0	3.0	38	38	5.6	3.7	1.6
2.....		3.1	34	36	4.8	3.8	1.5
3.....		3.1	18	32	4.6	3.6	1.5
4.....		3.1	13	28	4.2	3.5	1.5
5.....		2.9	11	26	3.9	3.4	1.5
6.....	128	2.7	17	54	3.9	3.5	1.7
7.....	230	2.8	24	52	3.3	2.9	1.7
8.....	33	2.8	20	43	2.9	2.8	1.7
9.....	24	2.6	15	32	3.3	2.8	1.6
10.....	15	2.6	13	32	12	2.9	1.6
11.....	9.8	2.6	11	28	15	2.9	1.5
12.....	7.2	2.5	8.7	30	13	2.7	1.2
13.....	5.4	2.5	8.1	28	11	2.8	.8
14.....	5.0	2.4	5.6	24	9.8	2.6	.9
15.....	4.6	2.4	5.2	23	8.7	2.4	.9
16.....	4.0	2.3	6.4	22	15	2.0	.9
17.....	4.0	2.5	25	23	24	1.5	1.0
18.....	4.0	2.9	18	21	22	1.5	1.0
19.....	4.0	3.0	18	19	20	1.4	1.0
20.....	4.4	4.3	20	18	21	1.4	1.0
21.....	4.2	8.5	16	18	20	1.3	.9
22.....	4.0	4.1	13	15	15	1.2	.8
23.....	3.9	8.4	14	12	13	1.2	.6
24.....	4.0	4.0	18	8.4	11	1.1	
25.....	3.8	3.5	18	6.6	8.4	1.1	
26.....	3.6	3.8	19	5.0	7.2	1.0	.6
27.....	3.5	11.0	24	5.6	6.0	1.0	
28.....	3.4	24.0	28	4.8	4.4	1.1	
29.....	3.3	-----	35	6.6	4.0	1.1	.6
30.....	3.3	-----	31	5.4	3.8	1.7	
31.....	3.1	-----	38	-----	3.9	-----	

NOTE.—Recorder not started until 8 a. m. Jan. 8. Discharge Jan. 1-7 computed from gage height graph estimated from records for Bully Creek at Westfall and at Warm Springs near Vale.

Monthly discharge of Cottonwood Creek near Westfall, Oreg., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
January.....	230	-----	17.0	1,050
February.....	24	2.3	4.41	245
March.....	38	5.2	18.8	1,160
April.....	54	4.8	23.2	1,380
May.....	24	2.9	9.83	604
June.....	3.8	1.0	2.20	131
July.....	1.7	-----	1.07	65.8
The period.....	-----	-----	-----	4,640

WILLOW CREEK NEAR MALHEUR, OREG.

LOCATION.—In sec. 6, T. 14 S., R. 41 E., at Stanfield ranch, half a mile above flow line of reservoir No. 3 of Willow River Land & Irrigation Co., $2\frac{1}{2}$ miles south of Malheur, Malheur County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 20, 1904, to August 14, 1906; March 19, 1910, to August 2, 1911; March 27, 1912, to September 30, 1915; March 1, 1921, to September 30, 1923.

GAGE.—Stevens 8-day water-stage recorder on left bank; inspected by James Minoungam.

DISCHARGE MEASUREMENTS.—Made from bridge 200 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed of sand and loose gravel. Just below gage is an artificial control of concrete. The crest is 2 feet above stream bed, 8 inches wide, inclined toward right end where there is a low-water section 3 feet long and 6 inches wide. The cut-off walls at ends conform to slope of the banks. The control was reconstructed in November, 1922, extending cut-off wall deeper into bed and banks of stream and adding a concrete apron 6 feet long.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 2.00 feet at 11 p. m. March 6 (discharge, 85 second-feet). No flow September 21–30.

1904–1906; 1910–1915; 1921–1923: Maximum discharge (computed from cross section and estimated velocities) 1,400 second-feet March 20, 1910. No flow at times.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Several small diversions above station irrigating a large area of meadow land; reservoir No. 3 just below. Eldorado ditch diverted 831 acre-feet into Willow Creek 25 miles above gaging station during period March 27 to August 31.

ACCURACY.—Stage-discharge relation permanent during period. Rating curve well defined. Operation of recorder satisfactory March 6 to August 22; gage above 4-foot weir at Anderson field read once every other day in January and February; staff gage above concrete control read twice on March 1 and 3 and once every other day August 23 to September 30. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or daily gage height when recorder was not operating; for January and February, by applying gage heights to weir table. Records good.

Discharge measurements of Willow Creek near Malheur, Oreg., during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
Mar. 27	H. G. Kennard a.....	<i>Feet</i> 1.14	<i>Sec.-ft.</i> 18.7	Apr. 21	Canfield and Kennard	<i>Feet</i> 0.74	<i>Sec.-ft.</i> 5.95
Apr. 17	.....do.....	.62	3.66	May 31	H. G. Kennard.....	.34	1.19

• Water master, Malheur County.

Daily discharge, in second-feet, of Willow Creek near Malheur, Oreg., for the year ending September 30, 1923

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	5.6	5.2	28	12	2.3	1.2	2.2	1.1	0.3
2			22	12	1.9	1.9	1.2	.6	.3
3	5.6	5.2	15	11	2.5	2.2	.6	.4	.3
4			17	10	2.6	2.8	.6	.4	.3
5	5.6		19	10	2.2	5.1	.4	.3	.3
6		5.2	21	11	2.1	5.3	.6	.5	.3
7	7.7		47	10	1.5	5.9	.8	.3	.2
8			37	8.9	1.2	4.7	.7	.4	.2
9	8.2	5.5	26	8.1	.9	3.1	.7	.4	.2
10			16	7.3	1.5	2.5	.8	.3	.2
11	7.6		17	5.6	1.3	2.7	.7	.3	.2
12		6.0	18	3.9	2.1	1.7	.5	.3	.2
13	5.3		19	4.3	3.1	.8	.4	.3	.2
14			16	4.7	2.9	.7	.4	.3	.1
15		5.6	18	4.3	2.7	.6	.6	.3	.1
16	4.5		20	3.9	3.0	.6	.8	.3	.1
17			41	3.3	3.2	.4	.6	.3	.1
18	8.2	6.6	29	2.4	5.4	.4	1.3	.3	.1
19			25	4.2	6.5	.8	1.2	.3	.1
20	6.0		20	5.9	5.3	.6	.7	.4	.1
21		7.6	18	6.5	4.0	.8	1.3	.3	-----
22	5.2		16	6.5	4.0	2.1	1.0	.4	-----
23			16	4.7	2.7	5.1	.7	.3	-----
24	7.1	13.5	17	3.5	1.9	7.1	.7	.3	-----
25			18	2.8	1.9	5.7	24	.3	-----
26	5.6		18	2.6	1.8	5.7	5.4	.3	-----
27		9.6	18	2.8	2.2	4.6	3.3	.3	-----
28	4.8		19	3.1	1.6	3.2	2.4	.3	-----
29			17	2.8	1.1	3.1	2.2	.3	-----
30	6.0		16	2.8	1.1	3.1	1.8	.3	-----
31			15	-----	1.1	-----	1.4	.3	-----

NOTE.—No flow Sept. 21-30.

Monthly discharge of Willow Creek near Malheur, Oreg., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
January			6.26	385
February			7.00	389
March	47	15	21.3	1,310
April	12	2.6	6.03	359
May	6.5	.9	2.50	154
June	7.1	.4	2.82	168
July	24	.4	1.94	119
August	1.1	.3	.36	22
September	.3	0	.13	8
The period				2,910

PAYETTE RIVER AT BANKS, IDAHO

LOCATION.—In SE. $\frac{1}{4}$ sec. 29, T. 9 N., R. 3 E., three-eighths mile below confluence of North and South Forks of Payette River and one-fifth mile above railroad depot at Banks, Boise County.

DRAINAGE AREA.—2,120 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 31, 1922, to September 30, 1923.

GAGE.—Vertical staff in two sections on right bank; low-water section 60 feet above high-water section; read by E. W. Church and Luther A. Vance.

DISCHARGE MEASUREMENTS.—Made from cable 125 feet below high-water gage.

CHANNEL AND CONTROL.—Bed composed of sand, gravel, and boulders. One channel at all stages. Control composed of large boulders; well defined and practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 10.8 feet June 12 (discharge, 14,900 second-feet); minimum discharge, estimated 550 second-feet, December 1.

1922-23: Maximum stage recorded, 12.54 feet June 7 and 8, 1922 (discharge, 18,900 second-feet); minimum discharge, December 1, 1922.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—Several diversions for irrigation from tributaries above.

REGULATION.—From July to September flow past station slightly affected by regulation at outlet of Payette Lake, 58 miles above.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined: Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table, except as indicated in footnote to table of daily discharge. Records good, except those for estimated periods, for which they are fair.

Discharge measurements of Payette River at Banks, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 24	Johnson and Paulsen	0.44	700	June 15	Berkeley Johnson	9.52	12,300
Jan. 18	L. L. Bryan	1.23	1,080	July 5	C. G. Paulsen	7.18	7,300
Mar. 27	Berkeley Johnson	1.60	1,190	13	Berkeley Johnson	5.11	4,260
Apr. 30	do	6.55	6,130	17	do	4.69	3,760
May 5	do	6.25	5,740	23	do	3.38	2,420
26	do	10.64	14,600	Aug. 2	Veatch and Johnson	2.40	1,720
June 4	do	7.48	7,980	18	F. M. Veatch	1.49	1,200
7	do	8.54	10,000	Sept. 6	do	1.17	1,050

Daily discharge, in second-feet, of Payette River at Banks, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	815	860	550	905	700	1,190	2,600	5,330	9,420	9,220	1,780	1,140
2.....	815	860	685	860		1,240	2,870	4,800	8,820	9,020	1,720	1,090
3.....	815	860	815	860		1,140	2,970	4,300	7,830	8,420	1,650	1,040
4.....	815	770	815	860		1,140	2,690	4,540	7,830	7,640	1,580	1,040
5.....	815	775	815	860		1,090	2,600	5,760	8,220	7,080	1,530	1,040
6.....	860	770	815	860	780	1,090	2,970	6,550	9,020	6,550	1,520	1,040
7.....	815	815	860	1,350		1,040	2,870	7,260	10,000	6,220	1,520	995
8.....	815	950	815	1,190		1,040	2,870	7,330	10,700	5,610	1,460	995
9.....	815	905	685	1,140		1,040	2,870	9,420	11,800	4,930	1,400	995
10.....	815	905	860	1,090		1,040	3,270	10,700	12,900	4,540	1,400	950
11.....	815	905	772	1,090	780	1,090	3,820	10,500	14,500	4,540	1,850	950
12.....	815	860	685	1,040		950	4,060	9,630	14,900	4,300	1,800	950
13.....	815	685	1,040	995		995	4,180	8,820	14,200	4,180	1,240	950
14.....	815	645	995	995		995	4,060	8,420	13,100	8,320	1,800	950
15.....	815	770	1,040	1,040		1,040	4,300	7,830	12,000	3,710	1,800	950
16.....	815	905	690	995	780	1,040	5,060	8,020	11,300	3,600	1,240	950
17.....	815	1,090		995		995	7,080	8,020	10,000	3,710	1,190	950
18.....	815	1,300		1,040		950	6,550	10,000	9,630	3,600	1,190	950
19.....	815	950		995		995	6,900	10,500	9,630	3,170	1,240	950
20.....	815	905		950		995	5,610	10,900	9,220	2,780	1,520	950
21.....	815	860	880	815	780	995	4,800	10,900	9,840	2,600	1,400	905
22.....	815	725		1,040		995	4,060	11,100	10,500	2,600	1,350	905
23.....	815	725		995		995	3,820	11,600	10,300	2,440	1,240	950
24.....	815	770		1,040		995	3,710	12,200	9,630	2,600	1,240	950
25.....	815	565		995		1,090	4,060	13,800	9,420	3,170	1,190	950
26.....	770	685	850	950	780	1,140	4,540	14,700	9,630	2,600	1,140	1,040
27.....	770	725		950		1,300	5,610	13,100	9,220	2,360	1,140	1,140
28.....	770	815		950		1,580	6,720	12,400	9,020	2,210	1,090	1,040
29.....	770	725		-----		1,990	6,720	11,800	9,220	2,060	1,090	995
30.....	815	645		850		2,440	6,060	10,900	9,420	1,990	1,090	950
31.....	815	-----	-----	-----	-----	2,690	-----	10,000	-----	1,850	1,140	-----

NOTE.—Discharge estimated Dec. 1 by comparison with flow at near-by stations, as observer reported water "below gage." Estimated because of ice Dec. 13-31 and Jan. 29 to Feb. 21; flow based on gage-height record, observer's notes, weather records, and by comparison with flow past stations in same drainage basin. Discharge interpolated Nov. 10, Dec. 11, Jan. 5, May 23, and Sept. 12. Braced figures show mean discharge for periods indicated.

Monthly discharge of Payette River at Banks, Idaho, for the year ending September 30, 1923

[Drainage area, 2,120 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	860	770	811	0.383	0.44	49,900
November.....	1,300	565	822	.388	.43	48,900
December.....	-----	-----	768	.362	.42	47,200
January.....	1,350	-----	982	.463	.53	60,400
February.....	1,090	-----	801	.378	.39	44,500
March.....	2,690	950	1,200	.566	.65	73,800
April.....	7,080	2,600	4,340	2.05	2.29	258,000
May.....	14,700	4,300	9,410	4.44	5.12	579,000
June.....	14,900	7,830	10,400	4.91	5.48	619,000
July.....	9,220	1,850	4,290	2.02	2.33	264,000
August.....	1,780	1,090	1,340	.632	.73	82,400
September.....	1,140	905	988	.466	.52	58,800
The year.....	14,900	-----	3,020	1.42	19.33	2,190,000

PAYETTE RIVER NEAR HORSESHOE BEND, IDAHO

LOCATION.—In sec. 14, T. 7 N., R. 2 E., 100 feet east of tracks of Idaho Northern Branch of Oregon Short Line Railroad, and 1½ miles northeast of Horseshoe Bend, Boise County.

DRAINAGE AREA.—2,230 square miles, revised (measured on topographic and Land Office maps).

RECORDS AVAILABLE.—November 23, 1912, to September 30, 1916; July 27, 1919, to September 30, 1923. February 13, 1906, to November 22, 1912, site in sec. 2, two miles upstream. Two small creeks enter between the two stations.

GAGE.—Barrett & Lawrence water-stage recorder on right bank 200 feet above railroad crossing installed May 3, 1912; inspected by S. H. McAlister and J. W. Anthony. Bristol recorder used after September 21, 1923.

DISCHARGE MEASUREMENTS.—Made from cable 200 feet below gage.

CHANNEL AND CONTROL.—Bed composed of cobbles and coarse gravel with a few large rocks. Control shifts slightly. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 7.35 feet at 2 p. m. June 12 (discharge, 14,300 second-feet; minimum stage, 0.75 foot December 1 (discharge, 530 second-feet).

1906-1916; 1919-1923: Maximum stage recorded, 9.57 feet at 1 p. m. June 9, 1921 (discharge, 22,100 second-feet); minimum stage, December 1, 1922 (discharge, 530 second-feet).

ICE.—Stage-discharge relation somewhat affected by ice.

DIVERSIONS.—Several diversions for irrigation from tributaries above; none between this station and the one at Banks.

REGULATION.—From July to September flow past station slightly affected by regulation at outlet of Payette Lake, 70 miles above.

ACCURACY.—Stage-discharge relation permanent during year; affected by ice during winter. Rating curve well defined. Operation of water-stage recorder satisfactory except at times during winter and August 23 to September 21. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspection of recorder graph except as indicated in footnote to table of daily discharge. Records good except for December, January, and February, for which they are fair.

COOPERATION.—Gage-height record furnished by Idaho Power Co.

Discharge measurements of Payette River near Horseshoe Bend, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 24	Berkeley Johnson	0.82	579	July 5	C. G. Paulsen	4.85	6,350
Jan. 25	L. L. Bryan	1.27	932	Aug. 13	Berkeley Johnson	3.46	4,060
Mar. 28	Berkeley Johnson	1.71	1,380	Aug. 3	do	1.82	1,550
May 6	do	4.68	6,470	Sept. 18	F. M. Veatch	1.44	1,120
June 7	do	5.67	9,520	Sept. 6	do	1.27	955
16	do	6.23	10,700				

Daily discharge, in second-feet, of Payette River near Horseshoe Bend, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	762	805	530			1,080	2,420	5,470	9,560	9,010	1,660	
2	762	848	650			1,160	2,650	4,940	8,620	8,470	1,610	
3	771	796	771			1,190	2,730	4,520	7,690	8,210	1,550	
4	762	762	762	860		1,080	2,650	4,620	7,440	7,690	1,530	
5	771	746	712			1,050	2,580	5,360	7,440	7,190	1,480	
6	780	746	720			1,080	2,730	6,480	8,210	6,710	1,450	
7	788	796	754			1,030	2,800	7,440	9,010	6,140	1,420	
8	796	864	712			999	2,800	7,690	9,840	5,800	1,380	
9	805	890	696			953	2,800	9,010	10,700	5,260	1,360	
10	814	899	720			926	3,040	9,840	11,600	4,940	1,310	
11	805	899	680			962	3,380	10,100	13,000	4,520	1,300	
12	814	882	610			962	4,020	9,560	14,000	4,220	1,250	
13	822	780	610			953	4,320	8,740	13,600	4,020	1,240	
14	822	704	746			917	4,120	8,470	12,700	3,930	1,220	
15	796	728	712			873	4,220	7,950	11,800	3,650	1,200	
16	796	780	664			926	5,040	7,950	10,700	3,470	1,190	
17	788	926	990			944	6,250	7,950	9,840	3,470	1,160	
18	788	1,140		1,040		908	6,480	9,010	9,280	3,380	1,120	
19	788	962		1,010		935	6,710	9,840	9,280	3,130	1,120	
20	788	882	680	980		953	5,910	10,100	9,280	2,800	1,300	
21	788	805		864		935	4,840	10,700	9,560	2,580	1,380	
22	786	746		839		971	4,120	10,700	9,840	2,500		873
23	771	704		933		980	3,840	11,000	9,840	2,350		882
24	771	640		980		999	3,740	11,300	9,560	2,500		899
25	780	656		953		1,050	4,020	12,400	8,280	3,040		908
26	771	720	870	944		1,080	4,520	13,600	9,010	2,650		962
27	771	762		890		1,200	5,260	12,700	9,010	2,280	1,140	1,070
28	746	771		873		1,460	6,020	11,800	9,010	2,140		1,040
29	737	822		830		1,750	6,480	11,300	9,010	2,000		980
30	720	712		822		2,140	5,910	11,000	9,010	1,880		960
31	728			805		2,350		10,100		1,750		

NOTE.—Discharge estimated by comparison with flow at Banks, Dec. 2, 17–31, Jan. 1–13, Feb. 1–28, Aug. 23–31, Sept. 1–5, 7–21, and 30; affected by ice Dec. 17 to Jan. 13, and during part of February. Discharge interpolated Oct. 1 and June 2. Braced figures show mean discharge for periods indicated.

Monthly discharge of Payette River near Horseshoe Bend, Idaho, for the year ending September 30, 1923

[Drainage area, 2,230 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acres-feet
October	822	720	780	0.350	0.40	48,000
November	1,140	640	806	.361	.40	48,000
December		530	734	.329	.38	45,100
January		805	949	.426	.49	53,400
February			794	.356	.37	44,100
March	2,350	873	1,120	.502	.58	68,900
April	6,710	2,420	4,210	1.89	2.11	251,000
May	13,600	4,520	9,090	4.08	4.70	559,000
June	14,000	7,440	9,890	4.43	4.94	588,000
July	9,010	1,750	4,250	1.91	2.20	261,000
August	1,660		1,280	.574	.66	78,700
September			959	.430	.48	57,100
The year	14,000	530	2,910	1.30	17.71	2,110,000

PAYETTE LAKE AT LARDO, IDAHO

LOCATION.—In sec. 8, T. 18 N., R. 3 E., at outlet of lake at Lardo, Valley County.

DRAINAGE AREA.—131 square miles (measured on topographic and Land Office maps).

RECORDS AVAILABLE.—Fragmentary records August 1, 1921, to September 30, 1923.

GAGE.—Vertical staff on tubular pier of highway bridge, near right bank; read by W. B. Boydston, Vernon Land, and R. W. Burnside. Gage datum is 4,984.17 feet above mean sea level.

DIVERSIONS.—None.

REGULATION.—Some storage is used for irrigation in the lower Payette Valley.

From 1919 to 1923, a small amount of regulation affected during July, August, and September, by installation and later gradual removal of temporary dam above highway bridge. No storage effective prior to 1919.

COOPERATION.—W. B. Boydston furnished gage-height record during 1921 and 1922.

Daily gage height, in feet, of Payette Lake at Lardo, Idaho, for the years ending September 30, 1921, 1922, and 1923

Day	1921	1922					1923					
	Aug.	Mar.	May	June	July	Jan.	Mar.	Apr.	May	June	July	Aug.
1.....	2.71	-----	2.06	4.10	-----	-----	-----	1.30	-----	3.1	3.1	-----
2.....	2.70	-----	-----	4.22	2.50	-----	-----	1.30	-----	3.5	-----	2.26
3.....	2.71	-----	2.20	4.42	2.50	-----	-----	1.29	1.80	-----	-----	-----
4.....	2.72	-----	2.28	4.60	-----	-----	-----	1.30	-----	2.9	2.9	-----
5.....	2.72	-----	2.42	-----	-----	-----	-----	-----	1.60	2.92	2.78	-----
6.....	2.71	-----	-----	-----	-----	-----	-----	1.35	-----	3.5	2.68	-----
7.....	2.71	-----	-----	-----	-----	-----	-----	1.35	-----	3.3	2.56	-----
8.....	2.70	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.48	-----
9.....	2.62	-----	2.68	-----	-----	-----	-----	-----	2.75	3.65	-----	-----
10.....	2.63	-----	2.60	4.50	-----	-----	-----	-----	-----	-----	2.25	-----
11.....	2.42	-----	2.60	-----	-----	-----	-----	-----	3.10	4.1	-----	-----
12.....	2.34	-----	2.62	4.40	-----	-----	-----	-----	-----	-----	2.80	-----
13.....	2.28	-----	2.68	-----	-----	-----	-----	-----	3.5	3.97	-----	-----
14.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.9	-----	-----
15.....	-----	-----	2.94	-----	-----	-----	-----	-----	3.5	-----	1.89	-----
16.....	-----	-----	3.14	-----	-----	-----	-----	-----	-----	3.45	1.82	-----
17.....	-----	-----	3.34	-----	-----	-----	-----	-----	3.2	3.38	-----	-----
18.....	-----	-----	3.60	-----	-----	-----	-----	-----	-----	-----	-----	-----
19.....	-----	-----	3.92	-----	-----	-----	-----	-----	3.45	3.10	-----	-----
20.....	-----	-----	4.10	-----	-----	-----	-----	-----	3.45	3.12	-----	-----
21.....	-----	-----	-----	-----	-----	-----	0.90	-----	-----	3.45	-----	-----
22.....	-----	-----	-----	-----	-----	-----	.92	-----	3.75	-----	-----	-----
23.....	-----	-----	3.98	-----	-----	-----	.96	-----	-----	3.49	-----	-----
24.....	-----	-----	4.10	-----	-----	0.84	.96	-----	3.90	-----	-----	-----
25.....	-----	-----	4.30	-----	-----	-----	1.00	-----	-----	3.33	-----	-----
26.....	-----	-----	4.55	-----	-----	-----	.98	-----	4.35	3.25	-----	-----
27.....	-----	-----	-----	-----	-----	-----	1.02	-----	-----	-----	-----	-----
28.....	-----	-----	-----	-----	-----	-----	-----	-----	3.7	3.28	-----	-----
29.....	-----	-----	3.60	-----	-----	-----	-----	-----	3.5	3.28	-----	-----
30.....	-----	1.60	3.75	-----	-----	-----	1.00	-----	3.45	-----	-----	-----
31.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

NOTE.—To change above readings to mean sea level datum add 4,984.174 feet. Gage heights obtained from auxiliary staff above temporary dam, at outlet of lake Aug. 1-13, 1921; readings corrected to bridge gage datum. On Aug. 2, 1923, after temporary dam above bridge was in place, actual water surface elevation of lake was determined by levels.

NORTH FORK OF PAYETTE RIVER AT LARDO, IDAHO

LOCATION.—In sec. 8, T. 18 N., R. 3 E., a quarter of a mile below Lardo, Valley County, and outlet of Payette Lake. No tributaries enter between lake and gage.

DRAINAGE AREA.—131 square miles (measured on topographic and Land Office maps).

RECORDS AVAILABLE.—September 1, 1908, to June 30, 1917, and May 24, 1919, to September 30, 1923.

GAGE.—Vertical staff on left bank installed August 11, 1923, replaced inclined staff 6 feet below present site, in use since July 25, 1911; read by Vernon Land, R. W. Burnside, and W. C. Marean.

DISCHARGE MEASUREMENTS.—Made from highway bridge a quarter of a mile above gage, from cable half a mile below gage, or by wading.

CHANNEL AND CONTROL.—Bed and control composed of cobbles and gravel; slightly shifting. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.5 feet June 11 (discharge, 2,900 second-feet); minimum stage, 1.05 feet November 17 (discharge, 4 second-feet); probably not actual extremes.

1908-1917; 1919-1923: Maximum stage recorded, 7.5 feet June 5, 1909 (discharge, 4,250 second-feet); minimum discharge, 3 second-feet, October 21 and 22, 1911, and November 10-26, 1919.

ICE.—Stage-discharge relation probably not affected by ice.

DIVERSIONS.—None above station.

REGULATION.—Flow during July, August, and September, partly regulated by installation and later gradual removal of temporary dam at outlet of Payette Lake a quarter of a mile above.

ACCURACY.—Stage-discharge relation changed slightly during winter. Rating curves well defined. Gage read to hundredths once daily; readings somewhat unreliable until May but good thereafter except for missing periods. Daily discharge ascertained by applying daily gage height to rating table except as noted in footnote to daily-discharge table. Records good for May, June, and September; fair for remainder of year.

Discharge measurements of North Fork of Payette River at Lardo, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Jan. 24	L. L. Bryan.....	1.99	53.4	July 15	Berkeley Johnson.....	3.30	416
Mar. 21	Berkeley Johnson.....	1.91	47.2	Aug. 1	Johnson and Veatch.....	1.89	48.0
May 3	do.....	2.95	268	11	F. M. Veatch.....	1.84	38.0
3	do.....	2.95	264	15	do.....	1.80	34.9
June 5	do.....	4.57	1,200	Sept. 2	do.....	2.47	138
July 6	C. G. Paulsen.....	4.26	974				

Daily discharge, in second-feet, of North Fork of Payette River at Lardo, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	23	5			47	53	50		1,040	1,550	48	140
2.....	23	5			47	54	52	280	1,000	1,470		134
3.....	22	5		30	48	53	55	278	1,080	1,350		130
4.....	22	5			46	51	58	293	1,150	1,230		125
5.....	22	5		39	45	52	60	308	1,230	1,040		121
6.....	21	5			40	45	52	348	1,380	966	44	115
7.....	21	5			40	43	51	438	1,720	861		111
8.....	20	5			40	43	53	529	1,840	782		108
9.....	20				90	40	54	729	1,970	700		104
10.....	18			98	39	55	74	900	2,440	638		100
11.....	18			100	38	56	82	1,070	2,900	584	39	97
12.....	16			95	37	55		1,040	2,620	529	38	136
13.....	16	5		92	36	54		1,000	2,330	490	37	159
14.....	15			90	37	55		1,020	2,240	451	36	159
15.....	15			86	39	58		1,040	1,940	412	35	150
16.....	14		10	82	42	60	110	1,140	1,630	390		132
17.....	14	4		78	43	56		1,230	1,720	300	34	119
18.....	12			74	44	55		1,480	1,680			115
19.....	12			67	43	54		1,720	1,630	55		108
20.....	10			64	45	52		1,720	1,630	55		104
21.....	10			60	46	45		1,840	1,720			100
22.....	9			58	48	46		1,970	1,760			97
23.....	8			58	50	48		2,000	1,800			93
24.....	8	6		54	48	50		2,150	1,760		100	90
25.....	8			53	50	51		2,480	1,720			86
26.....	7			52	51	50	200	2,800	1,800	50		83
27.....	7			51	53	48		2,380	1,840			80
28.....	6			51	52	48		1,970	1,880			77
29.....	6			50		47		1,720	1,800			74
30.....	6			50		47		1,720	1,680		140	71
31.....	5			48		48		1,380				

• Interpolated.

NOTE.—Flow estimated on account of missing gage heights, Nov. 9-16, 18-30, Dec. 1 to Jan. 4, Apr. 12 to May 2, July 17-19, 21-31, Aug. 2-10, 16-31, and Sept. 1, based on weather records and comparison with flow at other stations. Temporary dam installed July 18 and stored water released beginning Aug. 20. Braced figures show mean estimated discharge for periods indicated.

Monthly discharge of North Fork of Payette River at Lardo, Idaho, for the year ending September 30, 1923

[Drainage area, 131 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	23	5	14.0	0.107	0.12	861
November.....			5.4	.041	.05	321
December.....			10.0	.076	.09	615
January.....	100		60.6	.463	.53	3,730
February.....	53	36	44.5	.340	.35	2,470
March.....	60	45	52.0	.397	.46	3,200
April.....		50	123	.939	1.05	7,320
May.....	2,800		1,270	9.69	11.17	78,100
June.....	2,900	1,000	1,760	13.4	14.95	105,000
July.....	1,550		466	3.56	4.10	28,700
August.....			67.3	.514	.59	4,140
September.....	159	71	111	.847	.94	6,600
The year.....	2,900		333	2.54	34.40	241,000

NORTH FORK OF PAYETTE RIVER AT VAN WYCK, IDAHO

LOCATION.—In sec. 26, T. 14 N., R. 3 E., at highway bridge half a mile north of Van Wyck, Valley County, and 2 miles northwest of Cascade. Willow Creek, a small stream, enters from south, half a mile below.

DRAINAGE AREA.—586 square miles (measured on topographic and Land Office maps).

RECORDS AVAILABLE.—January 1, 1912, to June 30, 1916; June 9, 1920, to September 30, 1923. Gage heights January 1 to August 7, 1912, were derived from private records from comparative gage readings; daily discharge not determined prior to June 20, 1912. Several discharge measurements made during 1919 and spring of 1920.

GAGE.—Vertical staff spiked to downstream side of second bridge pier from right end of bridge; read by L. S. Kimball.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of rock overlain by sand and gravel; control somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.1 feet June 13 (discharge, 5,540 second-feet); minimum stage, 1.84 feet August 17 (discharge, 166 second-feet); lower flow may have occurred during period of no record.

1912–1916; 1920–1923: Maximum stage recorded, 8.6 feet May 20, 1921 (discharge, 8,700 second-feet); minimum stage, 1.70 feet August 20 and 21, 1920 (discharge, 128 second-feet).

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Above station practically no diversions are made from main stream, but numerous diversions for irrigation are made from tributaries.

REGULATION.—During July, August, and September, flow partly regulated by installation and later gradual removal of temporary dam at outlet of Payette Lake 30 miles above.

ACCURACY.—Stage-discharge relation changed during high-water period. Three curves used parallel to rating curves which are well-defined below 4,500 second-feet; one applicable April 8 to May 12; the second applicable June 5 to August 8; and the third August 9 to September 30. Gage read to half-tenths once daily. Daily discharge ascertained by applying daily gage height to rating table except as shown in footnote to table of daily discharge. Records good June to September; fair for April and May.

Discharge measurements of North Fork of Payette River at Van Wyck, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 22	Berkeley Johnson.....	(*)	229	July 15	Berkeley Johnson.....	3.33	1,000
May 4	.....do.....	3.54	1,280	Aug. 2	Johnson and Veatch.....	2.10	266
June 5	.....do.....	5.08	2,560	Aug. 17	F. M. Veatch.....	1.84	166
July 6	C. G. Paulsen.....	4.84	2,340	Sept. 3	.....do.....	1.98	227

*Stage-discharge relation affected by ice; gage not read.

*Daily discharge, in second-feet, of North Fork of Payette River at Van Wyck, Idaho
for the year ending September 30, 1923*

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1								1,550	3,620	3,430	292	198
2								1,470	2,810	3,170	268	215
3								1,240	2,670	3,040	268	228
4							800	1,240	2,660	2,910	268	232
5								1,400	2,540	2,540	268	215
6								1,550	2,780	2,300	268	211
7								1,810	3,040	2,670	245	211
8							777	1,720	3,710	1,680	245	211
9							809	1,610	3,850	1,520	241	202
10							841	2,330	4,000	1,450	232	190
11							970	3,030	4,600	1,300	232	190
12							970	3,030	5,060	1,220	211	190
13							1,100	2,780	5,540	1,150	232	190
14							1,100	2,770	5,220	1,080	232	198
15							1,100	2,520	4,750	1,010	211	215
16							1,240	2,530	4,300	1,010	190	232
17							1,720	2,520	3,710	944	166	232
18							1,630	3,000	3,570	684	174	224
19							1,550	3,390	3,430	592	178	232
20							1,240	3,480	3,710	504	211	228
21							1,180	3,740	3,710	476	245	215
22						229	1,180	3,940	4,000	448	232	211
23							1,180	4,080	4,000	448	245	190
24							1,240	4,300	3,850	476	198	190
25							1,470	4,590	3,710	368	190	198
26							1,550	4,810	3,710	368	190	202
27							1,720	5,280	3,570	394	190	211
28							1,910	5,270	3,710	368	190	211
29							1,910	4,840	3,430	342	198	202
30							1,910	4,190	3,570	342	190	211
31								3,740		292	202	

NOTE.—Braced figures show mean discharge for period Apr. 1-7, estimated because of ice by comparison with Lardo and Banks stations. Shifting-control method used May 13 to June 4. Result of actual discharge measurement Mar. 22.

*Monthly discharge of North Fork of Payette River at Van Wyck, Idaho, for the
year ending September 30, 1923*

[Drainage area, 586 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acro-feet
April	1,910		1,200	2.05	2.29	71,400
May	5,280	1,240	3,030	5.17	5.96	186,000
June	5,540	2,540	3,760	6.42	7.16	224,000
July	3,430	262	1,220	2.08	2.40	75,000
August	292	166	228	.381	.44	13,700
September	232	190	210	.368	.40	12,500
The period						583,000

SOUTH FORK OF PAYETTE RIVER NEAR GARDEN VALLEY, IDAHO

LOCATION.—In sec. 1, T. 8 N., R. 4 E., at Garden Valley ranger station, 300 feet above mouth of Station Creek, half a mile above mouth of Wash Creek, $1\frac{1}{4}$ miles above mouth of Alder Creek, $4\frac{3}{4}$ miles above mouth of Middle Fork of Payette River, and 5 miles southeast of Garden Valley, Boise County.

DRAINAGE AREA.—779 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 15, 1921, to September 30, 1923.

GAGE.—Vertical staff on right bank directly to rear of ranger station; read by F. H. Miller and Lionel Miller.

DISCHARGE MEASUREMENTS.—Made from cable 30 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of rock overlain with cobbles and gravel. Control formed by well-defined riffle; permanent. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.25 feet June 12 (discharge, 6,290 second-feet); minimum stage, 0.56 foot November 23 (measured discharge, 380 second-feet). Lower flow may have occurred during period of no record.

1921-1923: Maximum stage recorded, 6.87 feet June 9, 1921 (discharge, 9,330 second-feet); minimum stage, 0.56 foot November 23, 1922 (measured discharge, 380 second-feet). Lower flow probably occurred during periods of no record.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Practically none above.

REGULATION.—None.

ACCURACY.—Stage-discharge relation probably changed slightly during winter.

Standard rating curve well defined between 350 and 6,000 second-feet.

Gage read to hundredths once daily; record fragmentary prior to April 30.

Daily discharge ascertained by applying daily gage height to rating table except as indicated in footnote to table of daily discharge. Records good.

COOPERATION.—Gage-height record furnished by United States Forest Service.

Discharge measurements of South Fork of Payette River near Garden Valley, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 23	Johnson and Paulsen.....	0.56	390	May 24	Berkeley Johnson.....	4.08	4,400
Jan. 20	L. L. Bryan.....	.62	415	June 6	.....do.....	3.60	3,660
Mar. 24	Berkeley Johnson.....	.68	424	July 14	.....do.....	2.48	2,010
Apr. 30	.....do.....	2.10	1,550	Aug. 3	Johnson and Veatch.....	1.40	956
May 1	.....do.....	1.98	1,490	Sept. 4	F. M. Veatch.....	.91	576

Daily discharge, in second-feet, of South Fork of Payette River near Garden Valley, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1			400					1,530	3,180	3,810	1,000	615
2								2,880	3,970	960		580
3								2,880	3,330	960		580
4		428	400					1,650	2,880	3,330	944	580
5									3,180	3,180	928	580
6		485						2,330	3,650	2,740	912	580
7								2,740	4,130	2,460	896	548
8								3,030	4,450	2,330	880	548
9								3,490	4,930	2,200	864	548
10								4,130	5,610	2,070	848	548
11		515						3,330	6,120	2,070	832	515
12		548						3,030	6,290	2,070	816	515
13	485							2,740	5,610	1,950	800	515
14								2,600	4,450	2,070	784	515
15								2,740	3,810	1,840	768	515
16								2,880	3,650	1,840	752	515
17								3,650	3,330	1,950	736	515
18								3,650	3,330	1,730	720	515
19								3,650	3,490	1,530	758	515
20				400				3,650	3,490	1,530	918	485
21								3,970	3,810	1,530	796	485
22								3,970	3,970	1,430	720	485
23		380						4,130	3,650	1,480	685	485
24		400				428		4,450	3,330	1,530	685	515
25						400		5,440	3,180	1,530	650	515
26								5,610	3,180	1,340	685	515
27		400						4,450	3,180	1,240	650	548
28								4,610	3,180	1,240	650	548
29								3,490	3,260	1,140	615	548
30							1,630	3,490	3,330	1,140	615	548
31								3,180		1,050	615	

NOTE.—Discharge, May 2-5, estimated by comparison with flow near Banks. Interpolated on account of missing and unreliable gage height record, Aug. 4-17. Braced figure shows mean discharge for period indicated.

Monthly discharge of South Fork of Payette River near Garden Valley, Idaho, for the year ending September 30, 1923

(Drainage area, 779 square miles)

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
April 30	1,630	1,630	1,630	2.09	0.08	3,230
May	5,610		3,310	4.25	4.90	204,000
June	6,290	2,880	3,850	4.94	5.51	229,000
July	3,970	1,050	2,020	2.59	2.99	124,000
August	1,000	615	788	1.01	1.16	48,500
September	615	485	534	.685	.76	31,800
The period						641,000

SOUTH FORK OF PAYETTE RIVER NEAR BANKS, IDAHO

LOCATION.—In sec. 28, T. 9 N., R. 3 E., 1 mile above junction with North Fork of Payette River and 1½ miles northeast of Banks, Boise County.

DRAINAGE AREA.—1,200 square miles (measured on topographic maps).

RECORDS AVAILABLE.—August 19, 1921, to September 30, 1923.

GAGE.—A continuous water-stage recorder on right bank, installed September 12, 1922; inspected by J. A. McCubbin and Allen Gowey.

DISCHARGE MEASUREMENTS.—Made from cable at gage.

CHANNEL AND CONTROL.—Bed composed of rock, boulders, and sand. Banks steep. One channel at all stages. Control formed by well-defined rock and boulder riffle, 250 feet below gage; permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 7.49 feet at 6 a. m. June 12 (discharge, 8,160 second-feet); minimum stage, 0.19 foot at 8.30 p. m. December 12 (discharge, about 330 second-feet).

1921-1923: Maximum stage recorded, 8.70 feet June 7, 1922 (discharge, 9,900 second-feet); minimum stage and discharge December 12, 1922.

ICE.—Stage-discharge relation somewhat affected by ice.

DIVERSIONS.—None, except a few small ranch diversions from tributaries in drainage above.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well-defined between 400 and 8,000 second-feet. Operation of water-stage recorder satisfactory except for short periods. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting recorder graph except as indicated in footnote to table of daily discharge. Records excellent except for estimated periods, for which they are fair.

Discharge measurements of South Fork of Payette River near Banks, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 24	Paulsen and Johnson	0.43	436	May 23	Berkeley Johnson	5.64	5,700
Jan. 19	L. L. Bryan	.75	604	June 6	do	4.89	4,710
Mar. 26	Berkeley Johnson	.93	699	July 14	do	2.97	2,380
May 1	do	3.05	2,500	Aug. 17	F. M. Veatch	1.16	863
May 5	do	3.64	3,130	Sept. 5	do	.90	712

Daily discharge, in second-feet, of South Fork of Payette River near Banks, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	587	572	435	599	460	734	1,780	2,580	4,340	4,580	2,230	747
2	587	575	515	570		832	1,820	2,310	4,100	4,460	2,190	721
3	581	581	599	564		792	1,860	2,100	3,860	4,220	1,150	714
4	587	587	570	575		671	1,640	2,410	3,860	3,860	1,120	702
5	605	587	581	570		695	1,640	3,140	4,100	3,620	1,120	695
6	599	587	623	653	530	677	1,680	3,980	4,580	3,380	1,080	689
7	593	593	635	895		659	1,680	4,340	5,070	3,260	1,040	677
8	587	599	581	799		647	1,560	4,700	5,590	3,030	1,040	671
9	581	623	536	708		593	1,470	5,330	6,110	2,860	1,000	665
10	575	647	536	665		587	1,520	6,110	6,760	2,630	965	659
11	570	671	505	635		629	1,730	5,460	7,460	2,520	965	659
12	581	563	406	611		611	2,060	4,820	8,020	2,460	930	653
13	593	455	445	536		617	2,160	4,340	7,040	2,410	895	635
14	548	440	440	575		564	1,910	4,340	5,980	2,410	930	629
15	570	548		575		548	2,010	3,980	5,070	2,260	965	623
16	587	548		553	450	629	2,460	4,100	4,700	2,160	895	617
17	575	677		635		623	3,140	4,220	4,580	2,360	881	617
18	575	799		653		564	3,030	5,070	4,340	2,100	860	629
19	564	593		605		617	2,780	5,330	4,580	1,910	895	635
20	570	570		558		611	2,520	5,330	4,460	1,820	1,080	629
21	570	505		480		593	2,270	5,460	4,700	1,730	1,040	617
22	564	480		480		629	2,030	5,460	4,820	1,680	965	617
23	570	470		605		623	1,780	5,720	4,700	1,640	895	623
24	570	480		629		671	1,600	5,850	4,460	1,730	867	617
25	564	480		605		677	1,730	6,900	4,220	2,100	839	629
26	558	520		587	600	714	1,960	7,740	4,220	1,640	818	689
27	558	542		531		853	2,460	6,470	4,220	1,520	799	780
28	553	558		510		665	1,080	5,200	4,100	1,470	786	714
29	558	611		475			1,390	3,140	4,820	4,340	1,390	773
30	553	510					1,640	2,920	4,820	4,580	1,310	760
31	570			470			1,820		4,580		1,270	760

* Discharge interpolated on account of missing gage height record.

NOTE.—Discharge estimated because of ice, Dec. 14-31 and Jan. 30 to Feb. 19; flow based on gage-height record, observer's notes, weather records, and by comparison with flow past other stations in same drainage basin. On account of water-stage recorder not operating, daily staff gage height used Nov. 2, 4, 6, 8, 11, Dec. 20, 23, 25, and 27. Braced figures show mean discharge for periods indicated.

Monthly discharge of South Fork of Payette River near Banks, Idaho, for the year ending September 30, 1923

[Drainage area, 1, 200 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	605	548	574	0.478	0.55	35,300
November.....	799	440	566	.472	.53	33,700
December.....	-----	406	525	.438	.50	32,300
January.....	895	-----	593	.494	.57	36,500
February.....	665	-----	534	.445	.46	29,700
March.....	1,820	548	761	.634	.73	46,800
April.....	3,140	1,470	2,110	1.76	1.96	126,000
May.....	7,740	2,100	4,740	3.95	4.55	291,000
June.....	8,020	3,860	4,970	4.14	4.62	296,000
July.....	4,580	1,270	2,440	2.03	2.34	150,000
August.....	1,230	760	953	.794	.92	58,600
September.....	780	617	662	.552	.62	39,400
The year.....	8,020	-----	1,620	1.35	18.35	1,180,000

DEADWOOD RIVER NEAR LOWMAN, IDAHO

LOCATION.—In sec. 29, T. 9 N., R. 7 E., 600 feet above bridge on Garden Valley-Lowman highway, 700 feet above confluence with South Fork of Payette River, and $2\frac{1}{2}$ miles west of Lowman, Boise County.

DRAINAGE AREA.—217 square miles (measured on topographic map).

RECORDS AVAILABLE.—August 11, 1921, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder on left bank; inspected by W. C. Taylor and Chester Frost.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders; rough. Banks fairly low but not subject to overflow; gradient steep. Control fairly well defined, wide, and not sensitive; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.11 feet midnight to 2 a. m. May 26 (discharge, 2,400 second-feet); minimum stage, 1.06 feet 6 to 8 a. m. November 14 (discharge, 85 second-feet).

1921-1923: Maximum stage recorded, 4.53 feet at 3 a. m. May 26, 1922 (discharge, 3,080 second-feet); minimum stage, November 14, 1923.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation probably permanent; affected by ice November 22 to March 10. Rating curve fairly well defined. Operation of water-stage recorder satisfactory except during winter when occasional staff readings only were obtained, and during periods April 24 to May 12, and September 27-30. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspection of recorder graph except as indicated in footnote to table of daily discharge. Records fair.

Discharge measurements of Deadwood River near Lowman, Idaho, during the year ending September 30, 1923

Dat	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 23	Paulsen and Johnson	• 1.42	181	June 7	Berkeley Johnson	3.45	1,490
Jan. 21	L. L. Bryan	• 1.51	96.2	July 14	do.	2.40	499
Mar. 25	Berkeley Johnson	• 1.22	93.4	Aug. 3	Veatch and Johnson	1.82	301
May 1	do.	2.46	518	13	Berkeley Johnson	1.62	189
24	do.	3.69	1,920	Sept. 4	F. M. Veatch	1.47	137

• Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Deadwood River near Lowman, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	124	124	120	125	95	120	234	528	1,360	1,130	278	150
2	122	112					247	476	1,270	1,050	257	148
3	121	113					254		1,240	968	241	150
4	122	107					228	690	1,240	892	234	150
5	122	113					220		1,290	830	231	148
6	121	112	120	125	95	120	225	911	1,410	762	228	144
7	119	121					214		1,540	723	222	144
8	119	120					205	1,000	1,680	677	222	142
9	119	122					200		1,820	626	214	140
10	118	128					220		2,030	566	205	140
11	118	121	100	110	110	125	260	1,250	2,250	528	202	140
12	119	112					320		2,250	504	197	138
13	119	94					329	1,210	2,030	522	184	136
14	118	104					308	1,230	1,680	498	189	134
15	119	122					341	1,130	1,490	470	197	133
16	119	121	110	96	110	119	442	1,190	1,450	450	187	133
17	118	156					559	1,240	1,400	492	179	134
18	118	170					516	1,610	1,330	442	184	134
19	118	118					566	1,650	1,330	416	195	133
20	116	119					470	1,750	1,340	396	237	133
21	116	110	125	100	106	112	391	1,750	1,360	382	208	131
22	116						• 115	337	1,680	377	184	131
23	116						• 112	312	1,820	350	174	131
24	116						• 109	• 308	1,890	1,220	487	165
25	116						106	304	2,180	1,140	528	158
26	113	110	125	100	106	112	121	• 403	2,250	1,190	386	156
27	113						129	• 502	1,890	1,160	354	• 136
28	113						144	• 600	1,600	1,130	329	• 135
29	113						177	699	1,480	1,150	316	• 134
30	110						214	• 614	1,500	1,150	312	134
31	122						241	1,410		300	152	

• Discharge interpolated.

NOTE.—Braced figures show mean discharge for periods indicated; • estimated on account of ice Nov. 22 to Mar. 10, except Jan. 21 for which result of actual current meter measurement was used, and estimated on account of missing gage height record by comparison with South Fork of Payette River near Banks for Mar. 12-20, May 3-5, and 7-12.

Monthly discharge of Deadwood River near Lowman, Idaho, for the year ending September 30, 1923

[Drainage area, 217 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	124	110	118	0.544	0.63	7,260
November.....	170	94	117	.539	.80	6,960
December.....			115	.530	.61	7,070
January.....			112	.516	.59	6,890
February.....			102	.470	.49	5,660
March.....	241		130	.599	.99	7,990
April.....	699	200	361	1.66	1.85	21,500
May.....	2,250	476	1,330	6.13	7.07	81,800
June.....	2,250	1,130	1,450	6.68	7.45	86,300
July.....	1,130	300	551	2.54	2.93	33,900
August.....	278	150	196	.903	1.04	12,100
September.....	150	131	138	.636	.71	8,210
The year.....	2,250		395	1.82	24.66	286,000

WEISER RIVER ABOVE CRANE CREEK, NEAR WEISER, IDAHO

LOCATION.—In sec. 10, T. 11 N., R. 4 W., at Purcell ranch, 1 mile above mouth of Crane Creek, and 12 miles northeast of Weiser, Washington County.

DRAINAGE AREA.—1,160 square miles (measured on Forest Service, topographic, and United States Geological Survey State maps).

RECORDS AVAILABLE.—July 15, 1920, to September 30, 1923.

GAGE.—Friez water-stage recorder on left bank a quarter of a mile from Purcell ranch house; inspected by Erma L. Van Leuven and O. A. Purcell.

DISCHARGE MEASUREMENTS.—Made from cable 200 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and gravel. Control formed by well-defined gravel and boulder riffle 200 feet below gage; changes at times. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 6.08 feet from 8 p. m. April 6 to 6 a. m. April 7 (discharge, 5,020 second-feet); minimum stage, 1.18 feet September 23 and 24 (discharge, 60 second-feet).

1920-1923: Maximum stage from well-defined high-water mark, 9.98 feet March 24, 1922 (discharge, about 11,600 second-feet); minimum stage recorded, 0.83 foot August 11 and 12, 1920 (discharge, 11 second-feet).

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—Numerous diversions for irrigation above.

REGULATION.—None except that due to diversions.

ACCURACY.—Stage-discharge relation changed during winter; affected by ice December 11 to January 8 and January 27 to March 6. Rating curves well defined. Operation of water-stage recorder satisfactory except for short periods during November to February. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph except as indicated in footnote to table of daily discharge. Records excellent except for estimated periods, for which they are fair.

Discharge measurements of Weiser River above Crane Creek, near Weiser, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Feb. 16	Berkeley Johnson.....	3.45	223	June 16	C. G. Paulsen.....	3.60	1,540
Mar. 22	A. G. Fiedler.....	3.46	1,450	July 7	Berkeley Johnson.....	2.78	848
Apr. 14	Berkeley Johnson.....	4.55	2,680	26	Johnson and Veatch....	1.90	263
May 10	do.....	5.05	3,800	Aug. 27	F. M. Veatch.....	1.36	98.0
12	do.....	4.90	3,230	30	do.....	1.34	91.7
31	do.....	4.04	1,990				

* Stage-discharge relation affected by ice. Measured three-eighths mile below Crane Creek and measured flow of Crane Creek deducted.

Daily discharge, in second-feet, of Weiser River above Crane Creek, near Weiser, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.		
1.....	83	127	230	900	210	850	3,780	2,160	1,870	1,440	103	91		
2.....	87	129					4,080	1,920	1,920	1,320	98	84		
3.....	92	124					4,000	1,650	1,870	1,190	96	82		
4.....	92	116					3,630	1,540	1,820	1,060	94	80		
5.....	92	121					3,560	1,760	1,820	954	89	78		
6.....	94	119	261	940	220	1,010	4,380	2,160	2,100	863	84	76		
7.....	109	124					963	4,860	2,420	2,220	791	82	71	
8.....	109	129					954	4,080	2,620	2,280	720	94	71	
9.....	116	140					980	3,330	2,900	2,220	652	106	71	
10.....	114	151					599	940	1,010	3,040	3,260	2,280	601	106	71
11.....	111	148	350	742	220	954	2,900	3,630	2,550	580	101	71		
12.....	109	148					625	2,970	3,180	2,760	533	94	69	
13.....	109	145					530	2,970	2,830	2,350	458	89	69	
14.....	111	137					478	759	2,690	2,830	1,980	419	96	69
15.....	114	129					445	720	2,480	2,690	1,700	382	103	65
16.....	114	132	280	366	223	743	2,620	2,550	1,540	361	106	63		
17.....	114	137					456	2,970	2,620	1,540	346	103	61	
18.....	114	148					757	972	3,260	2,760	1,500	361	101	61
19.....	114	162					618	1,050	3,040	3,110	1,600	328	96	63
20.....	111	145					518	1,090	2,760	3,110	1,650	293	103	63
21.....	111	134	300	385	380	1,250	2,420	3,180	1,600	257	134	61		
22.....	114	137					370	1,540	1,980	3,110	1,760	238	162	61
23.....	114	124					425	1,760	1,700	3,040	2,040	220	145	60
24.....	114	124					409	2,480	1,540	2,900	1,980	196	131	60
25.....	114	154					420	3,400	1,600	3,040	1,870	319	116	61
26.....	114	171	500	385	600	3,260	1,700	3,180	1,820	260	103	67		
27.....	114	168					3,400	1,980	2,970	1,870	193	98	74	
28.....	111	196					3,630	2,220	2,620	1,700	165	98	78	
29.....	104	210					300	3,860	2,480	2,350	1,650	142	98	78
30.....	101							3,980	2,550	2,420	1,540	131	94	78
31.....	111							3,860	2,040	-----	116	94	-----	

NOTE.—Discharge estimated because of ice Dec. 11 to Jan. 9 and Jan. 27 to Mar. 6, based upon observer's notes, weather records and one discharge measurement. Estimated because of missing gage heights Nov. 29 to Dec. 6. Result of discharge measurement used Feb. 16. Discharge interpolated May 25. Braced figures show mean estimated discharge for periods indicated.

Monthly discharge of Weiser River above Crane Creek near Weiser, Idaho, for the year ending September 30, 1923

[Drainage area, 1,160 square miles]

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	116	83	107	6,680
November.....		116	145	8,630
December.....			330	20,300
January.....			596	36,600
February.....			287	15,900
March.....	3,930		1,630	100,000
April.....	4,860	1,540	2,920	174,000
May.....	3,630	1,540	2,660	164,000
June.....	2,760	1,500	1,910	114,000
July.....	1,440	116	513	31,500
August.....	162	82	104	6,400
September.....	91	60	70.2	4,180
The year.....	4,860	60	941	682,000

WEST FORK OF WEISER RIVER NEAR FRUITVALE, IDAHO

LOCATION.—In NW. $\frac{1}{4}$ sec. 9, T. 17 N., R. 1 W., at Caseman ranch, $1\frac{1}{4}$ miles northwest of Fruitvale post office, Adams County, and $1\frac{1}{2}$ miles above junction with Weiser River.

DRAINAGE AREA.—65 square miles (measured on Forest Service map).

RECORDS AVAILABLE.—October 5, 1910, to January 31, 1913, and October 1, 1919, to August 22, 1923.

GAGE.—Vertical staff on left bank; read by Ralph and Willard Finn.

DISCHARGE MEASUREMENTS.—Made by wading or from highway bridge half a mile below gage.

CHANNEL AND CONTROL.—Bed composed of sand and coarse gravel. Banks covered with brush; left bank not likely to be overflowed; right bank subject to overflow at extremely high stages. Control formed by poorly defined gravel riffle and by log embedded in stream bed below gage; affected at times by débris.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.77 feet May 11 (discharge, 543 second-feet); minimum stage, 0.74 foot October 28 (discharge, 19 second-feet). A lower stage probably occurred during period of no record.

1910–1913; 1919–1923: Maximum discharge recorded, 687 second-feet April 13 and May 18–23, 1921; minimum discharge, 0.5 second-foot July 23–27, 1911.

ICE.—Stage-discharge relation affected by ice; observations discontinued during winter.

DIVERSIONS.—Several small ditches divert above and below station.

REGULATION.—Flow regulated somewhat by head gates at the Lost Creek Reservoir 12 miles above. Head gates changed usually at infrequent intervals.

ACCURACY.—Stage-discharge relation affected by ice and by logs and débris on control; changed during winter and by blasting out of log jam May 19. Rating curve, well-defined between 16 and 300 second-feet, used May 22 to August 22; curve parallel thereto used April 1 to May 18. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table except during period of shifting control May 19 to 21. Records good except April 1 to May 19 which are fair owing to accumulation of logs and drift on control.

Discharge measurements of West Fork of Weiser River near Fruitvale, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 23	A. G. Fiedler.....	1.21	37.8	June 22	C. G. Paulsen.....	1.69	123
Apr. 12	Berkeley Johnson.....	3.03	322	July 10	Berkeley Johnson.....	1.29	72.1
May 11	do.....	3.75	509	Aug. 1	Veatch and Johnson.....	.75	21.6
June 2	do.....	2.35	230	Sept. 1	F. M. Veatch.....	1.22	64.4

Daily discharge, in second-feet, of West Fork of Weiser River near Fruitvale, Idaho, for the year ending September 23, 1923

Day	Oct.	Apr.	May	June	July	Aug.	Day	Oct.	Apr.	May	June	July	Aug.
1.....		324	220	262	109	22	16.....		298	337	84	66	78
2.....		311	176	230	102	21	17.....		421	364	84	69	78
3.....		324	160	240	96	21	18.....		378	378	84	* 51	78
4.....		364	137	230	90	23	19.....	37	378	358	90	33	78
5.....		421	152	240	78	21	20.....		274	351	96	30	78
6.....		481	324	230	78	52	21.....		201	397	102	27	78
7.....	41	337	324	220	84	52	22.....		184	364	109	25	78
8.....		251	311	84	84	52	23.....		176	364	116	25	
9.....		230	364	73	84	52	24.....		152	324	130	25	
10.....		230	451	69	73	52	25.....		184	298	152	25	
11.....		298	543	71	62	52	26.....		240	286	144	* 25	
12.....		324	481	66	66	78	27.....		286	240	176	* 24	
13.....		337	421	73	64	78	28.....	19	337	230	152	* 24	
14.....		298	481	78	66	78	29.....		337	251	144	* 23	
15.....		274	421	84	62	78	30.....		286	240	116	* 23	
							31.....			262		* 22	

* Discharge interpolated.

Monthly discharge of West Fork of Weiser River near Fruitvale, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April.....	481	152	298	17, 700
May.....	543	137	323	19, 900
June.....	262	66	134	7, 970
July.....	109	22	55.3	3, 400
August 1-22.....	78	21	58.1	2, 540
The period.....				51, 500

LITTLE WEISER RIVER AT RUBY RANCH, NEAR INDIAN VALLEY, IDAHO

LOCATION.—In sec. 6, T. 13 N., R. 1 E., at Ruby ranch, 6 miles southeast of Indian Valley, Adams County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—July 10 to September 30, 1923, when station was discontinued.

GAGE.—Vertical staff on left bank; read by L. F. Stamm. Prior to July 25 a vertical staff at same location but at different datum was used.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of rock overlain with gravel.* One channel at all stages. Stream winding above and below station. Banks heavily wooded. Control well defined; subject to change.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 1.82 feet (old datum) at 3.15 p. m. July 10 (discharge, 106 second-feet); minimum stage, 0.90 foot (new datum) September 14-25 (discharge, 14 second-feet).

ICE.—No record.

DIVERSIONS.—Practically none above. Numerous diversions below during irrigation season. Except for one small diversion, the flow past the station is the same as that at the Richardson ranch below.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curve well defined below 30 second-feet used August 16 to September 25 and a curve parallel thereto July 10-24. Shifting-control method used July 31 to August 15. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table and by shifting-control method. Discharge below 30 second-feet good; others poor.

Discharge measurements of Little Weiser River at Ruby ranch, near Indian Valley, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
July 10	Berkeley Johnson	<i>Feet</i> * 1.82	<i>Sec.-ft.</i> 106	Sept. 1	F. M. Veatch	<i>Feet</i> 0.95	<i>Sec.-ft.</i> 18.2
Aug. 1	F. M. Veatch	1.06	42.8	Oct. 1	do.	.95	18.2
	Paulsen and Wood	1.01	24.0		do.	.96	16.3

* Not referred to gage datum used after July 25.

Daily discharge, in second-feet, of Little Weiser River at Ruby ranch, near Indian Valley, Idaho, for the year ending September 30, 1923

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1		43	18	11	102	31	16	21	67	25	14
2		41	18	12	96	28	16	22	63	23	14
3		40	18	13	90	27	16	23	60	21	14
4		38	18	14	91	26	14	24		21	14
5		37	18	15	86	25	14	25		21	14
6		36	18	16	84	24	14	26		19	
7		35	18	17	92	23	14	27		19	
8		34	18	18	86	23	14	28		19	14
9		33	16	19	81	23	14	29		19	
10	106	32	16	20	72	32	14	30		18	
								31	43	18	

NOTE.—Discharge estimated Sept. 26-30.

Monthly discharge of Little Weiser River at Ruby ranch, near Indian Valley, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
August	43	18	27.5	1,690
September	18	14	15.4	916

LITTLE WEISER RIVER NEAR INDIAN VALLEY, IDAHO

LOCATION.—In sec. 1, T. 13 N., R. 1 W., on Richardson ranch, $5\frac{1}{2}$ miles southeast of Indian Valley, Adams County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 26, 1920, to February 28, 1921, and March 24 to June 29, 1923.

GAGE.—Vertical staff fastened to left pier of footbridge; read by H. A. Donart.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge.

CHANNEL AND CONTROL.—Bed composed of lava rock overlain with gravel and cobbles. One channel at all stages. Stream winding above and below station. Banks of medium height and wooded. Control well defined; subject to change.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 2.30 feet May 30 (discharge, 659 second-feet); minimum stage, 0.32 foot at 7.40 a. m. March 24 (discharge, 34 second-feet).

1920, 1921, and 1923: Maximum stage recorded, 2.83 feet May 25, 1921 (measured discharge, 779 second-feet). An estimated discharge of 1,400 second-feet occurred December 30, 1920. Minimum stage, 0.39 foot September 8, 1920 (discharge, 11 second-feet).

ICE.—No record.

DIVERSIONS.—Few small ranch diversions upstream; ditch on Richardson ranch above gage has maximum capacity of about 4 second-feet. Numerous diversions below during irrigation season.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curve well-defined below 550 second-feet used prior to May 26, and curve parallel thereto June 1–29; shifting-control method used May 26–31. Gage read to hundredths once and sometimes twice daily. Gage-height record not wholly reliable. Daily discharge ascertained by applying daily gage height to rating table, or by estimation; shifting-control method used May 26–31. Records fair.

Discharge measurements of Little Weiser River near Indian Valley, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 24	A. G. Fiedler.....	0.32	33.7	June 2	Berkeley Johnson.....	1.30	279
Apr. 13	Berkeley Johnson.....	1.06	179	22	C. G. Paulsen.....	1.87	509
May 11	do.....	1.65	380				

Daily discharge in second-feet, of Little Weiser River near Indian Valley, Idaho, for the year ending September 30, 1923

Day	Mar.	Apr.	May	June	Day	Mar.	Apr.	May	June
1.....		201	257	494	16.....		210	416	-----
2.....		210	274	274	17.....		290	435	-----
3.....		180	274	-----	18.....		290	454	-----
4.....		189	290	-----	19.....		257	474	-----
5.....		144	307	-----	20.....		257	474	-----
6.....		195	360	-----	21.....		241	474	-----
7.....		225	378	-----	22.....		152	494	494
8.....		225	378	-----	23.....		139	494	324
9.....		210	474	-----	24.....	39	114	494	324
10.....		210	555	-----	25.....	41	126	514	307
11.....		225	378	-----	26.....	60	144	555	342
12.....		195	360	-----	27.....	73	195	596	307
13.....		192	378	-----	28.....	96	225	617	290
14.....		180	378	-----	29.....	139	241	638	290
15.....		186	397	-----	30.....	172	257	659	-----
					31.....	192	-----	617	-----

Monthly discharge of Little Weiser River near Indian Valley, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March 24-31.....	192	39	102	1,620
April.....	290	114	204	12,100
May.....	659	257	447	27,500

LITTLE WEISER RIVER NEAR CAMBRIDGE, IDAHO

LOCATION.—Near line between secs. 8 and 9, T. 14 N., R. 2 W., on Gladhart Lane, half a mile south of State highway, $4\frac{1}{2}$ miles east of Cambridge, Washington County, 5 miles above mouth and 7 miles below mouth of Grays Creek.

DRAINAGE AREA.—187 square miles (measured on topographic maps and United States Geological Survey base map of Idaho).

RECORDS AVAILABLE.—May 22, 1920, to September 30, 1923.

GAGE.—Vertical staff fastened to streamward side of right abutment of wooden bridge used prior to September 1. Beginning that date temporary gage was used which was set 500 feet upstream on right bank and read same at low stages but not set to datum of original gage. Gage read by Mrs. W. J. Martin.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and gravel. Channel winding above and below gage. Banks subject to overflow at high stages. Control formed by well-defined gravel riffle 75 feet below gage; subject to change during high water. Stage of zero flow at gage height, 1.30 feet as determined August 25, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.00 feet at 5 p. m. March 26 and 9.15 a. m. April 7 (discharge, 667 second-feet). Minimum stage, 1.34 feet (on temporary gage) September 18-22 (discharge, 1.2 second-feet).

1920-1923: Maximum discharge estimated, 2,350 second-feet December 31, 1920, when gage was submerged; no flow August 2 to September 14 and September 17-25, 1920.

ICE.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

DIVERSIONS.—Numerous ditch and canal diversions above, chiefly for irrigation of land in Indian Valley.

REGULATION.—None except that due to diversions.

ACCURACY.—Stage-discharge relation not permanent. Two well-defined rating curves used and curves parallel thereto. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table, using shifting-control method May 13-31. Records good.

Discharge measurements of Little Weiser River near Cambridge, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 23	A. G. Fiedler.....	3.08	314	July 10	Berkeley Johnson.....	2.35	113
Apr. 11	Berkeley Johnson.....	3.06	309	Aug. 31	Johnson and Veatch.....	1.82	20.2
May 11	do.....	3.46	478	Aug. 16	C. G. Paulsen.....	1.59	7.6
June 1	do.....	3.18	391	31	F. M. Veatch.....	1.45	3.1
21	C. G. Paulsen.....	2.99	299				

Daily discharge, in second-feet, of Little Weiser River near Cambridge, Idaho, for the year ending September 30, 1923

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....		550	258	368	257	19	3.2
2.....		456	241	348	227	17	2.0
3.....		420	204	348	208	16	1.7
4.....		438	214	310	193	16	1.6
5.....		438	311	410	172	12	1.6
6.....		588	383	430	161	12	1.7
7.....		667	383	410	150	12	1.7
8.....		550	438	430	134	12	1.9
9.....		401	438	430	127	11	2.2
10.....		329	667	461	119	9.0	1.7
11.....		311	512	556	102	8.0	1.6
12.....		329	438	514	96	8.0	1.6
13.....		293	402	472	82	8.0	1.4
14.....		276	384	389	80	8.0	1.3
15.....		258	347	348	70	8.0	1.3
16.....		311	333	329	66	8.0	1.3
17.....		365	334	310	74	8.0	1.3
18.....	139	365	442	274	62	8.0	1.2
19.....	179	347	527	310	58	4.3	1.2
20.....	185	293	491	310	41	4.3	1.2
21.....	198	258	493	310	41	14	1.2
22.....	276	208	464	410	41	11	1.2
23.....	293	179	485	389	40	8.0	1.6
24.....	347	160	466	368	38	8.0	1.6
25.....	550	176	554	368	91	6.5	1.6
26.....	512	214	626	368	41	5.0	1.7
27.....	475	258	464	329	37	5.7	2.0
28.....	475	293	388	329	32	3.4	2.5
29.....	475	347	348	292	37	2.9	2.2
30.....	512	293	388	274	28	2.9	3.4
31.....	475		329		21	2.7	

Monthly discharge of Little Weiser River near Cambridge, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March 18-31.....	550	139	364	10, 100
April.....	667	160	346	20, 000
May.....	667	204	411	25, 300
June.....	556	274	373	22, 200
July.....	257	21	94.4	5, 800
August.....	19	2.7	8.99	553
September.....	3.4	1.2	1.72	102
The period.....				84, 700

CRANE CREEK AT MOUTH, NEAR WEISER, IDAHO

LOCATION.—In sec. 14, T. 11 N., R. 4 W., just below steel highway bridge at Harris ranch, one-fourth mile above mouth, and 12 miles northeast of Weiser, Washington County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—July 14, 1920, to September 30, 1923.

GAGE.—Friez water-stage recorder on right bank; installed July 21, 1920; inspected by Erma L. Van Leuven and O. A. Purcell.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of cobbles and boulders; very rough. Concrete control installed August 21, 1920, 100 feet below gage. Above stage of about 4.0 feet stream flows in two channels. Stage of zero flow at gage height 1.25 ± 0.05 foot as determined May 20, 1922.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.85 feet at 11 p. m. January 7 (discharge, 765 second-feet); minimum stage, from water-stage recorder, 1.64 feet September 5 (discharge, 3.1 second-feet).

1920-1923: Maximum stage recorded, 5.95 feet March 24, 1922, from well-defined high-water mark (discharge, about 1,860 second-feet); minimum stage, 1.30 feet January 21, 1922 (discharge, 0.4 second-foot).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—Canal of Crane Creek Irrigation District, which diverts about 4 miles above gage, is principal diversion. Several small ranch diversions a short distance above gage.

REGULATION.—Flow regulated by head gates at Crane Creek Reservoir and by diversions above.

ACCURACY.—Stage-discharge relation practically permanent for flow in main channel; for second channel stage-discharge relation is subject to change. Rating curve, well-defined between 0 and 600 second-feet, used October 1 to December 31; for period January 1 to September 30, rating curve used well defined below 600 second-feet and fairly well defined above. Operation of water-stage recorder satisfactory except for short periods in October, December, and June. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspection of recorder graph except as noted in footnote to daily discharge table. Records good.

Discharge measurements of Crane Creek at mouth, near Weiser, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Feb. 16	Berkeley Johnson.....	1.75	5.42	June 16	C. G. Paulsen.....	2.48	41.0
Mar. 22	A. G. Fiedler.....	2.27	27.6	July 7	Berkeley Johnson.....	1.78	5.96
Apr. 14	Berkeley Johnson.....	3.83	295	26	Johnson and Veatch.....	1.86	8.13
May 10	.....do.....	2.20	25.3	Aug. 27	F. M. Veatch.....	2.70	* 91.8
31	.....do.....	1.84	8.39				

* Made under very poor measuring conditions; probably unreliable.

Daily discharge, in second-feet, of Crane Creek at mouth, near Weiser, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		6.2	5.9	470	6.8	51	17	8.4	10	9.4	16	10
2		5.9	6.2	447	7.8	42	32	29	10	9.1	14	6.5
3		5.6		431	7.8	19	13	31	11	8.4	38	3.6
4	12	5.6		415	6.8	12	11	28	9.8	6.3	43	3.2
5		5.6	7.0	439	6.8	11	13	32	9.4	5.0	47	3.1
6		5.3		539	6.5	23	49	35	18	6.0	60	6.5
7	13	5.6	7.8	714	6.5	72	53	33	38	6.0	127	6.3
8	26	5.6	7.0	621	6.3	53	85	29	17	7.5	134	5.5
9	28	5.6	6.4	515	6.3	38	173	25	11	7.5	134	5.2
10		5.6	7.0	505	6.3	34	213	24	11	7.1	132	5.0
11		6.2	5.9	359	6.3	28	353	20		6.5	137	4.7
12		5.3	5.1	32	6.3	38	411	16		11	136	4.7
13		5.3	6.2	19	6.0	28	346	13	58	7.5	134	4.2
14	48	5.3	5.3	16	5.8	19	294	12		8.8	134	9.4
15	16	5.3	6.2	12	5.8	18	223	12		6.5	132	13
16	9.2	5.3	5.9	12	5.5	32	141	65	49	7.5	130	13
17	7.2	5.3	5.9	53	5.5	70	93	66	44	8.4	130	14
18	6.2	5.3	5.9	51	5.5	45	89	42	42	9.8	130	16
19	6.2	5.3	5.9	25	5.5	45	82	21	60	9.4	129	18
20	4.8	5.3	5.6	18	5.8	37	77	12	45	8.1	129	18
21	5.9	5.3	5.9	14	7.8	39	77	13	8.8	8.1	129	18
22	5.3	5.3	5.9	12	11	51	77	46	6.8	9.4	127	18
23	5.3	5.3	5.9	11	15	71	68	13	13	8.4	127	19
24	5.3	5.3	5.9	10	22	105	60	5.0	16	11	125	19
25	5.3	5.3		9.4	24	82	13	4.2	11	9.1	122	35
26	4.8	5.9	5.9	9.1	25	75	7.8	3.8	12	8.8	107	46
27	5.1	5.9	7.8	8.4	26	71	6.3	3.6	14	10	76	46
28	4.8	5.9	19	8.8	41	57	5.5	4.2	12	12	72	44
29	4.6	5.9	81	8.1		43	14	4.7	8.4	21	62	28
30	4.3	5.9	482	8.1		31	12	9.8	10	16	18	22
31	4.8		496	6.8		23		8.4		14	14	

NOTE.—Discharge estimated because of missing gage heights, Oct. 1-7, 10-13, and June 11-15: Break in Crane Creek Canal on June 10 increased flow past station by amount approximately equal to flow of canal immediately prior to its break, upon which estimated flow for June 11-15 was based. Braced figures show mean discharge for periods indicated.

Monthly discharge of Crane Creek at mouth, near Weiser, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October		4.3	14.3	879
November	6.2	5.3	5.55	330
December	496	5.1	40.2	2,470
January	714	6.8	187	11,500
February	41	5.5	10.6	589
March	105	11	44.0	2,710
April	411	5.5	104	6,190
May	66	3.6	21.6	1,330
June		6.8	26.2	1,560
July	21	5.0	9.15	563
August	137	14	98.2	6,040
September	46	3.1	15.5	922
The year	714	3.1	48.4	35,100

CRANE CREEK IRRIGATION DISTRICT CANAL NEAR WEISER, IDAHO

LOCATION.—In sec. 7, T. 11 N., R. 3 W., $3\frac{1}{2}$ miles below diversion dam of Crane Creek Irrigation District and 12 miles northeast of Weiser, Washington County.

RECORDS AVAILABLE.—June 23, 1920, to September 30, 1923.

GAGE.—Friez water-stage recorder on right bank installed May 5, 1923, 1,000 feet above previous location; inspected by J. R. Scott and C. C. Herner.

DISCHARGE MEASUREMENTS.—Made from plank across flume.

CHANNEL AND CONTROL.—Section of wooden flume and earth canal section forms control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year from water-stage recorder, 2.26 feet at 5 p. m. June 6 (discharge, 62 second-feet); canal reported dry May 16–17, September 26–29, and during nonirrigation season.

1920–1923: Maximum stage recorded, 2.83 feet (upper location) 4 to 8 a. m. July 15, 1920 (discharge, 79 second-feet); canal reported dry during nonirrigation seasons.

DIVERSIONS.—None between gage and point of diversion.

REGULATION.—Flow controlled by head gates at diversion dam.

ACCURACY.—Stage-discharge relation changed May 16 on account of canal repairs.

Three well defined rating curves used as follows: The first for former location 1,000 feet below present gage, applicable October 1–14; the second applicable May 5–15; and the third, applicable May 18 to September 30. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspection of recorder graph. Records good.

COOPERATION.—Crane Creek Irrigation District furnished gage-height record.

Crane Creek Irrigation District Canal diverts water from the south side of Crane Creek in sec. 3, T. 11 N., R. 3 W., $5\frac{1}{2}$ miles below Crane Creek Reservoir where water is released and transported through canal for irrigation of lands in the Crane Creek and Sunnyside irrigation districts, aggregating 10,000 acres, of which about 2,000 acres were cultivated in 1923. The districts operate about 100 miles of canal and irrigation structures under one management.

Discharge measurements of Crane Creek Irrigation District Canal near Weiser, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
May 10	Berkeley Johnson.....	2.02	57.0	July 26	Veatch and Johnson...	2.07	54.6
31	do.....	2.00	53.6	Aug. 27	F. M. Veatch.....	2.00	47.6
June 16	C. G. Paulsen.....	.86	12.7	30	do.....	1.98	48.7
July 7	Berkeley Johnson.....	1.90	45.9				

Daily discharge, in second-feet, of Crane Creek Irrigation District Canal near Weiser, Idaho, for the year ending September 30, 1923

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1-----	45	-----	53	44	50	45	16-----	-----	0	9.7	59	51	28
2-----	45	-----	52	45	50	17	17-----	-----	0	16	57	50	28
3-----	45	-----	53	45	51	17	18-----	-----	11	13.0	55	50	28
4-----	46	-----	53	45	52	17	19-----	-----	45	.5	55	51	28
5-----	46	38	53	46	52	16	20-----	-----	49	.4	56	50	28
6-----	44	39	49	47	52	22	21-----	-----	22	.4	55	50	28
7-----	42	41	40	47	52	27	22-----	9.1	.8	55	50	28	
8-----	40	45	50	51	51	28	23-----	-----	43	.7	55	50	28
9-----	29	51	53	53	50	28	24-----	-----	47	.7	48	50	28
10-----	23	58	24	53	51	28	25-----	-----	46	.5	55	49	5.5
11-----	23	60	2.5	55	50	28	26-----	-----	49	.6	54	48	0
12-----	23	61	1.1	49	50	28	27-----	-----	49	9.3	54	49	0
13-----	23	60	.7	59	50	28	28-----	-----	51	26	52	50	0
14-----	12	60	.5	58	51	28	29-----	-----	53	35	50	49	0
15-----	0	38	.6	60	50	27	30-----	-----	42	43	50	48	4.0
							31-----	-----	53	-----	50	49	-----

NOTE.—Water reported turned out Oct. 15 and not turned in again until just a few days prior to May 5 when gage readings were commenced. Canal reported dry May 16-17 and Sept. 26-29.

Monthly discharge of Crane Creek Irrigation District Canal near Weiser, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October 1-14-----	46	12	34.7	964
May 5-31-----	61	0	41.5	2,220
June-----	53	.4	21.4	1,270
July-----	60	44	52.2	3,210
August-----	52	48	50.2	3,090
September-----	45	0	21.5	1,280

WEISER IRRIGATION DISTRICT CANAL NEAR WEISER, IDAHO

LOCATION.—In sec. 32, T. 11 N., R. 4 W., at Durbin ranch, 1½ miles below head-works of canal, and 7 miles above Weiser, Washington County.

RECORDS AVAILABLE.—April 29, 1920, to September 19, 1923.

GAGE.—Friez water-stage recorder adjacent to left side of concrete rating flume; inspected by J. A. Swann and Fred Hempenway. Zero of gage is at bottom of rating flume.

DISCHARGE MEASUREMENTS.—Made from footwalk across concrete rating flume.

CHANNEL AND CONTROL.—Canal above and below gage is about 20 feet wide. Bed composed of hard clay and gravel; fairly permanent. Banks are clean and not subject to appreciable growth of moss or weeds.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.26 feet at 9 p. m. July 13 (discharge, 178 second-feet). Canal reported dry April 25 and during nonirrigation season.

1920-1923: Maximum stage recorded, 4.13 feet at 2 p. m. May 23, 1920 (discharge, 206 second-feet); canal dry except during irrigation season.

ICE.—No record.

DIVERSIONS.—One farm lateral diverts about one-fourth mile above gage.

REGULATION.—Flow regulated at Luck waste gate, half a mile above, which in practice forms head of canal although actual diversion from Weiser River is 1½ miles above gage. Water from waste gate returns to Weiser River through a slough which formerly was main channel of river.

ACCURACY.—Stage-discharge relation not permanent. Two well-defined rating curves used, one applicable October 1-7 and the other April 14 to September 19. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph. Records excellent.

COOPERATION.—Gage-height record furnished by Weiser Irrigation District.

Weiser Irrigation District Canal diverts water from the north side of Weiser River in sec. 3, T. 10 N., R. 4 W., $1\frac{1}{2}$ miles above gage and furnishes water for irrigation of about 9,600 acres, included in projects of the Weiser Irrigation District and Weiser Bench Irrigation Co. near Weiser. The district maintains about 20 miles of main canal.

Discharge measurements of Weiser Irrigation District Canal near Weiser, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 14	Berkeley Johnson.....	1.66	78.4	July 7	Berkeley Johnson.....	3.08	163
May 12	do.....	3.13	167	26	Veatch and Johnson...	3.11	170
31	do.....	3.17	172	Aug. 26	F. M. Veatch.....	3.00	160
June 16	C. G. Paulsen.....	3.08	167				

Daily discharge, in second-feet, of Weiser Irrigation District Canal near Weiser, Idaho, for the year ending September 30, 1923

Day	Oct.	Apr.	May	June	July	Aug.	Sept.
1.....	64	-----	136	170	167	107	99
2.....	64	-----	136	170	174	99	92
3.....	64	-----	139	170	167	112	85
4.....	64	-----	142	170	164	120	80
5.....	62	-----	146	170	164	116	78
6.....	62	-----	150	170	167	114	78
7.....	62	-----	150	170	167	160	76
8.....	-----	-----	153	170	164	167	72
9.....	-----	-----	160	167	167	167	70
10.....	-----	-----	167	170	170	167	71
11.....	-----	-----	170	170	174	164	71
12.....	-----	-----	167	170	174	164	71
13.....	-----	-----	170	167	174	164	70
14.....	-----	74	170	167	174	160	74
15.....	-----	80	170	167	174	160	77
16.....	-----	81	170	167	174	164	77
17.....	-----	87	170	167	174	164	79
18.....	-----	93	174	167	174	164	83
19.....	-----	96	174	167	170	164	85
20.....	-----	111	170	167	170	164	-----
21.....	-----	127	170	167	170	164	-----
22.....	-----	136	170	167	167	164	-----
23.....	-----	139	170	167	164	164	-----
24.....	-----	66	170	167	164	160	-----
25.....	-----	0	174	167	167	160	-----
26.....	-----	54	174	167	167	160	-----
27.....	-----	133	174	167	167	153	-----
28.....	-----	156	174	167	156	153	-----
29.....	-----	160	174	167	150	150	-----
30.....	-----	153	174	167	136	108	-----
31.....	-----	-----	170	-----	119	106	-----

NOTE.—No gage-height record subsequent to Sept. 19.

Monthly discharge of Weiser Irrigation District Canal near Weiser, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October 1-7.....	64	62	63.1	876
April 14-30.....	160	0	108	3,470
May.....	174	136	164	10,100
June.....	170	167	168	10,000
July.....	174	119	165	10,100
August.....	167	99	148	9,100
September 1-19.....	99	70	78.3	2,950

POWDER RIVER NEAR NORTH POWDER, OREG.

LOCATION.—In NE. $\frac{1}{4}$ sec. 12, T. 6 S., R. 39 E., below all tributaries and return water from irrigation in the North Powder Valley and near the backwater of the proposed Thief Valley reservoir; at entrance to short canyon below North Powder Valley, 3 miles northeast of North Powder, Union County.

DRAINAGE AREA.—775 square miles; at lower end of Thief Valley, 826 square miles.

RECORDS AVAILABLE.—May 20, 1913, to September 30, 1915; March 10 to July 31, 1916; February 1 to July 31, 1920; November 21, 1920, to September 30, 1923. Records at this station are almost directly comparable with those at station below Thief Valley, March 9, 1909, to June 30, 1912, as the inflow between the two points constitutes only a negligible percentage of total.

GAGE.—Inclined staff on left bank; read by Mrs. H. C. Bidwell.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Rocks with some sand; occasionally slight shifts.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.0 feet April 7, June 9, 10 (discharge, 815 second-feet); minimum stage, 0.60 foot October 1-2 and September 5 (discharge, 15 second-feet).

1909-1916; 1920-1923: Maximum stage recorded, 8.1 feet May 20, 21, 24, and 25, 1921 (discharge, 3,010 second-feet); stream bed dry in August and September, 1910.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—Water is diverted from Powder River and its tributaries for irrigating about 72,000 acres of land above this station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent; affected by ice December 8-22 and February 1-28. Rating curve well defined. Staff gage read to quarter-tenths once a day, except after August 15 when it was read only three times a week. Daily discharge ascertained by applying daily gage height to rating table; interpolated for days when gage was not read in August and September. Records excellent except for periods when stage-discharge relation was affected by ice for which they are fair.

Discharge measurements of Powder River near North Powder, Oreg., during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 3	G. H. Canfield.....	1.72	149
May 4	Canfield and Fisher.....	2.64	326

Daily discharge, in second-feet, of Powder River near North Powder, Oreg., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	15	30	69	185		195	734	396	300	425	52	21
2.....	15	28	69	185		176	734	382	287	410	47	19
3.....	19	28	75	176		143	695	313	340	368	42	18
4.....	19	28	81	185		143	734	354	425	354	44	16
5.....	19	32	87	216		159	695	313	486	340	42	15
6.....	21	32	81	238		176	734	340	551	313	37	16
7.....	23	34	75	238		185	815	396	620	313	32	18
8.....	23	37		238		195	734	368	734	262	28	19
9.....	23	42		238		185	657	396	815	216	32	23
10.....	25	42		227		176	620	425	815	195	34	23
11.....	25	47		238		185	620	440	774	176	32	23
12.....	28	52		238		195	585	502	734	159	32	23
13.....	28	47		238		205	585	486	657	151	37	26
14.....	30	47		250		216	585	502	620	143	34	29
15.....	32	50		262	130	238	585	396	551	143	32	32
16.....	34	50	90	238		238	620	340	455	135	32	32
17.....	37	52		238		262	620	354	425	143	32	34
18.....	37	52		227		262	657	368	396	143	30	36
19.....	42	54		227		262	620	354	368	143	28	37
20.....	42	58		195		238	657	368	313	151	26	39
21.....	44	63		185		238	657	368	354	151	24	41
22.....	42	58		176		250	620	382	340	128	23	42
23.....	47	58	195	167		250	620	382	368	114	23	42
24.....	42	52	287	167		300	585	368	340	107	23	42
25.....	37	58	340	159		313	585	368	340	100	23	42
26.....	37	58	313	159		326	551	368	326	87	23	42
27.....	34	63	262	151		340	551	368	340	75	22	46
28.....	32	69	195	143		425	534	354	368	63	20	49
29.....	32	75	195	135		534	486	326	425	63	19	52
30.....	32	75	195	128		585	425	340	455	58	20	52
31.....	30		195	121		734		313		54	20	

NOTE.—Braced figures show mean discharge for periods indicated.

Monthly discharge of Powder River near North Powder, Oreg., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	47	15	30.5	1,880
November.....	75	28	49.0	2,920
December.....	340	69	131	8,060
January.....	262	121	199	12,200
February.....			130	7,220
March.....	734	143	269	16,500
April.....	815	425	630	37,500
May.....	502	313	378	23,200
June.....	815	287	477	28,400
July.....	425	54	183	11,300
August.....	52	19	30.5	1,880
September.....	52	15	31.6	1,880
The year.....	815	15	212	153,000

• Estimated.

SALMON RIVER AT STANLEY, IDAHO

LOCATION.—In sec. 3, T. 10 N., R. 13 E., a quarter of a mile above mouth of Valley Creek, half a mile northeast of new Stanley post office, and three-fourths mile southwest of old Stanley, Custer County.

DRAINAGE AREA.—355 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 2, 1921, to September 30, 1923.

GAGE.—Vertical staff on left bank; read by E. P. Huffman.

DISCHARGE MEASUREMENTS.—Made by wading or from wagon bridge at old Stanley 1 mile below; discharge of Valley Creek deducted to determine flow past gage when measured at bridge.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders; practically permanent. Control well defined but not sensitive owing to width of channel and swift current. Banks fairly low. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum discharge during year, 2,540 second-feet June 12 and 13; minimum stage, 0.89 foot March 15 and 16 (discharge, 211 second-feet).

1921-1923: Maximum stage recorded, 3.8 feet June 12, 1921 (discharge, 4,390 second-feet); minimum discharge March 15 and 16, 1923.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—None above gage.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed slightly during winter; affected by ice December 19 to February 27. Rating curves well-defined. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table except as indicated in footnote to table of daily discharge. Records fair, chiefly because daily staff readings may not represent actual mean flow for the day, especially during the spring and flood periods, when diurnal fluctuations are excessive.

Discharge measurements of Salmon River at Stanley, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 21	L. L. Bryan.....	0.98	262	June 22	Berkeley Johnson.....	2.20	* 1,260
May 8	C. G. Paulsen.....	1.64	688	July 14	A. G. Fiedler.....	2.04	* 1,010
28	A. G. Fiedler.....	2.28	* 1,300	Aug. 14	Berkeley Johnson.....	1.16	342

* Discharge obtained by measuring Salmon River below mouth of Valley Creek and deducting discharge of Valley Creek.

Daily discharge, in second-feet, of Salmon River at Stanley, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	265	250	253	275	260	277	256	390	1,120	1,570	494	256
2	261	250	250			266	256	403	1,070	1,640	467	256
3	261	242	250			266	251	409	1,020	1,670	440	288
4	265	235	253			277	251	415	970	1,500	428	293
5	261	242	253			277	246	507	1,020	1,500	428	293
6	261	250	250	260	260	277	246	507	1,070	1,430	428	282
7	257	253	257			266	241	656	1,300	1,430	409	277
8	257	253	261			256	241	738	1,430	1,360	390	266
9	261	257	257			256	246	826	1,640	1,300	390	266
10	257	257	257			256	251	920	1,880	1,120	390	266
11	261	257	257	290	265	266	256	920	2,140	1,120	370	256
12	265	253	261			256	261	970	2,540	1,070		266
13	265	250	261			256	266	920	2,540	1,070		256
14	261	250	257			216	266	970	2,050	1,070		251
15	261	257	265			211		826	1,640	1,070		246
16	257	257	265	270	265	211		873	1,500	1,020	370	256
17	257	272	265			216		920	1,240	970		251
18	257	265	257			226	300	970	1,240	920		246
19	257	257				236		970	1,240	826		241
20	257	257				251		1,020	1,240	782		241
21	257	257		265	270	251		1,070	1,240	738	453	236
22	257	261				256	315	1,120	1,240	697	428	236
23	257	261				256	315	1,120	1,240	697	403	231
24	257	257				261	309	1,240	1,180	697	378	226
25	257	261	265			261	309	1,500	1,120	970	355	226
26	253	261		266	266	261	320	1,800	1,120	697	343	236
27	250	265				256	378	1,570	1,120	641	332	246
28	250	257				251	409	1,430	1,070	618	320	256
29	250	253				246	390	1,300	1,240	579	320	256
30	250	253				241	378	1,240	1,360	543	309	246
31	253					236		1,180		521	288	

NOTE.—Discharge estimated on account of uncertain gage heights, by comparison with flow at near-by stations, Nov. 15-18, Apr. 15-21, Aug. 11-13, and 15-18; estimated because of ice Dec. 19 to Feb. 27. Braced figures show mean discharge for periods indicated.

Monthly discharge of Salmon River at Stanley, Idaho, for the year ending September 30, 1923

[Drainage area, 355 square miles]

Month	Discharge in second-feet				Run-off	
	Maxi- mum	Mini- mum	Mean	Per square mile	Inches	Acre-feet
October-----	265	250	258	0.727	0.84	15,900
November-----		235	255	.718	.80	15,200
December-----		250	260	.732	.84	16,000
January-----			277	.780	.90	17,000
February-----			262	.738	.77	14,600
March-----	277	211	251	.707	.82	15,400
April-----	409	241	292	.823	.92	17,400
May-----	1,800	390	958	2.70	3.11	58,900
June-----	2,540	970	1,390	3.92	4.37	82,700
July-----	1,640	521	1,020	2.87	3.31	62,700
August-----	494	288	388	1.09	1.26	23,900
September-----	293	226	255	.718	.80	15,200
The year-----	2,540	211	489	1.38	18.74	355,000

SALMON RIVER BELOW YANKEE FORK, NEAR CLAYTON, IDAHO

LOCATION.—In sec. 20, T. 11 N., R. 15 E., a quarter of a mile below Sunbeam Dam and mouth of Yankee Fork, 3 miles above Robinson Bar, 7 miles south of Bonanza, 12 miles below Stanley and mouth of Valley Creek, and 17 miles above Clayton, Custer County.

DRAINAGE AREA.—841 square miles (measured on topographic maps).

RECORDS AVAILABLE.—October 28, 1921, to September 30, 1923.

GAGE.—Vertical staff on left bank; read by Peter Ryan.

DISCHARGE MEASUREMENTS.—Made from cable three-tenths mile below gage.

CHANNEL AND CONTROL.—Bed composed of boulders and gravel. Control formed by well-defined boulder and rock riffle; practically permanent. Banks high. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.0 feet at 6.30 p. m. June 12 and 10 a. m. June 13 (discharge, 4,920 second-feet); minimum stage, 0.3 foot November 22–27 (discharge, 352 second-feet).

1922–1923: Maximum stage recorded, 7.6 feet June 7, 15, and 17, 1922 (discharge, 6,760 second-feet); minimum stage and discharge occurred November 22–27, 1922

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—None of importance above station.

REGULATION.—None. Future operation of power plant at Sunbeam Dam may affect flow somewhat during low stages owing to probable changes in gate opening. Power plant not in operation at present.

ACCURACY.—Stage-discharge relation at low stages changed slightly during winter. Rating curves well-defined above 450 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table, except as indicated in footnote to table of daily discharge. Records good except during estimated periods for which they are fair.

COOPERATION.—Gage-height record furnished by Love & von Brecht.

Discharge measurements of Salmon River below Yankee Fork, near Clayton, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 19	L. L. Bryan.....	0.36	389	June 23	Berkeley Johnson.....	3.93	2,770
May 7	O. G. Paulsen.....	2.70	1,660	July 13	A. G. Fiedler.....	2.98	1,920
27	A. G. Fiedler.....	4.83	3,390	Aug. 14	Berkeley Johnson.....	1.10	708
29	do.....	3.90	2,690				

Daily discharge, in second-feet, of Salmon River below Yankee Fork, near Clayton, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	433	392	392	440	390	400	524	905	2,450	3,220	960	568
2.....	433	392	372				524	852	2,270	3,120	905	546
3.....	433	392	392				524	852	2,100	3,020	852	524
4.....	433	392	392				568	905	2,010	2,920	852	524
5.....	433	392	433				546	1,070	2,180	2,820	800	524
6.....	433	392	433	440	390	400	502	1,540	2,820	2,640	800	524
7.....	433	392	454				481	1,760	3,120	2,540	750	502
8.....	433	392	433				502	1,920	3,520	2,360	750	481
9.....	412	412	433				439	2,270	3,830	2,180	703	524
10.....	412	412	433				398	2,270	4,370	2,100	703	524
11.....	433	412	433	440	390	400	439	2,270	4,700	2,100	703	502
12.....	433	412	433				502	2,270	4,920	2,010	703	502
13.....	433	392	433				546	1,840	4,920	1,920	657	502
14.....	433	392	433				612	1,840	4,040	1,840	703	502
15.....	433	392	433				634	1,760	3,220	1,760	703	439
16.....	412	372	433	440	390	400	657	1,840	3,120	1,760	657	439
17.....	412	392	433				750	1,920	3,020	1,840	657	439
18.....	412	433	433				378	800	2,180	2,920	1,680	634
19.....	412	372	433				378	852	2,450	2,290	1,540	657
20.....	412	412	433				398	852	2,450	2,920	1,460	750
21.....	412	392	433	420	400	400	418	852	2,640	2,920	1,460	750
22.....	412	352	433				398	750	2,730	2,920	1,390	750
23.....	392	352	433				398	612	2,820	2,730	1,320	750
24.....	392	352	433				418	568	3,120	2,730	1,320	657
25.....	392	352	433				418	590	3,830	2,640	1,260	612
26.....	392	352	433	430	400	400	398	634	4,260	2,640	1,190	612
27.....	392	352	433				398	750	3,720	2,450	1,190	612
28.....	392	392	433				418	800	3,220	2,450	1,190	590
29.....	392	392	433				418	960	2,730	2,640	1,130	590
30.....	392	372	433				418	960	2,820	2,920	1,070	590
31.....	392	372	433				439	2,640	2,640	1,020	568	568

N OTE.—Discharge estimated on account of ice, based upon gage-height record, observer's notes, weather records, and by comparison with flow at near-by stations Dec. 27 to Mar. 17; estimated because of silt deposit on control caused by opening of gates in Sunbeam Dam above through which a large amount of accumulated sediment above dam was released Sept. 19-30. Braced figures show mean discharge for periods indicated.

Monthly discharge of Salmon River below Yankee Fork, near Clayton, Idaho, for the year ending September 30, 1923

[Drainage area, 841 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	433	392	415	0.493	0.57	25,500
November.....	433	352	387	.460	.51	23,000
December.....	454	372	427	.508	.59	26,300
January.....	439	395	430	.511	.59	26,400
February.....	439	395	395	.470	.49	21,900
March.....	439	403	403	.479	.55	24,800
April.....	960	398	638	.759	.85	38,000
May.....	4,260	852	2,250	2.68	3.09	138,000
June.....	4,920	2,010	3,080	3.66	4.08	183,000
July.....	3,220	1,020	1,880	2.24	2.58	116,000
August.....	960	568	709	.843	.97	43,600
September.....	568	439	501	.596	.66	29,800
The year.....	4,920	352	962	1.14	15.53	696,000

SALMON RIVER AT SALMON, IDAHO

LOCATION.—In sec. 6, T. 21 N., R. 22 E., at rear of Rose ranch buildings, 300 feet below island, just above Lemhi River, and one-fourth mile below highway bridge at Salmon, Lemhi County.

DRAINAGE AREA.—3,600 square miles (Forest Service records).

RECORDS AVAILABLE.—April 25, 1912, to September 30, 1916, and July 6, 1919, to September 30, 1923.

GAGE.—Vertical staff on left bank; installed September 13, 1923, at same site and set to same datum as inclined staff installed October 20, 1913, and used to September 12, 1923; read by Viola Renner and Wendell Wilson.

DISCHARGE MEASUREMENTS.—Made from cable 700 feet below gage.

CHANNEL AND CONTROL.—One channel at all stages. Bed composed of rock overlain with sand and gravel. Control subject to change.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.5 feet June 13 (discharge, 10,200 second-feet); minimum stage, 2.0 feet December 13, 14, February 1, 2, and 11 (discharge, 715 second-feet); lower flow may have occurred during period of ice effect.

1912-1916; 1919-1924: Maximum stage recorded, 9.35 feet June 12, 1921 (discharge, 16,400 second-feet); minimum discharge, 710 second-feet August 30 to September 3 and December 8 and 9, 1919; lower flow may have occurred during winter.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—A small ditch diverts from left between bridge and gage but its total capacity is less than 1 per cent of low-water flow. Numerous small diversions, principally on tributaries above.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent during year; affected by ice December 16 to January 10 and February 3 to 10. Rating curve well defined between 900 and 9,000 second-feet and fairly well defined above. Gage read to half-tenths once daily. Daily discharge ascertained by applying daily gage height to rating table except for period during which stage-discharge relation was affected by ice during which it was based upon observer's notes, weather records, and comparison with flow at station near Clayton. Open-water records good; others fair.

COOPERATION.—Gage-height record January to September furnished by United States Forest Service.

Discharge measurements of Salmon River at Salmon, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 26	L. L. Bryan.....	2.39	990	July 11	A. G. Fiedler.....	4.70	3,830
26	do.....	2.42	1,040	Sept. 13	Berkeley Johnson.....	* 2.52	1,080
May 31	A. G. Fiedler.....	5.11	4,370	13	do.....	* 2.52	1,080
July 11	do.....	4.70	3,830				

* Referred to vertical staff gage installed Sept. 13, 1923. Sloping staff read 2.50 feet.

Daily discharge, in second-feet, of Salmon River at Salmon, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1-----	1,080	1,260	1,210	1,150	715	1,040	1,170	1,340	4,200	6,140	1,980	1,260
2-----	1,080	1,300	1,080		715	1,080	1,260	1,340	4,030	6,370	1,860	1,260
3-----	1,040	1,340	1,080			1,080	1,340	1,340	3,710	6,600	1,750	1,210
4-----	1,000	1,260	1,210			1,040	1,170	1,390	3,390	6,370	1,750	1,210
5-----	1,000	1,260	1,170			925	1,260	1,440	3,550	5,700	1,750	1,170
6-----	1,040	1,300	1,170	1,150	780	1,000	1,170	1,080	4,200	5,090	1,640	1,130
7-----	1,000	1,260	1,130			1,000	1,130	2,500	5,090	4,540	1,540	1,130
8-----	1,080	1,260	1,080			1,040	1,130	2,780	5,920	4,370	1,540	1,130
9-----	1,130	1,300	1,000			1,080	1,080	3,080	6,370	4,370	1,540	1,130
10-----	1,170	1,340	1,040			1,080	1,130	3,390	7,560	4,200	1,440	1,080
11-----	1,170	1,300	1,000	1,210	715	1,080	1,130	3,550	8,340	3,870	1,390	1,080
12-----	1,210	1,300	1,000	1,210	780	1,130	1,170	3,230	9,660	3,870	1,340	1,080
13-----	1,210	1,340	715	1,260	850	1,080	1,170	3,080	10,200	3,710	1,300	1,080
14-----	1,170	1,300	715	1,260	815	1,080	1,130	2,780	9,380	3,550	1,260	1,080
15-----	1,210	1,260	925	1,210	850	1,040	1,170	2,640	7,560	3,550	1,440	1,130
16-----	1,260	1,170	950	1,210	850	1,040	1,210	2,780	6,370	3,550	1,390	1,130
17-----	1,260	1,260		1,170	925	1,040	1,340	2,780	5,490	3,870	1,340	1,130
18-----	1,300	1,260		1,170	965	1,000	1,540	2,640	4,900	3,230	1,260	1,080
19-----	1,260	1,300		1,130	1,000	1,000	1,640	2,780	4,720	3,080	1,300	1,080
20-----	1,260	1,300		1,170	1,080	1,040	1,750	3,080	4,900	3,080	1,490	1,080
21-----	1,210	1,260	1,000	1,210	1,080	1,080	1,750	3,230	5,090	2,780	1,860	1,080
22-----	1,210	1,260		1,170	1,080	1,040	1,440	3,870	5,490	2,780	1,540	1,080
23-----	1,210	1,210		1,170	1,040	1,080	1,390	4,370	5,490	2,640	1,490	1,080
24-----	1,170	1,170		1,080	1,040	1,080	1,340	5,290	5,290	2,640	1,490	1,130
25-----	1,170	1,170		1,130	1,080	1,000	1,340	6,370	5,090	2,780	1,440	1,130
26-----	1,170	1,210	1,050	1,130	1,080	1,000	1,300	7,560	4,720	2,780	1,440	1,170
27-----	1,210	1,210		1,080	1,080	1,040	1,300	6,380	4,720	2,500	1,440	1,170
28-----	1,170	1,260		1,080	1,080	1,080	1,260	5,490	4,540	2,360	1,260	1,170
29-----	1,130	1,260		1,040	-----	1,080	1,260	4,720	5,090	2,360	1,260	1,170
30-----	1,170	1,210		1,000	-----	1,130	1,300	4,540	5,700	2,230	1,260	1,170
31-----	1,210	-----		780	-----	1,130	-----	4,540	-----	2,100	1,260	-----

NOTE.—Braced figures show estimated mean discharge for periods indicated. Stage-discharge relation affected by ice Dec. 16-31, Jan. 1-10, and Feb. 2-10.

Monthly discharge of Salmon River at Salmon, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October-----	1,300	1,000	1,160	71,300
November-----	1,340	1,170	1,260	75,000
December-----	1,210	-----	1,020	62,700
January-----	-----	780	1,140	70,100
February-----	1,080	715	895	49,700
March-----	1,130	925	1,050	64,600
April-----	1,750	1,080	1,290	76,800
May-----	7,560	1,340	3,440	212,000
June-----	10,200	3,390	5,710	340,000
July-----	6,600	2,100	3,780	232,000
August-----	1,980	1,260	1,490	91,600
September-----	1,260	1,080	1,130	67,200
The year-----	10,200	715	1,950	1,410,000

SALMON RIVER AT WHITEBIRD, IDAHO

LOCATION.—In sec. 22, T. 28 N., R. 1 E., at highway bridge near Whitebird, Idaho County, just above Whitebird Creek and below all important tributaries.

DRAINAGE AREA.—13,600 square miles (measured on General Land Office map, edition of 1909).

RECORDS AVAILABLE.—August 18, 1910, to September 30, 1917; October 1, 1919, to September 30, 1923.

GAGE.—Chain gage on handrail of highway bridge; installed September 14, 1920; read by R. E. Shuck.

DISCHARGE MEASUREMENTS.—Made from gaging car suspended from ferry cable or from highway bridge.

CHANNEL AND CONTROL.—Channel straight for several hundred feet above and below gage. One channel at all stages. Banks not subject to overflow. Control composed of section of river channel and large boulder riffle three-eighths mile below; permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 15.9 feet June 12 (discharge, 56,000 second-feet); minimum stage, 1.3 feet December 15, 16, and February 2, 3 (discharge, 2,820 second-feet).

1910-1917; 1919-1923: Maximum stage recorded, 21.2 feet June 9, 1921 (discharge, 88,800 second-feet); minimum stage on November 15, 1916 when water was below gage (estimated discharge, 2,500 second-feet).

Maximum stage determined from high-water marks, 27.5 feet June, 1894 (discharge, 120,000 second-feet) estimated by extending rating curve.

ICE.—Stage-discharge relation affected by ice during severe winters.

DIVERSIONS.—Very little water diverted for irrigation above station.

REGULATIONS.—None.

ACCURACY.—Stage-discharge relation probably permanent; not affected by ice.

Rating curve well defined. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table. Records good.

No discharge measurements made during year.

Daily discharge, in second-feet, of Salmon River at Whitebird, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	3,780	3,780	3,780	4,200	2,900	3,660	5,340	10,400	28,800	32,500	7,580	4,660
2.....	3,780	3,920	3,660	3,780	2,820	3,780	6,500	9,560	27,000	32,500	7,140	4,660
3.....	3,780	3,780	3,540	3,660	2,820	3,920	7,140	9,300	25,700	30,600	6,700	4,660
4.....	3,780	3,780	3,780	3,540	2,900	3,780	7,140	8,540	24,400	30,600	6,700	4,500
5.....	3,780	3,780	3,780	3,660	3,000	3,780	6,920	9,560	25,300	26,600	6,500	4,340
6.....	3,780	3,660	4,060	3,920	3,300	3,540	6,700	12,100	28,800	24,000	6,300	4,340
7.....	3,780	3,660	3,920	4,060	3,540	3,660	6,700	15,600	33,400	23,600	6,300	4,200
8.....	3,780	3,920	4,060	4,340	3,540	3,660	6,500	19,200	38,200	21,600	6,100	4,200
9.....	3,780	3,920	4,060	4,060	3,660	3,780	6,100	22,800	44,100	19,600	6,300	4,200
10.....	3,780	4,060	3,780	4,200	3,300	3,660	6,300	26,600	46,600	18,100	6,100	4,060
11.....	3,780	4,060	3,660	4,060	3,200	3,540	6,500	26,200	53,400	17,700	6,100	4,060
12.....	3,780	4,060	3,420	4,060	3,100	3,540	6,700	26,200	56,000	16,600	5,520	4,060
13.....	3,780	4,060	2,900	4,060	3,100	3,660	6,920	20,800	54,400	15,600	5,520	4,060
14.....	3,780	3,780	2,900	3,920	3,100	3,540	7,360	20,000	48,200	14,600	5,340	4,060
15.....	3,780	3,540	2,820	3,660	3,200	3,540	7,360	19,600	41,100	14,300	5,340	3,920
16.....	3,780	3,540	2,820	3,540	3,420	3,540	7,580	19,200	40,600	13,900	5,340	4,060
17.....	3,780	3,660	2,900	3,420	3,420	3,540	9,040	20,400	36,300	13,900	5,340	4,060
18.....	3,780	4,200	3,200	3,660	3,420	3,660	10,900	23,600	33,400	13,600	5,340	4,060
19.....	3,780	4,200	3,420	3,540	3,540	3,660	11,800	26,600	33,900	12,100	5,340	4,060
20.....	3,780	4,060	3,540	3,540	3,540	3,540	10,900	27,500	34,800	11,200	5,340	4,600
21.....	3,780	4,060	3,660	3,420	3,660	3,660	10,600	29,300	35,800	10,600	6,300	3,920
22.....	3,780	3,780	3,780	3,420	3,660	3,780	10,400	30,600	36,700	10,400	6,500	3,920
23.....	3,780	3,540	4,060	3,540	3,780	3,540	10,100	33,900	37,700	10,100	6,100	3,920
24.....	3,780	3,300	4,060	3,660	3,660	3,660	7,140	36,300	34,800	10,100	5,700	3,920
25.....	3,780	3,200	4,060	3,660	3,660	3,780	6,920	44,100	33,900	9,820	5,340	4,060
26.....	3,780	3,100	4,060	3,920	3,660	3,780	7,140	50,300	33,900	9,820	5,160	4,060
27.....	3,920	3,100	4,200	3,780	3,660	3,920	7,580	41,100	33,900	9,560	4,980	4,340
28.....	3,780	3,660	4,340	3,540	3,660	4,060	7,820	38,200	32,500	8,780	4,980	4,500
29.....	3,780	3,780	4,340	3,420	-----	4,500	10,100	36,300	32,500	8,300	4,820	4,340
30.....	3,780	3,780	4,200	3,300	-----	5,160	10,900	31,600	32,000	7,580	4,820	4,340
31.....	3,780	-----	4,200	3,000	-----	5,340	-----	29,300	-----	7,580	4,820	-----

NOTE.—Gage not read Sept. 2; discharge interpolated.

*Monthly discharge of Salmon River at Whitebird, Idaho, for the year ending
September 30, 1923*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	3,920	3,780	3,780	232,000
November.....	4,200	3,100	3,760	224,000
December.....	4,340	2,820	3,710	228,000
January.....	4,340	3,000	3,720	229,000
February.....	3,780	2,820	3,360	187,000
March.....	5,340	3,540	3,810	234,000
April.....	11,800	5,340	7,970	474,000
May.....	50,300	8,540	25,000	1,540,000
June.....	56,000	24,400	36,600	2,180,000
July.....	32,500	7,580	16,300	1,000,000
August.....	7,580	4,820	5,800	357,000
September.....	4,660	3,920	4,190	249,000
The year.....	56,000	2,820	9,850	7,130,000

VALLEY CREEK AT STANLEY, IDAHO

LOCATION.—In sec. 3, T. 10 N., R. 13 E., one-eighth mile above Valley Creek ranger station, one-fourth mile above confluence with Salmon River, three-eighths mile below Stanley post office, Custer County.

DRAINAGE AREA.—176 square miles (measured on topographic maps).

RECORDS AVAILABLE.—December 21, 1910, to October 31, 1913; May 2, 1921, to September 30, 1923.

GAGE.—Vertical staff on left bank, installed May 2, 1921; read by E. P. Huffman.

DISCHARGE MEASUREMENTS.—Made from log bridge 300 feet upstream or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel. Control well-defined; practically permanent. Banks fairly low; left bank may be overflowed at extremely high stages. Stage of zero flow, -0.3 foot ± 0.2 foot determined July 23, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.9 feet June 12 (discharge, 886 second-feet); minimum stage, 0.96 foot March 12 (discharge, 53 second-feet). Lower flow may have occurred during winter when discharge was not accurately determined.

1910-1913; 1921-1923: Maximum stage recorded, 4.4 feet May 29, 1921 (discharge, 1,850 second-feet); minimum stage and discharge March 12, 1923.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—A few ranch diversions for irrigation above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed slightly for low stages during ice-affected period December 15 to February 22. Rating curves well-defined between 70 and 1,150 second-feet. Gage read to hundredths once daily. Daily discharge determined by applying daily gage height to rating table except as indicated in footnote to table of daily discharge. Records good except during estimated periods and for May and June, for which they are fair.

Discharge measurements of Valley Creek at Stanley, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 21	L. L. Bryan	1.18	87	June 22	Berkeley Johnson	2.36	574
May 7	C. G. Paulsen	2.36	545	July 14	A. G. Fiedler	2.04	384
28	A. G. Fiedler	2.27	510	Aug. 14	Berkeley Johnson	1.38	135

Daily discharge, in second-feet, of Valley Creek at Stanley, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	78	60	68	85	65	70	99	234	442	581	163	99
2	78	63	63			70	95	234	442	610	163	95
3	78	64	60			67	91	257	442	581	154	91
4	78	64	63			70	87	254	416	552	149	91
5	78	64	63			73	87	552	416	524	149	87
6	78	64	64	95	70	70	84	469	496	524	149	87
7	80	65	65			58	82	552	552	524	143	87
8	78	60	65			56	87	469	610	442	137	84
9	80	57	64			56	91	610	700	469	143	91
10	80	60	63			56	95	610	761	416	143	91
11	80	60	65	70	70	56	99	610	823	390	137	112
12	84	65	65			53	102	640	886	390	132	112
13	82	68	64			56	99	469	854	390	127	124
14	82	82	65			58	102	469	700	390	132	124
15	82	85				58	96	416	610	390	127	112
16	80	89	70	80	70	70	91	442	552	365	124	112
17	78					77	117	416	524	341	122	91
18	78					80	137	442	524	317	117	84
19	78					73	166	469	670	295	108	80
20	78	90				70	273	524	581	273	179	77
21	78		75	73	73	80	273	452	552	254	166	73
22	78					77	273	581	552	246	137	73
23	78	89				77	198	610	552	234	132	70
24	78	89				73	234	610	469	234	122	70
25	78	89				73	198	670	469	341	117	77
26	75	93	75	70	73	70	198	700	469	216	112	80
27	68	89				67	234	581	469	216	108	84
28	63	82				64	250	524	442	209	104	91
29	60	60				73	257	496	496	192	102	87
30	57	68				82	257	496	552	179	102	87
31	57					97		469		169	104	

NOTE.—Discharge estimated on account of erroneous gage heights Nov. 17–22 and Apr. 15; estimated because of ice Dec. 15 to Feb. 22. Braced figures show mean discharge for periods indicated.

Monthly discharge of Valley Creek at Stanley, Idaho, for the year ending September 30, 1923

[Drainage area, 176 square miles]

Month	Discharge in second-feet				Run-off	
	Maxi-mum	Mini-mum	Mean	Per square mile	Inches	Acre-feet
October	84	57	76.1	0.432	0.50	4,680
November		57	75.6	.429	.48	4,500
December			68.1	.387	.45	4,190
January			86.5	.491	.57	5,320
February			67.8	.385	.40	3,770
March	97	53	68.9	.391	.45	4,240
April	273	82	152	.864	.96	9,040
May	700	234	498	2.83	3.26	30,600
June	886	416	567	3.22	3.59	33,700
July	610	169	363	2.06	2.38	22,300
August	179	102	132	.750	.86	8,120
September	124	70	90.8	.516	.58	5,400
The year	886	53	188	1.07	14.48	136,000

YANKEE FORK OF SALMON RIVER NEAR CLAYTON, IDAHO

LOCATION.—In sec. 20, T. 11 N., R. 15 E., at Sunbeam Dam, 350 feet above confluence with Salmon River, 3 miles west of Robinson Bar, 7 miles south of Bonanza, and 17 miles west of Clayton, Custer County.

DRAINAGE AREA.—195 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 3, 1921, to September 30, 1923.

GAGE.—Vertical staff on right bank; read by Peter Ryan. Gage datum lowered 0.65 foot September 17, 1922; gage heights prior to October 1, 1922, referred to original datum.

DISCHARGE MEASUREMENTS.—Made from highway bridge 250 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of rock, boulders, and gravel. Control formed by rock and gravel riffle 50 feet below gage, is well-defined at low and medium stages. Although gradient is steep, control is not well defined at high stages due possibly to slight backwater effect from Salmon River when it is in flood. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.4 feet at 9 a. m. June 13 (discharge, 1,730 second-feet); minimum discharge, estimated 42 second-feet, February 1–15. Lower flow may have occurred during winter.

1921–1923: Maximum stage recorded, 5.24 feet at 8 p. m. June 12, 1921 (discharge, 3,360 second-feet); minimum discharge, estimated 42 second-feet February 1–15, 1923. Probably not actual minimum.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed slightly during ice-affected period November 20 to March 24. Rating curve used prior to November 20 is well defined between 72 and 1,400 second-feet; the one used after March 24 is well defined between 40 and 1,000 second-feet, above which it is extended parallel to former curve. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table except as indicated in footnote to table of daily discharge. Open-water records good; others fair.

COOPERATION.—Gage-height record furnished by Love & von Brecht.

Discharge measurements of Yankee Fork of Salmon River near Clayton, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 20	L. L. Bryan.....	0.43	45.7	June 22	Berkeley Johnson.....	3.14	778
May 6	C. G. Paulsen.....	2.44	446	July 13	A. G. Fiedler.....	2.00	308
28	A. G. Fiedler.....	3.29	831	Aug. 14	Berkeley Johnson.....	1.00	128

* Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Yankee Fork of Salmon River near Clayton, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	72	67					122	208	635	740	138	91
2.....	72	67					122	199	542	740	138	82
3.....	72	64					94	190	542	635	138	78
4.....	72	64					98	208	587	587	138	78
5.....	72	60					79	256	685	542	138	78
6.....	72	62					77	425	995	500	122	77
7.....	72	64					70	500	1,140	500	122	70
8.....	72	70	64	65	42		68	587	1,120	425	122	68
9.....	70	70					57	685	1,380	392	120	77
10.....	70	67				44	57	800	1,560	362	114	73
11.....	70	70					68	860	1,640	335	117	76
12.....	70	67					81	740	1,640	310	117	76
13.....	72	70					96	392	1,640	310	122	76
14.....	70	74					116	392	1,220	298	122	72
15.....	70	80					155	392	860	266	116	71
16.....	70	85					218	425	800	266	111	71
17.....	70	88					256	500	740	298	109	70
18.....	70	74					236	542	685	256	106	71
19.....	70	64					246	587	740	236	122	71
20.....	70					46	246	685	740	218	138	70
21.....	70						181	800	740	218	120	67
22.....	70				43		146	800	740	208	120	68
23.....	67		70	45		45	109	860	740	199	116	67
24.....	67						103	1,140	635	199	106	68
25.....	64	60				45	109	1,380	587	190	97	68
26.....	64					46	130	1,470	587	181	94	76
27.....	64					46	155	1,070	587	181	92	83
28.....	64					46	181	860	635	181	91	81
29.....	67					47	266	740	685	181	94	79
30.....	64					49	236	685	740	172	102	67
31.....	67					54		685		164	91	

NOTE.—Braced figures show mean discharge for periods indicated; estimated on account of ice, based on gage-height record, observer's notes, weather records, one discharge measurement, and by comparison with flow at near-by stations. Result of actual discharge measurement used Mar. 20.

Monthly discharge of Yankee Fork of Salmon River near Clayton, Idaho, for the year ending September 30, 1923

[Drainage area, 195 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	72	64	69.2	0.355	0.41	4,250
November.....	88		66.2	.339	.38	3,940
December.....			67.1	.344	.40	4,130
January.....			54.7	.281	.32	3,360
February.....			42.5	.218	.23	2,350
March.....	54		45.0	.231	.27	2,770
April.....	266	57	139	.713	.80	8,270
May.....	1,470	190	647	3.32	3.83	39,800
June.....	1,640	542	886	4.54	5.06	52,700
July.....	740	164	332	1.70	1.96	20,400
August.....	138	91	116	.595	.69	7,130
September.....	91	67	74.0	.379	.42	4,400
The year.....	1,640		212	1.09	14.77	154,000

WARM SPRINGS CREEK AT ROBINSON BAR, NEAR CLAYTON, IDAHO

LOCATION.—In sec. 27, T. 11 N., R. 15 E., at Robinson Bar, half a mile above confluence with Salmon River and 14 miles west of Clayton, Custer County.

DRAINAGE AREA.—81 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 30, 1921, to March 31, 1923, when records were discontinued.

GAGE.—Vertical staff on right bank; read by Llewellyn Clawson and Tom Williams.

DISCHARGE MEASUREMENTS.—Made by wading or from highway bridge 600 feet below gage.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders; subject to slight changes. Control fairly well defined. One channel at all stages. Banks high and wooded. Stage of zero flow determined May 3, 1921, at gage height -0.4 foot ± 0.3 foot.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period, estimated 58 second-feet, October 1–28; minimum discharge, estimated 20 second-feet, February 1–15. Probably not actual extremes.

1921–1923: Maximum stage recorded, 4.11 feet June 14, 1922 (discharge, about 883 second-feet); minimum discharge, estimated 20 second-feet, February 1–15, 1923. Probably not actual extremes.

ICE.—Stage-discharge relation not seriously affected by ice. Warm springs which enter a short distance above have a tendency to prevent severe ice formation.

DIVERSIONS.—Two small ditches divert water for irrigation above.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed during winter. Rating curve used prior to December 6, well defined below 200 second-feet. Gage read to hundredths once daily except October 1–28 when readings were not obtained; after December 5, gage-height record probably not very reliable. Daily discharge ascertained by applying daily gage height to rating table except as indicated in footnote to table of daily discharge. Records probably fair.

Discharge measurements of Warm Springs Creek at Robinson Bar, near Clayton, Idaho, during the period October 1, 1922, to October 13, 1923

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>			<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 18	L. L. Bryan.....	0.90	23.0	May 29	A. G. Fiedler.....	2.10	162
May 7	C. G. Paulsen.....	1.68	88.1	July 13	do.....	2.20	192
26	A. G. Fiedler.....	2.50	228	Oct. 13	F. M. Veatch.....	1.44	64.2

Daily discharge, in second-feet, of Warm Springs Creek at Robinson Bar, near Clayton, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1.....		48	42				16.....		45				23
2.....		48	42				17.....		45				23
3.....		48	42				18.....		45				
4.....		45	42				19.....		45				
5.....		45	42				20.....		45				
6.....		45					21.....		45				
7.....	58	45					22.....	58	45			25	
8.....		45		30	20	23	23.....		45	40	30		
9.....		45					24.....		42				
10.....		45					25.....		42				25
11.....		45	40				26.....		42				
12.....		42					27.....		42				
13.....		45					28.....		42				
14.....		45					29.....	48	42				
15.....		45					30.....	48	42				
							31.....	48					

NOTE.—Discharge estimated on account of lack of gage-height record Oct. 1-28; estimated because of uncertain gage heights and probable slight ice effect at times, based on one discharge measurement, weather records, and by comparison with flow at near-by stations, Dec. 5 to Mar. 17 and Mar. 19-31. Result of actual current meter measurement used Mar. 18. Braced figures show mean discharge for periods indicated.

Monthly discharge of Warm Springs Creek at Robinson Bar, near Clayton, Idaho, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....		48	57.0	3,500
November.....	48	42	44.5	2,650
December.....	42		40.3	2,480
January.....			30.0	1,840
February.....			22.3	1,240
March.....			23.8	1,460
The period.....				13,200

BEAR VALLEY CREEK NEAR CAPE HORN, IDAHO

LOCATION.—About sec. 31, T. 13 N., R. 10 E. (unsurveyed), Valley County 250 feet below mouth of Fir Creek, 5 miles above confluence with Middle Fork of Salmon River, 7 miles northwest of Cape Horn, Custer County.

DRAINAGE AREA.—180 square miles; revised (measured on Forest Service maps).

RECORDS AVAILABLE.—September 6, 1921, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder on right bank; inspected by United States Forest Service employees.

DISCHARGE MEASUREMENTS.—Made from cable 50 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders. Banks high. One channel at all stages. Control not well defined; subject to slight moss growth.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year from water-stage recorder, 4.5 feet at 8 a. m. May 26, 1923 (discharge, 2,300 second-feet); minimum stage, 1.08 feet at 1 p. m. November 13, 1922 (discharge, about 55 second-feet). Higher and lower discharges may have occurred during periods of no record.

1921-1923: Same as given above.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed slightly during winter. Rating curves fairly well defined between 90 and 1,400 second-feet. Operation of water-stage recorder satisfactory except during September. Daily discharge ascertained by applying to rating table mean daily gage height determined from inspection of recorder graph except as indicated in footnote to table of daily discharge. Records good, except those for September which are fair.

Discharge measurements of Bear Valley Creek near Cape Horn, Idaho, during the year ending September 30, 1923

Date	Made by—	Gage height	Dis-charge
June 21	Berkeley Johnson.....	<i>Feet</i> 3.20	<i>Sec.-ft.</i> 1,090
July 15	A. G. Fiedler.....	1.96	320
Aug. 13	Berkeley Johnson.....	1.51	133

Daily discharge, in second-feet, of Bear Valley Creek near Cape Horn, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	94	94							982	837	187	
2.....	94	86							850	790	180	
3.....	94	86							877	726	173	
4.....	97	88							982	664	169	
5.....	101	90							1,020	615	166	
6.....	101	101							1,200	579	159	
7.....	99	105							1,240	585	156	
8.....	99	97							1,290	508	156	
9.....	97	94							1,380	467	153	
10.....	97	94							1,510	433	146	
11.....	97	86							1,700	405	143	
12.....	99	79							1,850	377	137	
13.....	99	83							1,750	372	134	
14.....	99	122						701	1,380	351	140	
15.....	97	120						695	1,160	320	156	
16.....	97	117						790	1,090	315	143	
17.....	97	115						877	1,130	362	137	
18.....	97	122						1,050	1,050	315	140	
19.....	94	105						1,160	1,090	276	150	
20.....	94							1,240	1,090	257	194	
21.....	94	100						1,240	1,050	253	180	
22.....	92							1,240	1,050	280	162	
23.....	94							1,420	1,020	253	150	
24.....	94							1,460	982	276	137	
25.....	94							1,800	898	496	134	
26.....	92							2,000	946	305	131	
27.....	92							1,460	946	253	128	
28.....	92							1,160	864	239	126	
29.....	86							1,130	857	223	126	
30.....	86							1,200	857	210	123	
31.....	97							1,130		194	122	

NOTE.—Discharge estimated on account of ice Nov. 20-22; on account of missing gage heights Aug. 31 to Sept. 13 and Sept. 16-30. Braced figures show mean discharge for periods indicated.

Monthly discharge of Bear Valley Creek near Cape Horn, Idaho, for the year ending September 30, 1923

[Drainage area, 180 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	101	86	95.4	0.530	0.61	5,870
November 1-22.....	122	79	99.3	.552	.45	4,330
May 14-31.....	2,000	696	1,210	6.72	4.50	43,200
June.....	1,850	850	1,140	6.33	7.06	67,800
July.....	837	194	404	2.24	2.58	24,800
August.....	194		150	.833	.96	9,220
September.....			109	.606	.68	6,490

GRANDE RONDE RIVER AT LA GRANDE, OREG.

LOCATION.—In SW. $\frac{1}{4}$ sec. 31, T. 2 S., R. 38 E., one-fourth mile above bridge on river road half a mile northwest of La Grande, Union County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—February 16, 1918, to September 2, 1920; November 22, 1920, to June 30, 1923, when station was discontinued.

GAGE.—Inclined and vertical staff on left bank; installed February 13, 1923; read by S. U. Evans. Briggs gage on right bank 100 feet upstream used previous to this date.

DISCHARGE MEASUREMENTS.—Made from highway bridge below gage or by wading.

CHANNEL AND CONTROL.—Control is a well-defined coarse gravel riffle, practically permanent, narrow at low stages, widening to full width of river at medium stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.0 feet March 31 and April 6 (discharge, 2,330 second-feet); minimum stage, 1.10 feet October 14-22, November 15, and 24-26 (discharge, 21 second-feet).

1918-1923: Maximum stage recorded, 7.0 feet April 22, 1922 (discharge, 4,750 second-feet); minimum discharge, 4 second-feet September 14 and 16-20, 1922 (gage height, 0.90 foot).

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation for both gages permanent; affected slightly by ice for short periods. Rating curves for both gages well defined. Staff gage read to hundredths once a day. Daily discharge ascertained by applying daily gage height to rating table. Records good except for periods when stage-discharge relation was affected by ice and discharge was estimated, for which they are fair.

Discharge measurements of Grande Ronde River at La Grande, Oreg., during the year ending September 30, 1923

Date	Made by—	Gage height		Discharge
		New or lower gage	Old or upper gage	
Feb. 14	G. H. Canfield.....	Feet	Feet	Sec.-feet
Mar. 3	do.....	0.90	1.42	52
Apr. 19	do.....	1.70	2.23	307
		3.20	3.50	1,280

Daily discharge, in second-feet, of Grande Ronde River at La Grande, Oreg., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	138	31		47		311	2,260	790	610
2	95	31		47		355	2,180	700	760
3	95	31		47		300	2,040	640	820
4	33	27		50		128	1,650	640	850
5	39	27		50		205	1,650	700	820
6	39	31		133	54	191	2,330	880	760
7	33	31		425		188	1,650	985	880
8	33	32		425		170	1,520	1,100	820
9	23	32		302		140	1,400	1,290	760
10	23	33		237		128	1,340	1,650	760
11	27	36		184		170	1,520	1,340	760
12	27	40	28	126		155	1,650	1,100	700
13	23	40		95	52	140	1,340	1,100	820
14	21	40		105	52	125	1,290	985	820
15	21	21		105	47	170	1,340	880	760
16	21	27		115	46	170	1,520	880	760
17	21	40		138	45	410	1,780	850	700
18	21	53		105	46	300	1,520	1,290	640
19	21	53		105	47	580	1,400	1,520	580
20	21	36		115	50	640	1,100	1,400	610
21	21	37		95	66	580	1,020	1,240	640
22	21	33		78	90	382	915	1,100	640
23	23	33			140	333	850	1,020	640
24	23	21	44		205	520	820	985	1,100
25	23	21	47	70	188	580	790	950	1,400
26	23	21	50		140	790	820	880	1,400
27	23	33	62	62	146	1,020	880	820	1,400
28	23	33	65	62	191	1,520	950	730	1,100
29	27	33	62	65		2,040	950	640	1,100
30	27	33	95	62		2,180	880	700	1,100
31	27		62	62		2,330		580	

NOTE.—Discharge estimated from a comparison with climatic records and from observer's notes Nov. 29, Dec. 1-23, Jan. 23-26, Feb. 1-12, because stage-discharge relation was affected by ice. Discharge estimated Apr. 1, June 29, and 30 because gage was not read.

Monthly discharge of Grande Ronde River at La Grande, Oreg., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	138	21	33.4	2,050
November	53	21	33.0	1,960
December	95	28	36.5	2,240
January	425	47	120	7,380
February	205	45	78.5	4,360
March	2,330	125	556	34,200
April	2,330	790	1,380	82,100
May	1,650	580	980	60,300
June	1,400	580	850	50,600
The period				245,000

CLEARWATER RIVER AT KAMIAH, IDAHO

LOCATION.—In sec. 1, T. 33 N., R. 3 E., at former toll bridge at Kamiah, Lewis County, 6 miles below mouth of South Fork of Clearwater River.

DRAINAGE AREA.—4,850 square miles (measured on General Land Office map, edition of 1909).

RECORDS AVAILABLE.—August 20, 1910, to September 30, 1923.

GAUGE.—Chain gage attached to downstream handrail of bridge; installed May 30, 1911; read by Mrs. Elsie McCarty.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND CONTROL.—Bed at gage and control consists of heavy boulders and gravel. Control practically permanent. One channel at low water; two channels between gage heights about 5 and 8 feet, and one channel above gage height 8 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 12.9 feet May 26 (discharge, 49,600 second-feet); minimum stage, 1.8 feet November 25 and 26 (discharge, 695 second-feet). Flow may have been less sometime December 13–19, when stage-discharge relation was affected by ice.

1910–1923: Maximum stage recorded, 16.1 feet May 26, 1913 (discharge, 76,600 second-feet); minimum stage occurred in December, 1919, when stage-discharge relation was affected by ice, discharge certainly less than 500 second-feet).

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Several small ditches divert water for irrigation above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed May 27; affected by ice December 13–19. Rating curve used prior to the change well defined; that used after the change fairly well defined. Gage read once daily to tenths. Records good.

COOPERATION.—Gage-height record furnished by United States Weather Bureau.

The following discharge measurement was made by J. E. Stewart:

October 9, 1922: Gage height, 2.25 feet; discharge, 1,010 second-feet.

Daily discharge, in second-feet, of Clearwater River at Kamiah, Idaho, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	1,070	1,170	1,070	1,600	760	1,720	12,300	15,300	21,600	15,700	2,620	1,430
2.....	980	1,170	1,070	1,490	980	1,600	11,500	13,500	29,600	14,400	2,620	1,430
3.....	1,070	1,170	1,070	1,490	980	1,600	12,300	15,300	25,900	13,500	2,470	1,430
4.....	1,070	1,070	980	1,490	980	1,720	12,300	16,200	25,600	11,900	2,470	1,430
5.....	980	980	1,070	1,600	1,170	1,720	10,700	19,000	25,000	11,100	2,470	1,430
6.....	1,170	980	1,070	1,600	1,170	1,720	10,300	26,300	27,600	10,300	2,470	1,430
7.....	1,170	980	980	3,640	1,490	1,720	9,910	32,400	31,700	9,540	2,330	1,320
8.....	980	980	980	4,280	1,380	1,720	9,180	35,900	34,500	9,180	2,330	1,320
9.....	1,070	1,170	980	3,850	1,070	1,600	8,480	35,800	37,300	8,480	2,330	1,320
10.....	980	1,070	1,070	2,570	1,070	1,490	8,140	38,800	41,800	7,810	2,190	1,220
11.....	980	1,070	830	2,570	1,170	1,490	8,830	35,900	42,500	7,810	2,190	1,220
12.....	980	1,070	760	2,260	1,070	1,490	9,180	29,600	43,200	7,480	2,190	1,220
13.....	980	1,070		1,970	980	1,600	9,180	27,000	34,500	6,850	2,050	1,220
14.....	980	980		1,840	900	1,600	9,540	25,600	27,000	6,260	1,910	1,220
15.....	980	900		1,840	900	1,490	10,300	25,600	23,200	5,450	1,910	1,220
16.....	980	830	850	1,600	1,070	1,490	13,500	24,400	22,700	5,200	1,910	1,220
17.....	980	1,070		1,600	1,070	1,720	17,600	27,000	22,200	5,200	1,780	1,220
18.....	980	2,410		1,670	1,270	1,720	21,100	30,300	22,200	5,980	1,780	1,220
19.....	980	1,840		1,970	1,270	1,720	22,700	30,300	21,600	4,960	1,780	1,220
20.....	980	1,600	1,490	1,840	1,380	2,110	17,600	31,000	21,600	4,510	1,910	1,220
21.....	1,070	1,170	1,490	1,720	1,380	2,260	16,600	30,300	21,600	4,100	2,330	1,220
22.....	1,270	1,170	1,380	1,720	1,600	2,110	11,900	33,800	19,000	3,910	2,770	1,220
23.....	1,170	980	1,380	1,600	1,720	2,110	10,700	34,500	21,100	3,910	2,050	1,220
24.....	1,070	830	1,490	1,600	1,840	2,260	10,300	32,400	19,500	3,560	1,910	1,220
25.....	1,070	695	1,970	1,600	1,840	2,570	10,300	40,200	19,000	3,560	1,910	1,220
26.....	1,070	695	2,110	1,490	1,840	2,730	10,700	49,600	17,600	3,910	1,780	1,220
27.....	1,070	760	2,110	1,380	1,720	2,900	13,100	35,900	19,000	3,400	1,780	1,320
28.....	1,070	980	2,110	1,380	1,600	4,280	17,100	27,600	17,600	3,240	1,660	1,540
29.....	980	1,170	2,730	1,270		6,260	20,600	24,400	17,100	3,080	1,660	1,430
30.....	980	1,170	2,110	900		8,480	18,100	23,200	16,200	2,920	1,540	1,320
31.....	1,070		1,720	760		11,100		22,700		2,770	1,430	

NOTE.—Braced figure shows mean estimated discharge for period indicated.

Monthly discharge of Clearwater River at Kamiah, Idaho, for the year ending September 30, 1923.

[Drainage area, 4,850 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	1,270	980	1,040	0.214	0.25	64,000
November.....	2,410	695	1,110	.229	.26	66,000
December.....	2,730	-----	1,290	.266	.31	79,300
January.....	4,280	760	1,890	.390	.45	116,000
February.....	1,840	760	1,270	.262	.27	70,500
March.....	11,100	1,490	2,580	.532	.61	159,000
April.....	22,700	8,140	12,800	2.64	2.94	762,000
May.....	49,600	13,500	28,900	5.96	6.87	1,780,000
June.....	43,200	16,200	25,700	5.30	5.91	1,530,000
July.....	15,700	2,770	6,770	1.40	1.61	416,000
August.....	2,770	1,430	2,080	.429	.49	128,000
September.....	1,540	1,220	1,300	.268	.30	77,400
The year.....	49,600	-----	7,260	1.49	20.27	5,250,000

SOUTH FORK OF CLEARWATER RIVER NEAR GRANGEVILLE, IDAHO

LOCATION.—In SE. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 30, T. 30 N., R. 4 E. Boise meridian, below power house of Grangeville Electric Light & Power Co., 3 miles east of Mount Idaho, 6 miles southeast of Grangeville, Idaho County, and 19 miles above mouth.

DRAINAGE AREA.—940 square miles.

RECORDS AVAILABLE.—November 14, 1910, to July 31, 1911; October 9 to November 18, 1911; January 4, 1912, to September 30, 1916; and April 1 to September 30, 1923.

GAGE.—Chain gage on right bank 150 feet below power house; installed April 1, 1923; read by power-plant operators.

DISCHARGE MEASUREMENTS.—Made from cable one-fourth mile below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of large boulders; shifts only at high stages. Gradient steep. Channel curved at gage. Left bank subject to overflow during extremely high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 7.7 feet at 5 p. m. May 10 (discharge, 4,450 second-feet); minimum stage, 2.78 feet at 7 a. m. September 16 (discharge, 98 second-feet).

1910-1916; 1923: Maximum stage recorded, 9.7 feet (old datum) May 30, 1912 (discharge, 9,830 second-feet); minimum stage recorded, that of September 16, 1923.

ICE.—Stage-discharge relation seriously affected by ice during severe winters.

DIVERSIONS.—Low-water flow diverted through power plant. All water diverted for power purposes returned to river above gage.

REGULATION.—Operation of power plant causes slight fluctuation in stage.

ACCURACY.—Stage-discharge relation practically permanent; not affected by ice. Rating curve well defined. Gage read to half-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records excellent.

COOPERATION.—Gage-height record furnished by Grangeville Electric Light & Power Co.

No discharge measurements were made during year.

Daily discharge, in second-feet, of South Fork of Clearwater River near Grangeville, Idaho, for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1-----	1,510	1,790	3,170	2,410	316	151	16-----	2,090	3,450	2,650	850	212	125
2-----	1,420	1,600	4,010	2,300	316	141	17-----	2,650	3,730	2,650	970	193	157
3-----	1,510	1,420	3,730	2,090	816	131	18-----	3,040	4,150	2,780	910	193	141
4-----	1,510	1,600	3,450	1,890	316	141	19-----	2,780	4,150	3,170	730	186	141
5-----	1,420	1,990	3,450	1,990	316	157	20-----	1,990	4,150	3,170	675	595	131
6-----	1,420	2,530	4,010	1,790	294	141	21-----	1,600	3,870	3,310	620	420	131
7-----	1,180	3,040	3,870	1,600	294	151	22-----	1,280	3,590	3,170	595	325	125
8-----	1,260	3,310	4,010	1,420	280	141	23-----	1,280	3,590	3,450	545	272	125
9-----	1,260	3,730	3,870	1,340	272	120	24-----	1,180	3,590	3,450	545	239	141
10-----	1,420	4,300	4,010	1,180	272	131	25-----	1,180	4,010	3,450	520	231	151
11-----	1,600	4,150	4,010	1,260	264	125	26-----	1,260	4,300	3,310	470	212	125
12-----	1,690	3,590	3,870	1,180	231	141	27-----	1,600	3,450	3,590	420	231	345
13-----	1,600	3,590	3,590	970	223	131	28-----	2,090	3,040	3,170	420	193	264
14-----	1,510	3,450	3,170	910	223	120	29-----	2,190	2,780	2,910	370	186	193
15-----	1,600	3,450	2,650	850	231	111	30-----	1,990	3,040	2,650	370	164	193
							31-----		2,650		348	164	

Monthly discharge of South Fork of Clearwater River near Grangeville, Idaho, for the year ending September 30, 1923

[Drainage area, 940 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
April-----	3,040	1,180	1,670	1.78	1.99	99,400
May-----	4,300	1,420	3,260	3.47	4.00	200,000
June-----	4,010	2,650	3,390	3.61	4.03	202,000
July-----	2,410	848	1,050	1.12	1.29	64,600
August-----	595	164	264	.281	.32	16,200
September-----	348	111	151	.161	.18	8,980
The period-----						591,000

MISCELLANEOUS DISCHARGE MEASUREMENTS

Discharge measurements of streams in the Snake River basin at points other than regular gaging stations, made during the year ending September 30, 1923, are listed in the following table:

Miscellaneous discharge measurements in Snake River drainage basin during the year ending September 30, 1923

Date	Stream	Tributary to or diverting from	Locality	Gage height	Discharge
				<i>Feet</i>	<i>Sec.-ft.</i>
Sept. 25	Snake River.....	Columbia River.....	NE. $\frac{1}{4}$ sec. 5, T. 11 S., R. 20 E., above Dry Creek Falls, $1\frac{1}{2}$ miles east of Murtaugh, Idaho.		* 23.9
Aug. 7	do.....	do.....	NE. $\frac{1}{4}$ sec. 6, T. 11 S., R. 20 E., 100 feet above confluence with Dry Creek, 1 mile northeast of Murtaugh, Idaho.	0.71	* 53.6
9	do.....	do.....	do.....	.70	* 51.9
10	do.....	do.....	do.....	.70	* 44.0
11	do.....	do.....	do.....	.67	* 43.6
23	do.....	do.....	do.....	.64	* 51.1
28	do.....	do.....	do.....	.61	* 48.7
30	do.....	do.....	do.....	.60	40.3
Sept. 13	do.....	do.....	do.....	.59	* 48.8
15	do.....	do.....	do.....	.59	* 45.2
18	do.....	do.....	do.....	.60	* 50.3
21	do.....	do.....	do.....	.59	* 45.8
25	do.....	do.....	do.....	.59	* 47.6
Aug. 29	do.....	do.....	SW. $\frac{1}{4}$ sec. 31, T. 9 S., R. 18 E., at headrace of Shoshone Falls power plant, 7 miles northeast of Twin Falls, Idaho.		583
Sept. 11	do.....	do.....	do.....		* 592
July 26	Emma Matilda Creek.....	Two Ocean Creek.....	One-half mile below outlet of Emma Matilda Lake, Wyo.	3.07	18.9
26	Two Ocean Creek.....	Pacific Creek.....	Midway between Two Ocean Creek and mouth, Wyo.	1.35	27.0
31	do.....	do.....	do.....	1.55	30.5
Aug. 30	Great feeder canal.....	Snake River.....	Below White Canal head near Rigby, Idaho.		163
June 14	Henrys Fork.....	do.....	Below dam near Lake, Idaho		1.2
14	do.....	do.....	Just north of Yellowstone highway bridge near Lake, Idaho.	1.32	2.4
14	Dry Creek.....	Henrys Fork.....	Three-eighths mile above confluence with Henrys Fork near Lake, Idaho.		21.3
20	do.....	do.....	do.....		14.4
May 7	Warm Springs Creek.....	Canyon Creek.....	At mouth, near Pincock Hot Springs, Idaho.		6.1
26	do.....	do.....	do.....		18.3
June 11	do.....	do.....	do.....		11.8
July 17	do.....	do.....	do.....		5.5
Aug. 23	do.....	do.....	do.....		4.4
Sept. 23	do.....	do.....	do.....		5.3
July 23	Aggregate surface inflow.	Snake River.....	Between Shelley and Porterville gaging stations, Idaho.		12.3
25	do.....	do.....	do.....		
Aug. 23	do.....	do.....	do.....		109
25	do.....	do.....	do.....		
July 23	Aggregate surface inflow excepting Blackfoot River.	do.....	Between Porterville and Clough gaging stations, Idaho.		90.3
25	do.....	do.....	do.....		
Aug. 23	do.....	do.....	do.....		120
25	do.....	do.....	do.....		
May 20	Camas Creek.....	Mud Lake.....	Sec. 20, T. 10 N., R. 38 E., at highway bridge at Jacoby ranch, 11 miles east of Dubois, Idaho.		108
June 8	do.....	do.....	do.....		98.1
July 5	do.....	do.....	do.....		93.0
Sept 5	do.....	do.....	do.....		39.8
Oct. 18	do.....	do.....	do.....		87.7

* Furnished by C. E. Tappan, employee of Idaho Power Co.

Miscellaneous discharge measurements in Snake River drainage basin during the year ending September 30, 1923—Continued

Date	Stream	Tributary to or diverting from	Locality	Gage height	Discharge
				<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 9	Camas Creek	Mud Lake	NW. $\frac{1}{4}$ sec. 36, T. 7 N., R. 35 E., at highway bridge, 5 miles southwest of Hamer, Idaho.		83.4
Apr. 29	do	do	do		113
June 11	do	do	do		26.3
July 1	do	do	do		155
Aug. 1	do	do	do		96.2
Sept. 1	do	do	do		79.8
June 8	Woods Hump ditch	Camas Creek	4 miles below head; diverts from right bank of Camas Creek in sec. 21, T. 12 N., R. 38 E., 10 miles east of Spencer, Idaho.		79.1
Sept. 5	do	do	do		9.4
May 20	Woods Lucky Strike ditch	do	3 miles below head; diverts from right bank of Camas Creek in sec. 36, T. 12 N., R. 38 E., 5 miles south of Kilgore, Idaho.		Dry.
June 8	do	do	do		23.8
July 5	do	do	do		Dry.
Sept. 5	do	do	do		Dry.
May 20	Woods No. 1 ditch	do	1 mile below head; diverts from left bank of Camas Creek in sec. 19, T. 11 N., R. 39 E., 10 miles south of Kilgore, Idaho.		Dry.
June 8	do	do	do		3.0
July 5	do	do	do		Dry.
Sept. 5	do	do	do		Dry.
May 20	Woods Woodie ditch	do	1 mile below head; diverts from right bank of Camas Creek in sec. 26, T. 11 N., R. 38 E., 10 miles south of Kilgore, Idaho.		7.4
June 8	do	do	do		3.8
July 5	do	do	do		Dry.
Sept. 5	do	do	do		Dry.
June 9	Beaver Creek	do	NE. $\frac{1}{4}$ sec. 23, T. 12 N., R. 36 E., $\frac{1}{4}$ mile southeast of Spencer, Idaho.		127
Sept. 6	do	do	do		14.9
June 9	Rattlesnake Creek	Beaver Creek	NW. $\frac{1}{4}$ sec. 31, T. 12 N., R. 37 E., 3 miles southeast of Spencer, Idaho.		7.7
Sept. 6	do	do	do		Dry.
June 9	Dry Creek	do	Sec. 3, T. 11 N., R. 36 E., 1 mile north of Highbridge, Idaho.		10.6
Sept. 6	do	do	do		Dry.
Apr. 28	Rays Lake Irrigating Co.'s canal	Rays Lake	Diverts from Rays Lake, in SE. $\frac{1}{4}$ sec. 30, T. 7 N., R. 36 E., 4 miles southwest of Hamer, Idaho.		Dry.
June 6	do	do	do		Dry.
July 7	do	do	do		6.9
Sept. 29	do	do	do		Dry.
July 30	do	do	do		7.8
Sept. 1	do	do	do		Dry.
June 7	Holly Water Users' canal	Camas Creek	Diverts from left bank of Camas Creek, in NW. $\frac{1}{4}$ sec. 36, T. 7 N., R. 35 E., $\frac{1}{4}$ mile below Rays Lake, and 5 miles southwest of Hamer, Idaho.		19.1
July 29	do	do	do		19.5
July 30	do	do	do		14.6
Sept. 1	do	do	do		15.6
June 29	Owsley-Magill pump canal	do	Diverts from left bank of Camas Creek in NW. $\frac{1}{4}$ sec. 3, T. 6 N., R. 35 E., 7 miles southwest of Hamer, Idaho.		16.6
July 30	do	do	do		Dry.
Sept. 2	do	do	do		4.6
					Dry.

^b Estimated.

^c Formerly known as Rays Lake Canal Co.

^d Formerly known as Hamer feeder pump canal.

*Miscellaneous discharge measurements in Snake River drainage basin during
the year ending September 30, 1923—Continued*

Date	Stream	Tributary to or diverting from	Locality	Gage height	Discharge
July 1	Spring Creek	Mud Lake	Sec. 28, T. 7 N., R. 35 E., 8 miles west of Hamer, Idaho.	Feet	Sec.-ft. 15.4
Aug. 1	do	do	do		14.6
Sept. 2	do	do	do		16.6
Apr. 28	Wiley-Binnard pump canal.	do	Diverts from Mud Lake in NE. ¼ sec. 9, T. 6 N., R. 35 E., 8 miles southwest of Hamer, Idaho.		Dry.
June 12	do	do	do		5.7
30	do	do	do		3.8
Sept. 2	do	do	do		Dry.
Apr. 28	Melton pump ditch	do	Diverts from Mud Lake in NE. ¼ sec. 13, T. 6 N., R. 34 E., 11 miles southwest of Hamer, Idaho.		Dry.
June 6	do	do	do		7.0
30	do	do	do		Dry.
July 30	do	do	do		5.2
Sept. 2	do	do	do		Dry.
June 5	First Owsley segregation pump canal.	do	Diverts from Mud Lake on line between secs. 23 and 24, T. 6 N., R. 34 E., 1 mile east of Terreton, Idaho.		91.3
30	do	do	do		112.
Aug. 2	do	do	do		58.9
Sept. 2	do	do	do		55.9
June 30	Miller-Cutler pump ditch.	do	Diverts from Mud Lake in SE. ¼ sec. 15, T. 6 N., R. 34 E., one-half mile north of Terreton, Idaho.		Dry.
July 31	do	do	do		1.5
Sept. 3	do	do	do		Dry.
June 6	Jensen pump ditch	do	Diverts from Mud Lake in SW. ¼ sec. 14, T. 6 N., R. 34 E., one-half mile north of Terreton, Idaho.		2.1
July 2	do	do	do		2.5
Sept. 3	do	do	do		Dry.
June 30	Jemmett pump ditch	do	Diverts from Mud Lake in SE. ¼ sec. 15, T. 6 N., R. 34 E., at Terreton, Idaho.		Dry.
Aug. 1	do	do	do		3.6
Sept. 3	do	do	do		4.0
June 7	Second Owsley and Mud Lake pump canal.	do	Diverts from Mud Lake in SE. ¼ sec. 15, T. 6 N., R. 34 E., at Terreton, Idaho.		60.5
Sept. 3	do	do	do		75.9
July 2	Jefferson Reservoir Canal.	Jefferson Lake	One-fourth mile below head; diverts from Jefferson Lake in SW. ¼ sec. 16, T. 7 N., R. 34 E., 5 miles northeast of Level, Idaho.		24.1
Sept. 4	do	do	do		10.6
June 6	Hamer Canal Co.'s pump canal.	Hamer Lake	Diverts in SW. ¼ sec. 14, T. 7 N., R. 36 E., one-half mile northeast of Hamer, Idaho.		6.4
29	do	do	do		5.8
30	do	do	do		12.7
Sept. 1	do	do	do		4.8
Aug. 22	Big Lost River	S Snake River	Sec. 30, T. 8 N., R. 23 E., at State highway bridge, 10 miles northwest of Mackay, Idaho.	2.48	104
Sept. 14	do	do	do	2.24	55.4
Aug. 22	Big Lost River (back channel).	Big Lost River	Sec. 24, T. 8 N., R. 22 E., at State highway bridge, 11 miles northwest of Mackay, Idaho.	1.25	13.6
Sept. 14	do	do	do	1.10	7.9
Aug. 16	Little Lost River	do	At mouth of Sawmill Canyon in sec. 3, T. 11 N., R. 26 E., 46 miles northwest of Howe, Idaho.		30.5

* 6 sec.-ft. of flow estimated.

† 5.5 sec.-ft. of flow estimated.

Miscellaneous discharge measurements in Snake River drainage basin during the year ending September 30, 1923—Continued

Date	Stream	Tributary to or diverting from	Locality	Gage height	Discharge
July 1	Little Lost River.....	Big Lost River.....	Sec. 12, T. 10 N., R. 26 E., below confluence with Summit Creek, 35 miles northwest of Howe, Idaho.	<i>Feet</i>	<i>Sec.-ft.</i> • 119
Aug. 29	do.....	do.....	do.....		• 39.0
16	do.....	do.....	do.....		21.6
21	do.....	do.....	do.....		36.3
17	do.....	do.....	Sec. 3, T. 8 N., R. 27 E., below Badger Creek, 24 miles northwest of Howe, Idaho.		38.6
18	do.....	do.....	do.....		81.7
16	Warm Creek.....	Little Lost River.....	At mouth in sec. 2, T. 11 N., R. 26 E., 45 miles northwest of Howe, Idaho.		2.6
July 1	Sawmill ditch.....	do.....	Diverts from Little Lost River in sec. 26, T. 11 N., R. 26 E., 41 miles northwest of Howe, Idaho.		• 137
Aug. 29	do.....	do.....	do.....		• 39.3
16	do.....	do.....	do.....		29.6
21	do.....	do.....	do.....		36.7
July 1	do.....	do.....	At end of constructed section in sec. 29, T. 11 N., R. 26 E., 41 miles northwest of Howe, Idaho.		• 125
Aug. 29	do.....	do.....	do.....		• 24.8
21	do.....	do.....	do.....		33.3
16	do.....	do.....	At confluence with Summit Creek in sec. 29, T. 11 N., R. 26 E., 41 miles northwest of Howe, Idaho.		28.7
21	do.....	do.....	do.....		37.7
July 1	Summitt Creek.....	do.....	Above confluence with Sawmill ditch in sec. 29, T. 11 N., R. 26 E., 41 miles northwest of Howe, Idaho.		• 11.2
Aug. 29	do.....	do.....	do.....		• 10.0
16	do.....	do.....	do.....		11.1
21	do.....	do.....	do.....		12.4
July 8	Diversion canal.....	Dry Creek.....	About sec. 15, T. 10 N., R. 25 E., one-eighth mile below lower end of pipeline, 1 mile below Dry Creek Dam, Idaho.		• 60.1
15	do.....	do.....	do.....		• 60.5
Aug. 24	do.....	do.....	do.....		• 59.1
5	do.....	do.....	do.....		• 57.3
17	do.....	do.....	do.....		61.2
17	Wet Creek.....	Little Lost River.....	About sec. 7, T. 9 N., R. 29 E., one-fourth mile above Corral Creek, 6 miles above mouth, Idaho.		19.6
17	Squaw Creek.....	Wet Creek.....	At mouth, about sec. 8, T. 9 N., R. 26 E., 30 miles northwest of Howe, Idaho.		2.3
July 8	Deer Creek.....	Little Lost River.....	At mouth about sec. 34, T. 9 N., R. 27 E., 24 miles northwest of Howe, Idaho.		• Dry.
15	do.....	do.....	do.....		• Dry.
Aug. 24	do.....	do.....	do.....		• Dry.
5	do.....	do.....	do.....		• Dry.
10	do.....	do.....	do.....		• 2.1
17	do.....	do.....	do.....		2.3
July 8	Badger Creek.....	do.....	At mouth about sec. 34, T. 9 N., R. 27 E., 24 miles northwest of Howe, Idaho.		• Dry.
15	do.....	do.....	do.....		• Dry.
Aug. 24	do.....	do.....	do.....		• 4
5	do.....	do.....	do.....		• 1
10	do.....	do.....	do.....		• 3.2
17	do.....	do.....	do.....		3.1

• Furnished by Lynn Crandall, water master.

*Miscellaneous discharge measurements in Snake River drainage basin during
the year ending September 30, 1923—Continued*

Date	Stream	Tributary to or divert- ing from	Locality	Gage height	Dis- charge
				<i>Feet</i>	<i>Sec.-ft.</i>
July 8	Spring Creek	Little Lost River	At mouth about sec. 20, T. 7 N., R. 28 E., 16 miles northwest of Howe, Idaho.		* 27.6
15	do.	do.	do.		* 27.7
24	do.	do.	do.		* 28.3
Aug. 5	do.	do.	do.		* 28.7
10	do.	do.	do.		* 25.9
18	do.	do.	do.		26.5
July 8	Teeny Creek	do.	At mouth, 15 miles northwest of Howe, Idaho.		* 4.0
15	do.	do.	do.		* 4.8
24	do.	do.	do.		* 3.4
Aug. 5	do.	do.	do.		* 3.3
10	do.	do.	do.		* 6.1
18	do.	do.	do.		3.6
July 8	Blaine County diversion canal.	do.	Diverts from right bank of Little Lost River in sec. 11, T. 6 N., R. 28 E., 8 miles northwest of Howe, Idaho.		* 71.2
15	do.	do.	do.		* 61.6
22	do.	do.	do.		* 33.7
24	do.	do.	do.		* 33.7
Aug. 5	do.	do.	do.		* 27.7
10	do.	do.	do.		* 3.2
18	do.	do.	do.		26.6
June 1	Portneuf River	Snake River	Sec. 3, T. 8 S., R. 38 E., at Corbett ranch, 0.7 mile north of Pebble railroad station, Idaho.	1.21	223
23	do.	do.	do.	2.03	260
July 17	do.	do.	do.	2.30	225
Aug. 30	do.	do.	do.	1.66	228
Sept. 23	do.	do.	do.	1.76	142
Aug. 7	Dry Creek	do.	At mouth, NE. ¼ sec. 6, T. 11 S., R. 20 E., 1 mile northeast of Murtaugh, Idaho.		* 15.4
9	do.	do.	do.		* 16.5
10	do.	do.	do.		* 22.0
11	do.	do.	do.		* 27.6
23	do.	do.	do.		* 32.1
28	do.	do.	do.		* 19.4
30	do.	do.	do.		16.8
Sept. 13	do.	do.	do.		* 23.0
15	do.	do.	do.		* 22.7
18	do.	do.	do.		* 25.2
21	do.	do.	do.		* 22.6
25	do.	do.	do.		* 23.6
Aug. 20	Devils Washbowl outlet.	do.	NE. ¼ sec. 4, T. 10 S., R. 18 E., on north side of Snake River, 4 miles north of Kimberly, Idaho.		* 19.7
Sept. 22	Springs	do.	NE. ¼ sec. 4, T. 10 S., R. 18 E., on south side of Snake River, 4 miles north of Kimberly, Idaho.		* 21.3
Aug. 6	do.	do.	NW. ¼ sec. 4, T. 10 S., R. 18 E., on south side of Snake River, 4 miles north of Kimberly, Idaho.		* 7.4
July 30	Devils corral	do.	At upper outlet, SE. ¼ sec. 32, T. 9 S., R. 18 E., 4 miles north of Kimberly, Idaho.		* 37.3
Aug. 30	do.	do.	do.		41.9
6	Springs	do.	SE. ¼ sec. 32, T. 9 S., R. 18 E., on south side of Snake River, 4 miles north of Kimberly, Idaho.		* 3.9
6	Devils corral	do.	At lower outlet, SE. ¼ sec. 32, T. 9 S., R. 18 E., 4 miles north of Kimberly, Idaho.		* 8.4
Sept. 29	Spring	do.	SW. ¼ sec. 31, T. 9 S., R. 18 E., on north side of Snake River above Shoshone Falls, 7 miles northeast of Twin Falls, Idaho.		* 6.3

* Furnished by C. E. Tappan, employee of Idaho Power Co.

* Furnished by Lynn Crardall, water master.

Miscellaneous discharge measurements in Snake River drainage basin during the year ending September 30, 1923—Continued

Date	Stream	Tributary to or diverting from	Locality	Gage height	Discharge
Apr. 14	Blue Lakes outlet	Snake River	SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 28, T. 9 S., R. 17 E., 200 feet below highway bridge at Blue Lakes ranch, 4 miles north of Twin Falls, Idaho.	<i>Feet</i> 0.83	<i>Sec.-ft.</i> 209
May 5	do.	do.	do.	.82	192
July 23	do.	do.	do.	.88	210
May 12	West Fork of Fish Creek.	Little Wood River	Sec. 3, T. 1 N., R. 22 E., 2 miles above Fish Creek Dam, 14 miles northeast of Carey, Idaho.	.38	9.6
June 19	do.	do.	do.	.22	3.7
July 18	do.	do.	do.	.11	1
Oct. 4	Owyhee River	Snake River	Sec. 26, T. 46 N., R. 53 E., Mount Diablo base and meridian, one-half mile below Mountain City, Nev.	.98	8.1
Feb. 26	Cow Creek	Jordan Creek	Former gaging station at mouth at Danner, Ore.	.31	.5
May 2	do.	do.	do.	.22	.2
13	North Fork	Malheur River	Former gaging station at Juntura, Ore.	1.93	176
June 10	do.	do.	do.	1.72	119
July 12	do.	do.	do.	1.43	59
Aug. 13	do.	do.	do.	1.28	43.7
Feb. 18	Clover Creek	Bully Creek	2 miles north of Westfall, Ore.	1.61	1.3
Mar. 2	do.	do.	do.	2.35	16.9
26	North Fork of Payette River.	Payette River	Sec. 28, T. 9 N., R. 3 E., at mouth, three-fifths mile above Banks, Idaho.	-----	344
Sept. 5	do.	do.	do.	-----	280
May 12	Weiser Irrigation District Canal.	Weiser River	SW $\frac{1}{4}$ sec. 29, T. 11 N., R. 5 W., at pumping station at Weiser, Idaho.	3.28	131
30	do.	do.	do.	3.39	141
June 20	do.	do.	do.	3.24	133
July 7	do.	do.	do.	3.20	131
26	do.	do.	do.	3.05	118
Aug. 28	do.	do.	do.	3.14	123

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STREAM-GAGING STATIONS
AND
PUBLICATIONS RELATING TO WATER RESOURCES

PART XII.—NORTH PACIFIC SLOPE BASINS

STREAM-GAGING STATIONS AND PUBLICATIONS RELATING TO WATER RESOURCES

INTRODUCTION

Investigation of water resources by the United States Geological Survey has consisted in large part of measurements of the volume of flow of streams and studies of the conditions affecting that flow, but it has comprised also investigation of such closely allied subjects as irrigation, water storage, water powers, underground waters, and quality of waters. Most of the results of these investigations have been published in the series of water-supply papers, but some have appeared in the bulletins, monographs, professional papers, and annual reports.

The result of stream-flow measurements are now published annually in 12 parts, each part covering an area whose boundaries coincide with natural drainage as indicated below:

- Part I. North Atlantic slope basins (St. John River to York River).
- II. South Atlantic slope and eastern Gulf of Mexico basins (James River to the Mississippi).
- III. Ohio River basin.
- IV. St. Lawrence River basin.
- V. Upper Mississippi River and Hudson Bay basins.
- VI. Missouri River basin.
- VII. Lower Mississippi River basin.
- VIII. Western Gulf of Mexico basins.
- IX. Colorado River basin.
- X. Great Basin.
- XI. Pacific slope basins in California.
- XII. North Pacific slope basins, in three volumes:
 - A, Pacific slope basins in Washington and upper Columbia River basin.
 - B, Snake River basin.
 - C, Lower Columbia River basin and Pacific slope basins in Oregon.

HOW GOVERNMENT REPORTS MAY BE OBTAINED OR CONSULTED

Water-supply papers and other publications of the United States Geological Survey containing data in regard to the water resources of the United States may be obtained or consulted as indicated below.

1. Copies may be purchased at nominal cost from the Superintendent of Documents, Government Printing Office, Washington, D. C., who will on application furnish lists giving prices.

2. Sets of the reports may be consulted in the libraries of the principal cities of the United States.

3. Complete sets are available for consultation in the local offices of the water-resources branch of the Geological Survey, as follows:

Boston, Mass., 2500 Customhouse.
 Albany, N. Y., 704 Journal Building.
 Trenton, N. J., Statehouse.
 Charlottesville, Va., University of Virginia.
 Asheville, N. C., 316 Jackson Building.
 Chattanooga, Tenn. 830 Power Building.
 Columbus, Ohio, Engineering Experiment Station, Ohio State University.
 Chicago, Ill., 940 Transportation Building.
 Madison, Wis., care of Railroad Commission of Wisconsin.
 Ames, Iowa, State Highway Commission Building.
 Rolla, Mo., Rolla Building, School of Mines and Metallurgy.
 Topeka, Kans., 23 Federal Building.
 Helena, Mont., 45-46 Federal Building.
 Denver, Colo., 403 Post Office Building.
 Salt Lake City, Utah, 313 Federal Building.
 Idaho Falls, Idaho, 228 Federal Building.
 Boise, Idaho, Federal Building.
 Tacoma, Wash., 404 Federal Building.
 Portland, Oreg., 606 Post Office Building.
 San Francisco, Calif., 303 Customhouse.
 Los Angeles, Calif., 600 Federal Building.
 Tucson, Ariz., 210 Agricultural Building, University of Arizona.
 Austin, Tex., State Capitol.
 Honolulu, Hawaii, Territorial Office Building.

A list of the Geological Survey's publications may be obtained by applying to the Director, United States Geological Survey, Washington, D. C.

STREAM-FLOW REPORTS

Stream-flow records have been obtained at more than 4,800 points in the United States, and the data obtained have been published in the reports tabulated below:

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

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

Report	Character of data	Year
10th A, pt. 2.....	Descriptive information only.....	
11th A, pt. 2.....	Monthly discharge and descriptive information.....	1884 to September, 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 ratings.....	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.
W 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.
W 15.....	Descriptions, measurements, and gage heights, eastern United States, eastern Mississippi River, and Missouri River above junction with Kansas.	1897.
W 16.....	Descriptions, measurements, and gage heights, western Mississippi River below junction of Missouri and Platte, and western United States.	1897.
19th A, pt. 2.....	Descriptions, measurements, ratings, and monthly discharge (also some long-time records).	1897.
W 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
W 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.
W 35 to 39.....	Descriptions, measurements, gage heights, and ratings.....	1899.
21st A, pt. 4.....	Monthly discharge.....	1899.
W 47 to 52.....	Descriptions, measurements, gage heights, and ratings.....	1900.
22d A, pt. 4.....	Monthly discharge.....	1900.
W 55, 66.....	Descriptions, measurements, gage heights, and ratings.....	1901.
W 75.....	Monthly discharge.....	1901.
W 82 to 85.....	Complete data.....	1902.
W 97 to 100.....	do.....	1903.
W 124 to 135.....	do.....	1904.
W 165 to 178.....	do.....	1905.
W 201 to 214.....	do.....	1906.
W 241 to 252.....	do.....	1907-8.
W 261 to 272.....	do.....	1909.
W 281 to 292.....	do.....	1910.
W 301 to 312.....	do.....	1911.
W 321 to 332.....	do.....	1912.
W 351 to 362.....	do.....	1913.
W 381 to 394.....	do.....	1914.
W 401 to 414.....	do.....	1915.
W 431 to 444.....	do.....	1916.
W 451 to 464.....	do.....	1917.
W 471 to 484.....	do.....	1918.
W 501 to 514.....	do.....	1919-20.
W 521 to 534.....	do.....	1921.
W 541 to 554.....	do.....	1922.
W 561 to 574.....	do.....	1923.

The records at most of the stations discussed in these reports extend over a series of years, and miscellaneous measurements at many points other than regular gaging stations have been made each year. An index of the reports containing records obtained prior to 1904 has been published in Water-Supply Paper 119.

The table following gives, by years and drainage basins, the numbers of the papers on surface-water supply published from 1899 to 1918. The data for any particular station will, as a rule, be found in the reports covering the years during which the station was maintained. For example, data for Machias River at Whitneyville, Maine, 1903 to 1921, are published in Water-Supply Papers 97, 124, 165, 201, 241, 261, 281, 301, 321, 351, 381, 401, 431, 451, 471, 501, and 521, which contain records for the New England streams from 1903 to 1921. Results of miscellaneous measurements are published by drainage basins.

In these papers and in the following lists the stations are arranged in downstream order. The main stem of any river is determined by measuring or estimating its drainage area—that is, the headwater stream having the largest drainage area is considered the continuation of the main stream, and local changes in name and lake surface are disregarded. All stations from the source to the mouth of the main stem of the river are presented first, and the tributaries in regular order from source to mouth follow, the streams in each tributary basin being listed before those of the next basin below.

In exception to this rule the records for Mississippi River are given in four parts, as indicated on page III, and the records for large lakes are presented in order of the streams around the rim of the lake.

Numbers of water-supply papers containing results of stream measurements, 1899-1923

[For basins included see p. III]

Year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		
												A	B	C
1899 *	35	35, 36	36	36	36	36, 37	37	37	37	38, * 39	38, * 39	38	38	38
1900 *	47, * 48	48, * 49	48, * 49	49	49	49, * 50	50	50	50	51	51	51	51	51
1901	65, 75	65, 75	65, 75	65, 75	65, 75	65, 75	65, 75	65, 75	65, 75	66, 75	66, 75	66, 75	66, 75	66, 75
1902	82	82, 83	82	82	82, 83	82, 83	82, 83	82, 83	82, 83	85	85	85	85	85
1903	97	97, 98	98	97	97, 98	97, 98	97, 98	97, 98	97, 98	100	100	100	100	100
1904	124, * 125, * 126	125, * 126	125, * 126	125, * 126	125, * 126	125, * 126	125, * 126	125, * 126	125, * 126	133	133	133	133	133
1905	165, * 166, * 167	165, * 166, * 167	165, * 166, * 167	165, * 166, * 167	165, * 166, * 167	165, * 166, * 167	165, * 166, * 167	165, * 166, * 167	165, * 166, * 167	176, * 177	176, * 177	176	176	176
1906	201, * 202, * 203	201, * 202, * 203	201, * 202, * 203	201, * 202, * 203	201, * 202, * 203	201, * 202, * 203	201, * 202, * 203	201, * 202, * 203	201, * 202, * 203	212, * 213	212, * 213	212	212	212
1907-8	242	242	242	242	242	242	242	242	242	250, * 251	250, * 251	252	252	252
1909	261	261	261	261	261	261	261	261	261	270, * 271	270, * 271	272	272	272
1910	281	281	281	281	281	281	281	281	281	290	290	292	292	292
1911	301	301	301	301	301	301	301	301	301	310	310	312	312	312
1912	321	321	321	321	321	321	321	321	321	330	330	332-A	332-B	332-C
1913	351	351	351	351	351	351	351	351	351	360	360	362-A	362-B	362-C
1914	381	381	381	381	381	381	381	381	381	390	390	392	392	392
1915	401	401	401	401	401	401	401	401	401	410	410	412	412	412
1916	431	431	431	431	431	431	431	431	431	440	440	442	442	442
1917	451	451	451	451	451	451	451	451	451	460	460	462	462	462
1918	471	471	471	471	471	471	471	471	471	480	480	482	482	482
1919-20	501	501	501	501	501	501	501	501	501	510	510	512	512	512
1921	521	521	521	521	521	521	521	521	521	530	530	532	532	532
1922	541	541	541	541	541	541	541	541	541	550	550	552	552	552
1923	561	561	561	561	561	561	561	561	561	570	570	572	572	572

* Rating tables and index to Water-Supply Papers 35-99 contained in Water-Supply Paper 38. Tables for monthly discharge for 1899 in Twenty-first Annual Report, Part IV.

† James River only.

‡ Gullatin River.

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

¶ Moheve River only.

‡ Kings and Kern rivers and south Pacific slope basins.

§ 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. Tables for monthly discharge for 1900 in Twenty-second Annual Report, Part IV.

¶ Wissahickon and Schuylkill rivers to James River.

‡ Saloto River.

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

‡ Tributaries of Mississippi from east.

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

§ Hudson Bay only.

¶ New England rivers only.

‡ Hudson River to Delaware River, inclusive.

§ Susquehanna River to Yackin River, inclusive.

† Platte and Kansas rivers.

‡ Great Basin in California, except Truckee and Carson river basins.

§ Below junction with Gila.

† Rogue, Umpqua, and Siletz rivers only.

PRINCIPAL STREAMS

The largest rivers discharging into the Pacific Ocean in Oregon and Washington are Rogue, Umpqua, and Columbia rivers and streams that reach the ocean through Puget Sound. The principal tributaries of the Columbia are Kootenai, Clark Fork, Spokane, Wenatchee, Yakima, Snake, Walla Walla, Umatilla, John Day, Deschutes, Klickitat, Willamette, Lewis, and Cowlitz rivers. Nisqually, Puyallup, White, Snohomish, and Skagit rivers flow into Puget Sound. The streams of this division drain wholly or in part the States of Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming.

In addition to the list of gaging stations and the annotated list of publications relating specifically to the section, these pages contain also brief references to reports published by State and other organizations (p. xxxix).

GAGING STATIONS

NOTE.—Dash after date indicates that station was being maintained September 30, 1923. Period after a date indicates discontinuance.

BETWEEN COLUMBIA RIVER AND PUGET SOUND

Chehalis River at Centralia, Wash., 1910–11.

Quinault River at Quinault Lake, Wash., 1911–1922.

Soleduck River (head of Quillayute River) near Fairholm, Wash., 1917–1921.

Soleduck River at Snider ranger station, near Beaver, Wash., 1921–

Soleduck River near Quillayute, Wash., 1897–1901.

Bogachiel River:

Kalawa River near Forks, Wash., 1897–1901.

Lake Crescent (head of Lyre River) at Piedmont, Wash., 1919–

Lyre River at Piedmont, Wash., 1917–1922; 1923–

Elwha River at McDonald, Wash., 1897–1901; 1918–

Elwha River near Port Angeles, Wash., 1911–12.

Dungeness River at Sequim, Wash., 1897–98.

Dungeness River at Dungeness, Wash., 1898–1901.

PUGET SOUND DRAINAGE BASINS

Dosewallips River at Brinnon, Wash., 1910–11.

Duckabush River near Duckabush, Wash., 1910–11.

Skokomish River, North Fork (head of Skokomish River), near Hoodspport, Wash., 1910–11; 1913–

Nisqually River near Ashford, Wash., 1910–1914.

Nisqually River near La Grande, Wash., 1906–1911; 1919–

East Creek near Elbe, Wash., 1918–1922.

Little Nisqually River near Alder, Wash., 1920–

Tacoma power conduit near La Grande, Wash., 1919–

Puyallup River near Electron, Wash., 1909–

Puyallup River at Alderton, Wash., 1914–

Puyallup River at Puyallup, Wash., 1914-

Carbon River at Fairfax, Wash., 1910-1912.

White River below Forks, near Enumclaw, Wash., 1911-12.

White River at Buckley, Wash., 1899-1903; 1910-11; 1913-

Greenwater River at mouth, near Enumclaw, Wash., 1911-12.

White River flume at Buckley, Wash., 1913-

Green River ¹ (head of Duwamish River) at Kanaskat, Wash., 1911.

Lake Washington:

Cedar River ² at Vaughn Bridge, near Cedar Lake, Wash., 1898-99.

Cedar River at Cedar Lake, near North Bend, Wash., 1902-3.

Cedar River at Cedar Falls, Wash., 1914-

Cedar River near Landsberg, Wash., 1914-

Cedar River near Ravensdale, Wash., 1901-1912.

Cedar River at Clifford Bridge, near Ravensdale, Wash., 1895-1898.

Cedar River at Renton, Wash., 1901-1907. (Published in Water-Supply Paper 313.)

Skykomish River, South Fork (head of Snohomish River), near Berlin, Wash., 1910-11.

Skykomish River, South Fork, near Index, Wash., 1902-1905; 1911-12; 1913-

Skykomish River at Sultan, Wash., 1910-11.

Foss River near Skykomish, Wash., 1911.

East Fork of Foss River near Skykomish, Wash., 1911.

Miller Creek near Miller River (Berlin), Wash., 1911-1919.

West Fork of Miller Creek near Miller River (Berlin), Wash., 1911.

North Fork of Skykomish River at Index, Wash., 1910-1922.

Wallace River:

Olney Creek near Startup, Wash., 1922-

Sultan River near Sultan, Wash., 1911-

Snoqualmie River, Middle Fork (head of Snoqualmie River), near North Bend, Wash., 1907- (Records up to 1915 for all stations in Snoqualmie River basin published in Water-Supply Paper 412.)

Snoqualmie River near Snoqualmie, Wash., 1898-99; 1900; 1902-1904. (Revised records published in Water-Supply Paper 412.)

North Fork of Snoqualmie River at cable bridge, near North Bend, Wash., 1913-1915.

North Fork of Snoqualmie River near North Bend, Wash., 1907-

South Fork of Snoqualmie River near Garcia, Wash., 1910-1915.

South Fork of Snoqualmie River at North Bend, Wash., 1907-

Tokul Creek near Snoqualmie, Wash., 1907-1914.

Pilchuck Creek near Granite Falls, Wash., 1911.

Stilaguamish River, South Fork (head of Stilaguamish River), near Silverton, Wash., 1910-1917.

Stilaguamish River, South Fork, near Robe, Wash., 1902-3.

Stilaguamish River, South Fork at Granite Falls, Wash., 1911; 1913-1915.

Canyon Creek near Granite Falls, Wash., 1911-1913.

North Fork of Stilaguamish River:

Deer Creek at Oso, Wash., 1917-

Skagit River below Ruby Creek, near Marblemount, Wash., 1919-

Skagit River at Reflector Bar, near Marblemount, Wash., 1913-1922.

Skagit River near Marblemount, Wash., 1908-1914; 1920-

¹ Green River now flows to the sea through Duwamish River.

² Cedar River, formerly tributary to Duwamish River, now flows to the sea through Lake Washington and Lake Washington canal.

Skagit River near Sedro Woolley, Wash., 1908-1919; 1921-1923.

Ruby Creek near Marblemount, Wash., 1919-20.

Thunder Creek near Marblemount, Wash., 1919-

Stetattle Creek near Marblemount, Wash., 1913-1915.

Cascade River near Marblemount, Wash., 1909-1913.

Sauk River, North Fork (head of Sauk River), near Barlow Pass, Wash., 1917-1920.

Sauk River above Whitechuck River, near Darrington, Wash., 1910; 1917-1922.

Sauk River above Clear Creek, near Darrington, Wash., 1910-1913.

Sauk River at Darrington, Wash., 1914-

Sauk River near Suiattle Crossing, near Sauk, Wash., 1910-1912.

South Fork of Sauk River near Barlow Pass, Wash., 1917-1921.

Whitechuck River near Darrington, Wash., 1910; 1919-1921.

Clear Creek near Darrington, Wash., 1910-11.

Suiattle River below Lime Creek, near Darrington, Wash., 1920-21.

Baker Lake (on Baker River) near Concrete, Wash., 1910-1915.

Baker River below Anderson Creek, near Concrete, Wash., 1910-

Baker River at Concrete, Wash., 1910-1915.

Whatcom Lake near Bellingham, Wash., 1913-14.

Whatcom Creek near Bellingham, Wash., 1910-1914.

Nooksack River³ at Excelsior, Wash., 1920-21.

Nooksack River near Glacier, Wash., 1910-11.

Nooksack River near Deming, Wash., 1910-11.

Middle Fork of Nooksack River at ranger station, near Deming, Wash., 1910.

Middle Fork of Nooksack River near Deming, Wash., 1910-11; 1920-21.

South Fork of Nooksack River at Saxon Bridge, Wash., 1920-21.

COLUMBIA RIVER BASIN

Columbia River at Trail, British Columbia, 1913-

Columbia River at Kettle Falls, Wash., 1913-

Columbia River at Grand Coulee, near Nespelem, Wash., 1923.

Columbia River at Wenatchee, Wash., 1910; 1913-1916.

Columbia River at Vernita, Wash., 1917-

Columbia River near Julia, Wash., 1905.

Columbia River at Hanford, Wash., 1910.

Columbia River at Pasco, Wash., 1904-1910.

Columbia River at Cascade Locks and The Dalles, Oreg., 1878-

Kootenai River at Libby, Mont., 1910-

Kootenai River at Crossport, Idaho, 1904.

Kootenai River near Bonners Ferry, Idaho, 1904.

Kootenai River near Porthill, Idaho, 1904.

Tobacco River:

Grave Creek near Fortine, Mont., 1923-

Callahan Creek at Troy, Mont., 1911-1916.

Yaak River near Troy, Mont., 1910-1916.

Moyie River at Snyder, Idaho, 1911-1916; 1919-1923.

Clark Fork at Missoula, Mont., 1898-1907.

Clark Fork at St. Regis, Mont., 1910-1923.

Clark Fork near Plains, Mont., 1910-

Pend Oreille Lake at Hope, Idaho, 1921-

Pend Oreille Lake at Sandpoint, Idaho, 1914-1922.

³Revised decision of United States Geographic Board rendered Oct. 3, 1917.

Columbia River tributaries—Continued.

Clark Fork at Priest River, Idaho, 1903-1905.

Clark Fork at Newport, Wash., 1903-1921.

Clark Fork at Metaline Falls, Wash., 1908-1910; 1912-

Racetrack Creek near Anaconda, Mont., 1911-12; 1914-1917.

Little Blackfoot River and ditch near Elliston, Mont., 1910-1915.

Rock Creek near Quigley, Mont., 1910-1912; 1922-

Ranch Creek near Quigley, Mont., 1922-

Blackfoot River at Clearwater, Mont., 1921-1923.

Blackfoot River at Bonner, Mont., 1898-1905.

North Fork of Blackfoot River near Ovando, Mont., 1921-1923.

Clearwater River at Clearwater, Mont., 1921-1923.

Rattlesnake Creek at Missoula, Mont., 1899-1900.

Bitterroot River, West Fork (head of Bitterroot River), near Darby, Mont., 1910-1917.

Bitterroot River near Grantsdale, Mont., 1902-1907.

Bitterroot River near Missoula, Mont., 1898-1901; 1903-4.

East Fork of Bitterroot River near Darby, Mont., 1910-1916.

Skalkaho Creek near Hamilton, Mont., 1920-

Willow Creek near Corvallis, Mont., 1920-

Burnt Fork Creek near Stevensville, Mont., 1920-

Lolo Creek near Lolo, Mont., 1910-1916.

St. Regis River near St. Regis, Mont., 1910-1917.

Flathead River near Columbia Falls, Mont., 1910-1917.

Flathead River at Columbia Falls, Mont., 1922-23.

Flathead River at Demersville, near Kalispell, Mont., 1909-1912.

Flathead River at Demon's ranch, near Kalispell, Mont., 1909-1912.

Flathead River at Keller's ranch, near Holt, Mont., 1909-1912.

Flathead Lake (on Flathead River) near Holt, Mont., 1900.

Flathead Lake at Somers, Mont., 1922-

Flathead Lake at Polson, Mont., 1908-

Flathead River near Polson, Mont., 1907-

Middle Fork of Flathead River at Belton, Mont., 1910-1923.

Lake McDonald outlet at Lake McDonald, Mont., 1912-1914.

South Fork of Flathead River near Columbia Falls, Mont., 1910-1916; 1923-

Stillwater River near Kalispell, Mont., 1906-7; 1922.

Whitefish River near Kalispell, Mont., 1906.

Ashley Creek near Kila, Mont., 1916.

Swan River near Big Fork, Mont., 1910-11; 1922-

Big Creek near Polson, Mont., 1917-

Little Bitterroot River near Marion, Mont., 1910-1916.

Little Bitterroot River near Hubbard, Mont., 1909-1916.

Little Bitterroot River near Niarada (Dayton), Mont., 1908-9; 1916.

Crow Creek near Ronan, Mont., 1906-1917.

Crow Creek at Lozeau's ranch, near Ronan, Mont., 1911-1916.

Mud Creek near Ronan, Mont., 1908-1910.

Mission Creek near St. Ignatius, Mont., 1906-1917.

Dry Creek near St. Ignatius, Mont., 1908-1916.

Post Creek at Fitzpatrick's ranch, near Ronan, Mont., 1906-1911.

Post Creek at Deschamp's ranch, near Ronan, Mont., 1911.

Post Creek near St. Ignatius, Mont., 1911-1917.

Columbia River tributaries—Continued.

Clark Fork tributaries—Continued.

Flathead River tributaries—Continued.

Jocko River, South Fork (head of Jocko River), near Jocko, Mont., 1912-1916.

Jocko River near Jocko, Mont., 1908-1916; 1918-19.

Jocko River at Ravalli, Mont., 1906-1911.

Middle Fork of Jocko River near Jocko, Mont., 1912-1916.

North Fork of Jocko River near Jocko, Mont., 1912-1916.

Falls Creek near Jocko, Mont., 1912-1916.

Big Knife Creek near Jocko, Mont., 1908-1916.

Agency Creek near Jocko, Mont., 1908-1916.

Blodgett Creek near Jocko, Mont., 1909-16.

Finley Creek near Jocko, Mont., 1908-1916.

East Finley Creek near Jocko, Mont., 1908-1916.

Indian ditch near Jocko, Mont., 1908-1911; 1912-1916.

Valley Creek near Ravalli, Mont., 1908-1911.

Revals Creek near Dixon, Mont., 1911-1916; 1917-1919.

Thompson River near Thompson Falls, Mont., 1911-1916.

Prospect Creek near Thompson Falls, Mont., 1911-1916.

Priest River at outlet of Priest Lake, near Coolin, Idaho, 1911-

Priest River at Falk's ranch, near Priest River, Idaho, 1911-12.

Priest River at Priest River, Idaho, 1903-1905; 1910-11; 1923.

Sullivan Lake near Metaline Falls, Wash., 1912-1923.

Sullivan Creek near Metaline Falls, Wash., 1912-

Kettle River at Curlew, Wash., 1911-12.

Kettle River at Boyds, Wash., 1913-1915.

Curlew Creek near Curlew, Wash., 1917-1921.

Colville River at Blue Creek, Wash., 1922-

Colville River at Meyers Falls, Wash., 1922-

Hall Creek at Inchelium, Wash., 1912-

Stranger Creek at Meteor, Wash., 1916-

Stranger Creek at Inchelium, Wash., 1914-1917.

North Fork of Coeur d'Alene River (head of Coeur d'Alene River and through Coeur d'Alene Lake of Spokane River) at Prichard, Idaho, 1911-1914.

North Fork of Coeur d'Alene River at Enaville, Idaho, 1911-1913.

Coeur d'Alene River near Cataldo, Idaho, 1911-1912; 1920-

Coeur d'Alene Lake at Coeur d'Alene, Idaho, 1903-

Spokane River at Post Falls, Idaho, 1913-

Spokane River at Trent, Wash., 1911-1913.

Spokane River at Washington Water Power Co.'s dam, at Spokane, Wash., 1891-1896.

Spokane River at Spokane, Wash., 1896-

Spokane River below Little Falls, near Long Lake, Wash., 1912-

Little North Fork of Coeur d'Alene River near Enaville, Idaho, 1911-12.

St. Joe River at Avery, Idaho, 1911-1917.

St. Joe River at Calder, Idaho, 1920-

St. Joe River near Calder, Idaho, 1911-12.

St. Maries River at Lotus, Idaho, 1911-12; 1920-

Hayden Lake at Hayden Lake, Idaho, 1920-

Spokane Valley Land & Water Co.'s canal at Post Falls, Idaho, 1911-1917; 1919-

Columbia River tributaries—Continued.

Spokane River tributaries—Continued.

Latah (Hangman) Creek at and near Tekoa, Wash., 1904-5.

North Fork of Latah Creek near Tekoa, Wash., 1904-5.

Little Spokane River near Spokane, Wash., 1903-1905; 1911-1913
Sanpoil River at Keller, Wash., 1911-1917.

West Fork of Sanpoil River:

Lost Creek near Aeneas, Wash., 1920-21.

Nespelem River at Nespelem, Wash., 1911-

Nespelem canal at Nespelem, Wash., 1921-

Okanogan River at Okanogan, Wash., 1911-

Similkameen River near Oroville, Wash., 1911-

Sinlahekin Creek at Blue Lake, near Loomis, Wash., 1920.

Sinlahekin Creek at twin bridges, near Loomis, Wash., 1921-1923.

Sinlahekin Creek near Loomis, Wash., 1903-1905.

Toats Coulee Creek near Loomis, Wash., 1920-

West Okanogan Valley Irrigation District canal near Oroville,
Wash., 1922-

Bonaparte Creek near Anglin, Wash., 1920-21.

Johnson Creek near Riverside, Wash., 1903-1907.

Salmon Creek near Conconully, Wash., 1910-1922.

Salmon Creek near Okanogan, Wash., 1903-1912.

Methow River near Winthrop, Wash., 1912.

Methow River at Twisp, Wash., 1919-

Methow River at Pateros, Wash., 1903-1920.

Chewack Creek below Boulder Creek, near Winthrop, Wash., 1920-21.

Chewack Creek at Winthrop, Wash., 1912-13.

Twisp River at Twisp, Wash., 1911-1913.

Stehekin River (head of Chelan River) at Stehekin, Wash., 1910-1915.

Chelan Lake at Lakeside, Wash., 1897-1899.

Chelan Lake at Chelan, Wash., 1905; 1910-

Chelan River at Chelan, Wash., 1903-

Railroad Creek at Lucerne, Wash., 1910-1913.

Entiat River at Entiat, Wash., 1910-

Little Wenatchee River (head of Wenatchee River) near Chiwaukum,
Wash., 1911.

Wenatchee River near Leavenworth, Wash., 1910-

Wenatchee River at Dryden and Cashmere, Wash., 1904-1917.

Wenatchee River near Wenatchee, Wash., 1897.

White River near Chiwaukum, Wash., 1911-1914.

Nason Creek near Nason, Wash., 1911.

Chiwawa River near Leavenworth, Wash., 1911-1914.

Chiwaukum Creek near Chiwaukum, Wash., 1911.

Icicle Creek near Leavenworth, Wash., 1911-1914.

Peshastin Creek at Blewett, Wash., 1911-12.

Peshastin Creek near Leavenworth, Wash., 1911-12.

Wenatchee Valley canal at Dryden, Wash., 1911-1917 (irrigation
seasons only).

Crab Creek at Wilson Creek, Wash., 1904.

Crab Creek at Adrian, Wash., 1910; 1911; 1912.

Crab Creek near Ephrata, Wash., 1909.

Moses Lake at Neppel (Moses Lake), Wash. 1909-1914.

Crab Creek near Warden, Wash., 1909-1912.

Rocky Ford Creek near Ephrata, Wash., 1909-1911.

Columbia River tributaries—Continued.

- Keechelus Lake (on Yakima River) near Martin, Wash., 1906-
- Yakima River near Martin, Wash., 1903-
- Yakima River at Easton, Wash., 1904; 1910-1915.
- Yakima River at Cle Elum, Wash., 1906-
- Yakima River at Umtanum, Wash., 1906-1921.
- Yakima River at Selah Gap, near North Yakima, Wash., 1897; 1904-5; 1911; 1912.
- Yakima River at Union Gap, near Yakima City, Wash., 1894-1919.
- Yakima River near Parker (Wapato), Wash., 1908-1921.
- Yakima River near Mabton, Wash., 1911-12.
- Yakima River near Prosser, Wash., 1904-1906; 1913-1922.
- Yakima River at Kiona, Wash., 1895-1915.
- Yakima River near Richland, Wash., 1906-1911 (irrigation seasons).
 - Cabin Creek near Easton, Wash., 1909-1911.
 - Kachess Lake (on Kachess River) near Easton, Wash., 1905-
 - Kachess River near Easton, Wash., 1903-
 - Big Creek near Cle Elum, Wash., 1909.
 - Cle Elum River, North Fork (head of Cle Elum River), at Galena, Wash., 1907; 1911.
 - Cle Elum Lake near Roslyn, Wash., 1906-
 - Cle Elum River near Roslyn, Wash., 1903-
 - Teanaway River below Forks, near Cle Elum, Wash., 1911-12.
 - Teanaway River near Cle Elum, Wash., 1909-1911; 1912-1914.
 - Swauk Creek near Cle Elum, Wash., 1909-1912.
 - Cascade canal near Ellensburg (Thorp), Wash., 1905; 1909-1911.
 - West Kittitas canal near Thorp, Wash., 1904-5; 1909-1911.
 - Ellensburg Water Co.'s canal near Ellensburg, Wash., 1904-5; 1909-1911.
 - Taneum Creek near Thorp, Wash., 1909-1912.
 - Manastash Creek near Ellensburg, Wash., 1909-1914.
 - Wilson Creek at Thrall, Wash., 1911.
 - Selah Moxee canal near Selah, Wash., 1904-5; 1909-1911.
 - Wenas Creek near Selah, Wash., 1909-1912.
 - Naches River at Anderson's ranch, near Nile, Wash., 1909-1914.
 - Naches River at Oak Flat, near Nile, Wash., 1904-1917.
 - Naches River below Tieton River, near Naches, Wash., 1905; 1909-1912; 1915-
 - Naches River near North Yakima, Wash., 1893-1897; 1898-1912.
 - Bumping Lake (on Bumping River) near Nile, Wash., 1909; 1910-
 - Bumping River at Bumping Lake, near Nile, Wash., 1906; 1909-
 - American River near Nile, Wash., 1909; 1910; 1911; 1913; 1914; 1915.
 - Selah Valley canal near Naches, Wash., 1904-5; 1909-1911.
 - Tieton River, North Fork, below Clear Creek, near Naches, Wash., 1914-15.
 - Tieton River at Rimrock,⁴ Wash., 1908-1914; 1918-19.
 - Tieton River at headworks of Tieton canal, near Naches, Wash., 1906-
 - Tieton River at Cobb's ranch, near Naches, Wash., 1902-1913.
 - Tieton canal near Naches, Wash., 1910-
 - Wapatox canal near Naches, Wash., 1904-5; 1909-1911.
 - Naches Canal Co.'s (Gleed) canal near Naches, Wash., 1904-5; 1909-1911.

⁴ Records, 1908-1914, published as "Tieton River at McAllister Meadows, near Naches, Wash."

Columbia River tributaries—Continued.

Yakima River tributaries—Continued.

Naches River tributaries—Continued.

Yakima Valley (Congdon) canal near Naches, Wash., 1904-5; 1909-1911.

Naches-Cowiche canal near Naches, Wash., 1904-5; 1909-1911.

North Yakima power canal near North Yakima, Wash., 1904-5; 1910.

Schanno canal near North Yakima, Wash., 1904-5; 1909-1911.

North Yakima power waste at North Yakima, Wash., 1909-1912.

North Yakima mill waste at North Yakima, Wash., 1909-1912.

Naches Avenue Union canal at North Yakima, Wash., 1910.

Old Union canal near North Yakima, Wash., 1904-5; 1909-1911.

Moxee Co.'s canal near North Yakima, Wash., 1904-5; 1909-1911.

Fowler canal near North Yakima, Wash., 1904-5; 1909-1911.

Ahtanum Creek, North Fork (head of Ahtanum Creek), near Tampico, Wash., 1907-

Ahtanum Creek at The Narrows, near Tampico, Wash., 1908-1913.

Ahtanum Creek near Yakima, Wash., 1904; 1907-1912.

South Fork of Ahtanum Creek at Conrad ranch, near Tampico, Wash., 1915-

South Fork of Ahtanum Creek near Tampico, Wash., 1907-1914.

New Reservation canal at Parker (Yakima City), Wash., 1904-1921.

Old Reservation canal at Parker (Wapato), Wash., 1904-1921.

Sunnyside canal near Parker (Wapato), Wash., 1904-1921.

Toppenish Creek near Fort Simcoe, Wash., 1909-

Toppenish Creek near White Swan (Wapato), Wash., 1909-1912.

Toppenish Creek at railway bridge, near Toppenish, Wash., 1894-1896.

Toppenish Creek near Toppenish, Wash., 1908-9.

Toppenish Creek at Alfalfa, Wash., 1909-1912.

Simcoe Creek near Fort Simcoe, Wash., 1909-1923.

Reservation drain at Alfalfa, Wash., 1912-1923.

Satus Creek near Toppenish, Wash., 1908-1913.

Satus Creek below Dry Creek, near Toppenish, Wash., 1913-

Kiona canal near Kiona, Wash., 1904-5; 1908-1911.

Kennewick canal near Richland (Kennewick), Wash., 1904-5; 1910-11.

Lower Yakima canal near Kiona, Wash., 1905; 1910-11.

Snake River at south boundary of Yellowstone National Park, 1913-

Jackson Lake (Snake River) at Moran, Wyo., 1909-10 (fragmentary); 1911-

Snake River ⁵ near Moran, Wyo., 1903-

Snake River ⁵ at Grovont, Wyo., 1899.

Snake River at Alpine, Idaho, 1916-1918.

Snake River ⁵ near Lyon, Idaho, 1903-1911.

Snake River ⁵ near Heise, Idaho, 1910-

Snake River near Menan, Idaho, 1923.

Snake River at Idaho Falls, Idaho, 1889-90; 1892-1894.

Diversions from Snake River between Heise and Shelley gaging stations, 1919-

Snake River near Shelley, Idaho, 1915-

Snake River at Firth, Idaho, 1915.

⁵ Decision of United States Geographic Board; formerly called South Fork of Snake River.

Columbia River tributaries—Continued.

Diversions from Snake River between Shelley and Porterville gaging stations.
1919—

Snake River at Porterville Bridge, near Blackfoot, Idaho, 1916; 1918–1923.

Diversions from Snake River between Porterville and Blackfoot gaging stations, 1919—

Snake River near Blackfoot, Idaho, 1910—

Snake River at Neeley, Idaho, 1906—

Lake Walcott (on Snake River) near Minidoka, Idaho, 1909—

Snake River at Howells Ferry, near Minidoka, Idaho, 1910—

Snake River at Montgomery Ferry, near Minidoka, Idaho, 1895–1899;
1901–1910.

Lake Milner (on Snake River) at Milner, Idaho, 1911—

Snake River at Milner, Idaho, 1909—

Snake River near Kimberly, Idaho, 1923—

Snake River near Twin Falls, Idaho, 1911–1917; 1919—

Snake River near Hagerman, Idaho, 1912–1917; 1919—

Snake River at King Hill, Idaho, 1909—

Snake River near Murphy, Idaho, 1912; 1913—

Snake River at Weiser, Idaho, 1910—

Snake River at Oxbow, Oreg., 1923—

Snake River at Lewiston, Idaho, 1910.

Snake River at Riparia, Wash., 1916–1922.

Snake River near Burbank, Wash., 1907–1917.

Pacific Creek near Moran, Wyo., 1906; 1917–18.

Buffalo Fork near Elk (Moran), Wyo., 1906; 1917–18.

Spread Creek near Elk, Wyo., 1917–18.

Spring Creek near Teton, Wyo., 1917–18.

Cottonwood Creek near Teton, Wyo., 1917–18.

Spring Creek near Zenith, Wyo., 1917–18.

Gros Ventre River at Kelly, Wyo., 1918.

Gros Ventre River at Zenith, Wyo., 1917–18.

Spring Creek at West Gros Ventre Butte, Wyo., 1918.

Spring Creek at Zenith, Wyo., 1917–18.

Fish Creek near Wilson, Wyo., 1917–18.

Mosquito Creek near Wilson, Wyo., 1917–18.

Big Spring Creek near Cheney, Wyo., 1918.

Flat Creek near Cheney, Wyo., 1917–18.

Horse Creek near Cheney, Wyo., 1917–18.

Hoback River near Cheney, Wyo., 1917–18.

Fall Creek near Cheney, Wyo., 1917–18.

Dog Creek near Cheney, Wyo., 1917–18.

Cabin Creek near Cheney, Wyo., 1917–18.

Bailey Creek near Alpine, Idaho, 1917–18.

Wolf Creek near Alpine, Idaho, 1917–18.

Greys River near Alpine, Idaho, 1917–18.

Salt River near Alpine, Idaho, 1917–18.

McCoy Creek near Alpine, Idaho, 1917–18.

Indian Creek near Blowout, Idaho, 1917–18.

Big Elk Creek near Blowout, Idaho, 1917–18.

Little Elk Creek near Blowout, Idaho, 1917.

Bear Creek near Irwin, Idaho, 1917–18.

Palisade Creek near Irwin, Idaho, 1917–18.

Columbia River tributaries—Continued.

Snake River tributaries—Continued.

Fall Creek near Swan Valley, Idaho, 1917-18.

Rainy Creek at Swan Valley, Idaho, 1917-18.

Pine Creek near Swan Valley, Idaho, 1917-18.

Burns Creek near Heise, Idaho, 1917.

Henrys Fork⁶ near Lake, Idaho, 1920-

Henrys Fork at Warm River, Idaho, 1910-1915; 1918-

Henrys Fork near Ashton,⁷ Idaho, 1902-1909; 1920-

Henrys Fork in canyon above Fall River, Idaho, 1890-91.

Diversions from Henrys Fork between Ashton and St. Anthony gaging stations, Idaho, 1919-

Henrys Fork at St. Anthony, Idaho, 1919-

Diversions from Henrys Fork between St. Anthony and Rexburg gaging stations, Idaho, 1919-

Henrys Fork near Rexburg, Idaho, 1909-

Warm River at Warm River, Idaho, 1912-1915; 1918-

Robinson Creek at Warm River, Idaho, 1912-1915; 1918-

Fall River near Marysville, Idaho, 1902-3.

Diversions from Fall River above gaging station near Squirrel, Idaho, 1919-

Fall River near Squirrel,⁸ Idaho, 1904-1909; 1918-

Fall River at Canyon, Idaho, 1890-1901.

Diversions from Fall River between Squirrel and Chester gaging stations, Idaho, 1919-

Fall River near Chester, Idaho, 1920-

Teton River near St. Anthony, Idaho, 1903-1909; 1920-

Teton River at Chase's ranch, Idaho, 1890-1893.

Diversions from Teton River between gaging station near St. Anthony and mouth of river, Idaho, 1919-

Canyon Creek near Newdale, Idaho, 1920-

Willow Creek near Prospect, Idaho, 1903-4.

Willow Creek near Ririe, Idaho, 1916-

Willow Creek near Ionia, Idaho, 1916-

Grays Lake outlet near Herman, Idaho, 1916-

Idaho (Government) canal near Shelley, Idaho, 1912-

Blackfoot River above reservoir, near Henry, Idaho, 1914-

Blackfoot-Marsh reservoir (Blackfoot River) near Henry, Idaho, 1912-

Blackfoot River below reservoir, near Henry (near Rossfork), Idaho, 1908-

Blackfoot River near Shelley, Idaho, 1909-

Blackfoot River near Presto, Idaho, 1903-1909.

Blackfoot River near Blackfoot, Idaho (fragmentary), 1913; 1914; 1915-

Little Blackfoot River at Henry, Idaho, 1914-

Meadow Creek near Henry, Idaho, 1914-

Idaho (Government) canal near Firth, Idaho, 1914-

Sand Creek near Firth, Idaho, 1916-

Fort Hall upper canal near Blackfoot, Idaho, 1912-

Fort Hall lower canal near Blackfoot, Idaho, 1912-

⁶ Decision of United States Geographic Board; formerly called North Fork of Snake River.

⁷ Records, 1902-1909, published as "North Fork of Snake River near Ora, Idaho."

⁸ Records, 1904-1909, published as "Fall River at Fremont, Idaho."

Columbia River tributaries—Continued.

Snake River tributaries—Continued.

- Mud Lake at Terreton, Idaho, 1921—
 - Camas Creek near Dubois, Idaho, 1921—
 - Camas Creek near Camas, Idaho, 1921—
 - Camas Creek near Hamer, Idaho, 1912-13.
 - Beaver Creek at Dubois, Idaho, 1921—
 - Beaver Creek at Camas, Idaho, 1921—
- Medicine Lodge Creek near Small, Idaho, 1921—
- Birch Creek near Reno,⁹ Idaho, 1910-1912; 1921-1923.
- Little Lost River near Clyde, Idaho, 1910-1913.
- Little Lost River at Raymond's ranch, near Howe, Idaho, 1921—
- Little Lost River near Howe, Idaho, 1921—
 - Wet Creek at Clyde school, near Howe, Idaho, 1921-1923.
- Big Lost River at Howell's ranch, near Chilly, Idaho, 1904-1906; 1907-1914; 1920—
- Big Lost River below Chilly canal, near Chilly, Idaho, 1921-22.
- Big Lost River at Chilly Bridge, near Chilly, Idaho, 1920.
- Big Lost River below Chilly Sinks, near Chilly, Idaho, 1921-22.
- Big Lost River (back channel) below Chilly Sinks, near Chilly, Idaho, 1921.
- Big Lost River (east channel) above Mackay reservoir, near Mackay, Idaho, 1919—
- Big Lost River (west channel) above Mackay reservoir, near Mackay, Idaho, 1919—
- Mackay reservoir (Big Lost River) near Mackay, Idaho, 1919—
- Big Lost River below Mackay reservoir, near Mackay, Idaho, 1903-1906; 1912-1915; 1919—
- Big Lost River at Leslie, Idaho, 1919-1922.
- Big Lost River near Moore, Idaho, 1919—
 - Thousand Springs Creek near Chilly, Idaho, 1912-13; 1914; 1920-1922.
 - Warm Spring Creek (east channel) near Mackay, Idaho, 1919—
 - Warm Spring Creek (west channel) near Mackay, Idaho, 1919—
 - Sharp ditch near Mackay, Idaho, 1912-1914; 1919—
 - Streeter ditch near Mackay, Idaho, 1913-14.
 - Cedar Creek above forks, near Mackay, Idaho, 1911-1913.
 - Cedar Creek below forks, near Mackay, Idaho, 1911-1913.
 - Cedar Creek below power plant, near Mackay, Idaho, 1920-1922.
 - Clark ditch near Mackay, Idaho, 1920-1922.
 - Alder Creek near Mackay, Idaho, 1920-1922.
 - Antelope Creek near Darlington, Idaho, 1913-1916; 1920-1922.
 - Pass Creek near Leslie, Idaho, 1920-1922.
- Portneuf River above reservoir, near Chesterfield, Idaho, 1912-1914.
- Portneuf diversion channel near Chesterfield, Idaho, 1914.
- Portneuf River below reservoir, near Chesterfield, Idaho, 1912-1915.
- Portneuf River near Pebble, Idaho, 1910-1913.
- Portneuf River at Topaz, Idaho, 1913-1915; 1919—
- Portneuf River near McCammon, Idaho, 1896.
- Portneuf River at Pocatello, Idaho, 1897-1899; 1911—
 - Topons Creek near Chesterfield, Idaho, 1912-1914.
 - Pebble Creek near Pebble, Idaho, 1911-1914.
 - Birch Creek near Downey, Idaho, 1911-1914.

⁹ Records, 1910-1912, published as "Birch Creek near Kaufman, Idaho."

Columbia River tributaries—Continued.

Snake River tributaries—Continued.

Raft River near Bridge, Idaho, 1909-1915.

Clear Creek near Naf, Idaho, 1910-11; 1912-13.

Cassia Creek near Conant, Idaho, 1909-1912.

North Side Minidoka canal near Minidoka, Idaho, 1909-

South Side Minidoka canal near Minidoka, Idaho, 1909-

Goose Creek above Trapper Creek, near Oakley, Idaho, 1911-1916; 1919-

Goose Creek near Oakley, Idaho, 1909-1911.

Trapper Creek near Oakley, Idaho, 1911-1916; 1919-

Birch Creek near Oakley, Idaho, 1912-13; 1914-1916.

P. A. lateral near Milner, Idaho, 1919-

Milner¹⁰ Low Lift canal near Milner, Idaho, 1921-

North Side Twin Falls canal at Milner, Idaho, 1909-

South Side Twin Falls canal at Milner, Idaho, 1909-

Big Cottonwood Creek near Oakley, Idaho, 1909-1915.

Dry Creek near Artesian City, Idaho, 1912.

Blue Lakes outlet near Twin Falls, Idaho, 1917-1920.

Rock Creek near Rock Creek, Idaho, 1909-1912.

Rock Creek near Twin Falls, Idaho, 1922-

McMullen Creek near Rock Creek, Idaho, 1910; 1912.

Clear Lakes outlet near Buhl, Idaho, 1917-1920.

Salmon Falls Creek above upper Vineyard ditch, near Contact, Nev., 1914-15.

Salmon Falls Creek below upper Vineyard ditch, near Contact, Nev., 1914.

Salmon Falls Creek below High Line canal, near San Jacinto, Nev., 1914.

Salmon Falls Creek near San Jacinto, Nev., 1909-1916; 1918-

Salmon Falls Creek near Twin Falls, Idaho, 1909-10.

Upper Vineyard ditch near Contact, Nev., 1914.

Lower Vineyard ditch near Contact, Nev., 1914.

Jakes Creek above Hubbard ranch, near Contact, Nev., 1914.

Jakes Creek below Hubbard ranch, near Contact, Nev., 1914.

Willow Creek near Contact, Nev., 1914.

Bird's Nest ditch near Contact, Nev., 1914.

Harrell ditch near Contact, Nev., 1914.

High Line canal near San Jacinto, Nev., 1914.

San Jacinto ditch near San Jacinto, Nev., 1914.

Island ditch near San Jacinto, Nev., 1914.

West Boar's Nest ditch near San Jacinto, Nev., 1914.

Trout Creek near San Jacinto, Nev., 1914.

East Boar's Nest ditch near San Jacinto, Nev., 1914.

Shoshone Creek near San Jacinto, Nev., 1914-15.

North Side ditch near San Jacinto, Nev., 1914.

Cedar Creek near Roseworth, Idaho, 1909-1914; 1916.

Devil Creek near Three Creek, Idaho, 1912-14; 1916.

Big Wood River at Ketchum, Idaho, 1920-21.

Big Wood River at Gimlet, Idaho, 1904-5; 1920-21.

Big Wood River at Hailey, Idaho, 1889; 1915-

Big Wood River at Glendale Bridge, near Bellevue, Idaho, 1920-21.

Big Wood River near Bellevue, Idaho, 1911-

Magic reservoir (Big Wood River) near Richfield, Idaho, 1909-

¹⁰ Formerly known as Murtaugh canal.

Columbia River tributaries—Continued.

Snake River tributaries—Continued.

- Big Wood River below Magic dam, near Richfield, Idaho, 1911-
- Big Wood River above North Gooding canal, near Shoshone, Idaho, 1921-
- Big Wood River below North Gooding canal, near Shoshone, Idaho, 1911-
- Big Wood River near Shoshone, Idaho, 1905-6; 1908-1913.
- Big Wood River at Gooding, Idaho, 1896-1899; " 1921-
- Big Wood River near Gooding, Idaho, 1916-
- Big Wood River near Bliss, Idaho, 1899.
- Warm Springs Creek near Ketchum, Idaho, 1920-21.
- Trail Creek at Ketchum, Idaho, 1920-21.
- East Fork of Big Wood River at Gimlet, Idaho, 1920-21.
- Big Wood Slough at Hailey, Idaho, 1915-
- Camas Creek near Blaine, Idaho, 1912-
- Dry Creek near Blanche, Idaho, 1911-1914.
- Little Wood River near Carey, Idaho, 1904-5; 1920-
- Little Wood River near Richfield, Idaho, 1911-
- Little Wood River at Shoshone, Idaho, 1922-
- Little Wood River at Toponis (Gooding), Idaho, 1896-1899.
- Fish Creek above dam, near Carey, Idaho, 1920-
- Fish Creek near Carey, Idaho, 1919-20; 1923-
- West Fork of Fish Creek near Carey, Idaho, 1920-1922.
- Silver Creek near Picabo, Idaho, 1920-
- King Hill Creek near King Hill, Idaho, 1913.
- Little Canyon Creek at Glenns Ferry, Idaho, 1909-1913.
- Alkali Creek near Glenns Ferry, Idaho, 1909-1913.
- Cold Springs Creek near Hammett, Idaho, 1909-1913.
- Bennett Creek near Hammett, Idaho, 1909-1913.
- Rattlesnake Creek near Mountain Home, Idaho, 1917.
- Canyon Creek near Mountain Home, Idaho, 1917.
- Long Tom Creek below reservoir, near Bennett, Idaho, 1917.
- Willowdale Creek near Bennett, Idaho, 1917.
- Syrup Creek near Mountain Home, Idaho, 1917.
- Bruneau River near Rowland, Nev., 1913-1918.
- Bruneau River near Tindall, Idaho, 1910-1912.
- Bruneau River near Hot Spring, Idaho, 1909-1915.
- Bruneau River near Grandview, Idaho, 1895-1903; 1909-1916.
- Sheep Creek near Tindall, Idaho, 1910-1913.
- Marys Creek near Owyhee, Nev., 1913-1915.
- Marys Creek at Tindall, Idaho, 1910-1913.
- Louse Creek near Wickahoney, Idaho, 1911.
- East Fork of Bruneau River near Three Creek, Idaho, 1912-1914; 1916.
- East Fork of Bruneau River near Hot Spring, Idaho, 1910-1915.
- Three Creek near Three Creek, Idaho, 1912-1914; 1916.
- Cherry Creek near Three Creek, Idaho, 1912-1914; 1916.
- Deadwood Creek near Three Creek, Idaho, 1912-1914; 1916.
- Buckaroo ditch at Hot Spring, Idaho, 1912-1914.
- Grandview canal near Grandview, Idaho, 1912-1915.
- Castle Creek near Castle Creek, Idaho, 1910-11.

¹¹ Records, 1896-1899, published as "Malade River near Toponis, Idaho."

Columbia River tributaries—Continued.

Snake River tributaries—Continued.

Sucker Creek near Homedale, Idaho, 1919–1923.

Sucker Creek (at mouth) near Homedale, Idaho, 1903–1910.

Owyhee River near Gold Creek, Nev., 1916–

Owyhee River at Mountain City, Nev., 1913.

Owyhee River near Owyhee, Nev., 1913–

Owyhee River near Owyhee, Oreg., 1890–1893; 1895–96; 1903–1916; 1920–

South Fork of Owyhee River near Tuscarora, Nev., 1913.

South Fork of Owyhee River near Deep Creek, Nev., 1921–

Jack Creek near Tuscarora, Nev., 1913–

Jordan Creek near Jordan Valley, Oreg., 1911–1912; 1920.

Jordan Creek at Danner, Oreg., 1920; 1923.

Jordan Valley feed canal near Jordan Valley, Oreg., 1920; 1923.

Cow Creek at Narrows, near Jordan Valley, Oreg., 1914.

Cow Creek at Danner, Oreg., 1914; 1920.

Owyhee canal near Owyhee, Oreg., 1904–5; 1911–1916; 1920–

Boise River near Twin Springs, Idaho, 1911–

Arrowrock reservoir (Boise River) at Arrowrock, Idaho, 1917–

Boise River at Dowling's ranch, near Arrowrock, Idaho, 1911–

Boise River below Moore Creek, near Arrowrock, Idaho, 1915–16.

Boise River near Highland, Idaho (replaces the Boise station), 1905–1915.

Boise River near Boise, Idaho, 1894–1904.

Boise River at Caldwell, Idaho, 1895–96.

Boise River at Notus, Idaho, 1920–

Diversions from Boise River, Idaho, 1919–1922.

Cottonwood Creek near Arrowrock, Idaho, 1914–1918.

South Fork of Boise River near Lenox, Idaho, 1911–

Little Camas Creek at Little Camas store, Idaho, 1896.

Little Camas Creek below reservoir, near Bennett, Idaho, 1917.

Little Camas canal at heading, near Bennett, Idaho, 1917.

Little Camas canal above tunnel No. 9, near Bennett, Idaho, 1917.

Smith Creek near Lenox, Idaho, 1916–17.

Long Gulch Creek near Lenox, Idaho, 1916.

Rattlesnake Creek near Lenox, Idaho, 1915–1917.

Willow Creek near Lenox, Idaho, 1916–17.

Moore Creek near Arrowrock, Idaho, 1915–

Grimes Creek near Centerville, Idaho, 1910.

Dry Creek:

Spring Creek near Boise, Idaho, 1911–12.

Wilson ditch near Ontario, Oreg., 1904–5.

Malheur River near Drewsey, Oreg., 1914; 1920–21; 1923.

Malheur River at Warm Springs reservoir site, near Riverside, Oreg., 1914–1917.

Warm Springs reservoir (Malheur River) near Riverside, Oreg., 1920–

Malheur River below Warm Springs reservoir, near Riverside, Oreg., 1919–

Malheur River above South Fork, at Riverside, Oreg., 1906–7; 1908–1910.

Malheur River at Riverside, Oreg., 1909–1915.

Malheur River near Namorf, Oreg., 1913–1923.

Malheur River near Harper ranch, near Westfall, Oreg., 1903–1905.

Columbia River tributaries—Continued.

Snake River tributaries—Continued.

Malheur River near Hope, Oreg., 1919—

Malheur River near Little Valley, Oreg., 1914.

Malheur River at McLaughlin Bridge, near Vale, Oreg., 1904–1906.

Malheur River at Vale, Oreg., 1890–91; 1895–96; 1903–1914; 1919.

Malheur River at Halliday Bridge, near Ontario, Oreg., 1904–5.

Malheur River near Ontario, Oreg., 1903–4.

South Fork of Malheur River at Riverside, Oreg., 1910–1915;
1919–20.

North Fork of Malheur River at Scott's ranch, near Beulah, Oreg.,
1914.

North Fork of Malheur River at Foley's ranch, near Beulah,
Oreg., 1909–1912; 1913–14.

North Fork of Malheur River at Juntura, Oreg., 1919–20.

Vines ditch near Little Valley, Oreg., 1904–5; 1914.

Malheur Farmers' canal above Vale, Oreg., 1904–5.

McLaughlin ditch above Vale, Oreg., 1904–5.

"J. H." ditch above Vale, Oreg., 1904–5.

Gellerman & Frohman ditch above Vale, Oreg., 1904–5.

Sand Hollow ditch above Vale, Oreg., 1904–5.

Bully Creek near Westfall, Oreg., 1911–1913; 1923.

Bully Creek at Warm Springs, near Vale, Oreg., 1903–4; 1905–1907;
1911–1917; 1922–23.

Bully Creek at Vale, Oreg., 1904–5.

Cottonwood Creek near Westfall, Oreg., 1922–23.

Hope Mill ditch at Vale, Oreg., 1904–5.

Willow Creek near Malheur, Oreg., 1904–1906; 1910–11; 1912–1915;
1921—

Willow Creek near Brogan, Oreg., 1912–1914.

Willow Creek at Dell, Oreg., 1904–1906; 1910–11.

Cow Creek near Brogan, Oreg., 1912–1914.

Pole Creek near Brogan, Oreg., 1912–13.

Nevada ditch below Vale, Oreg., 1904–5.

Payette River at Banks, Idaho, 1922—

Payette River near Horseshoe Bend, Idaho, 1906–1916; 1919—

Payette River at Payette, Idaho, 1895–1897.

Payette Lake (North Fork of Payette River) at Lardo, Idaho,
1921—

North Fork of Payette River at Lardo, Idaho, 1908–1917; 1919—

North Fork of Payette River at Van Wyck, Idaho, 1912–1916; 1920—

Lake Fork of Payette River near McCall, Idaho, 1909–1914.

Gold Fork of Payette River near Roseberry, Idaho, 1920–21.

South Fork of Payette River near Garden Valley, Idaho, 1921—

South Fork of Payette River near Banks, Idaho, 1921—

Deadwood River near Lowman, Idaho, 1921—

Shafer Creek near Horseshoe Bend, Idaho, 1911–12.

Harris Creek near Horseshoe Bend, Idaho, 1911–12.

Weiser River at Starkey, Idaho, 1920.

Weiser River above Crane Creek, near Weiser, Idaho, 1920—

Weiser River near Weiser, Idaho, 1890–91; 1894–1904; 1910–1914.

West Fork of Weiser River near Fruitvale, Idaho, 1910–1913; 1919—

Lost Creek near Tamarack, Idaho, 1910–1914; 1920–21.

Middle Fork of Weiser River at Middle Fork, Idaho, 1910–1913.

Columbia River tributaries—Continued.

Snake River tributaries—Continued.

Weiser River tributaries—Continued.

Middle Fork of Weiser River near Mesa, Idaho, 1919-1921.

Little Weiser River at Ruby ranch, near Indian Valley, Idaho, 1923.

Little Weiser River near Indian Valley, Idaho, 1920-21; 1923.

Little Weiser River near Cambridge, Idaho, 1920-

Sage Creek near Midvale, Idaho, 1913.

Sommerscamp Creek near Midvale, Idaho, 1913.

Miller Creek near Midvale, Idaho, 1913.

Crane Creek near Midvale, Idaho, 1910-1916.

Crane Creek at mouth, near Weiser, Idaho, 1920-

Crane Creek Irrigation District canal near Weiser, Idaho, 1920-

Weiser Irrigation District canal near Weiser, Idaho, 1920-

Mann Creek near Weiser, Idaho, 1911-1913; 1920.

Monroe Creek (upper station) near Weiser, Idaho, 1911-12.

Monroe Creek (lower station) near Weiser, Idaho, 1911-1913.

Burnt River, North Fork (head of Burnt River) near Audrey, Oreg., 1915-16.

Burnt River near Hereford, Oreg., 1915-16.

Burnt River near Bridgeport, Oreg., 1915-16.

Middle Fork of Burnt River near Audrey, Oreg., 1915-16.

South Fork of Burnt River near Unity, Oreg., 1915-16.

South Fork of Burnt River at Hardman ranch, near Unity, Oreg., 1916-1920.

Fleetwood ditch near Unity, Oreg., 1918-1920.

Sawmill Creek near Unity, Oreg., 1915.

Camp Creek near Hereford, Oreg., 1915.

Powder River at Salisbury, Oreg., 1903-1914.

Powder River at Baker, Oreg., 1913; 1914.

Powder River near North Powder, Oreg., 1909-1912; 1913-1916; 1920-

Baldock Slough at Baker, Oreg., 1913; 1914.

Old Settlers Slough at Baker, Oreg., 1913; 1914.

Pine Creek near Baker, Oreg., 1913; 1914.

Goodrich Creek near Baker, Oreg., 1913.

Mill Creek near Baker, Oreg., 1913; 1914.

Lee-Polly ditch near Baker, Oreg., 1914.

Marble Creek near Baker, Oreg., 1913; 1914.

Salmon Creek near Baker, Oreg., 1913; 1914.

Willow Creek near Haines, Oreg., 1913.

North Powder River at Gardner's ranch, near North Powder, Oreg., 1912.

North Powder River at North Powder, Oreg., 1912; 1913; 1914.

Anthony Creek near North Powder, Oreg., 1912.

Wolf Creek near North Powder, Oreg., 1913; 1914.

Big Creek near Medical Springs, Oreg., 1913; 1914.

Goose Creek near Keating, Oreg., 1913; 1914.

Eagle Creek above West Fork, near Baker, Oreg., 1911.

Eagle Creek near Baker, Oreg., 1909-10.

Eagle Creek near New Bridge, Oreg., 1910-11; 1914.

West Fork of Eagle Creek near Baker, Oreg., 1911.

Daly Creek near Richland, Oreg., 1913.

Columbia River tributaries—Continued.

Snake River tributaries—Continued.

Imnaha River:

- Big Sheep Creek near Joseph, Oreg., 1920.
- Salmon River near Pierson, Idaho, 1910-1913.
- Salmon River at Stanley, Idaho, 1921-
- Salmon River below Yankee Fork, near Clayton, Idaho, 1921-
- Salmon River at Salmon, Idaho, 1912-1916; 1919-
- Salmon River at Whitebird, Idaho, 1910-1917; 1919-
- Lake Creek near Stanley, Idaho, 1910-1913.
- Valley Creek at Stanley, Idaho, 1910-1913; 1921-
- Yankee Fork of Salmon River near Clayton, Idaho, 1921-
- Warm Springs Creek at Robinson Bar, near Clayton, Idaho, 1921-1923.
- Pahsimeroi River near Goldburg, Idaho, 1910-1913.
- Pahsimeroi River below the sinks, near Goldburg, Idaho, 1913.
- Goldburg Creek near Goldburg, Idaho, 1910.
- Goldburg Creek at mouth, near Goldburg, Idaho, 1913.
- Big Creek near Patterson, Idaho, 1910-1912.

Lemhi River:

- Timber Creek near Leadore, Idaho, 1912.
- West Fork of Timber Creek near Leadore, Idaho, 1912.
- Eightmile Creek near Leadore, Idaho, 1912.
- North Fork of Salmon River near North Fork, Idaho, 1912.
- Middle Fork of Salmon River:
- Marsh Creek near Cape Horn, Idaho, 1922.
- Beaver Creek at Cape Horn, Idaho, 1922.
- Bear Valley Creek near Cape Horn, Idaho, 1921-
- Grande Ronde River at Hilgard, Oreg., 1903-1915.
- Grande Ronde River at LaGrande, Oreg., 1918-1923.
- Grande Ronde River at Elgin, Oreg., 1903-1912; 1918-19.
- Grande Ronde River at Zindel, Wash., 1904-1912.
- Ladd Creek near Hot Lake, Oreg., 1918.
- Catherine Creek near Union, Oreg., 1906-7; 1911-12; 1915; 1918-19
- Little Creek near Union, Oreg., 1915; 1918.
- Mill Creek near Cove, Oreg., 1918; 1920-21.
- State ditch near Alicel, Oreg., 1918.
- Willow Creek:
- Mill Creek near Summerville, Oreg., 1914-15.
- Wallowa Lake (on Wallowa River) near Joseph, Oreg., 1905-6; 1912-1914; 1915.
- Wallowa River at Joseph, Oreg., 1903-1914; 1915.
- Wallowa River near Wallowa, Oreg., 1903-1907.
- Wallowa River at Minam (near Elgin), Oreg., 1903-1914.
- Silver Lake ditch near Joseph, Oreg., 1905; 1915.
- Farmers' and Citizens' ditch near Joseph, Oreg., 1905; 1915
- Granger ditch at Joseph, Oreg., 1905; 1915.
- Big Bend ditch at Joseph, Oreg., 1905; 1915.
- Hurricane Creek near Joseph, Oreg., 1915.
- Lostine River near Lostine, Oreg., 1912-1914; 1915.
- Company ditch near Wallowa, Oreg., 1905.
- Bear Creek near Wallowa, Oreg., 1915.
- Minam River at Minam, Oreg., 1912-1914.

Asotin Creek near Shelmans ranch, near Asotin, Wash., 1904-1906.

Columbia River tributaries—Continued.

Snake River tributaries—Continued.

- Asotin Creek near Asotin, Wash., 1910; 1911.
- Selway River (head of Clearwater River), near Lowell, Idaho, 1911-12.
- Clearwater River at Kamiah, Idaho, 1910—
- Clearwater River near Lewiston, Idaho, 1910-1913.
- Lochsa River near Lowell, Idaho, 1910-1912.
- South Fork of Clearwater River near Grangeville, Idaho, 1910-1916;
1923—
- South Fork of Clearwater River at Kooskia, Idaho, 1910-1912.
- Lolo Creek near Greer, Idaho, 1911-12.
- Tucannon River near Pomeroy, Wash., 1913-1915.
- Tucannon River near Starbuck, Wash., 1914-1917.
- Palouse River near Potlatch, Idaho, 1914-1919.
- Palouse River at Elberton, Wash., 1904-5.
- Palouse River near Winona, Wash., 1915-1917.
- Palouse River at Hooper, Wash., 1897-1916.
- Rock Creek near Ewan (St. John), Wash., 1903-1905; 1914-1917.
- Cow Creek near Keystone, Wash., 1904-5.
- Walla Walla River near Milton, Oreg., 1903-1908; 1918—
- Walla Walla River at Whitman, Wash., 1897-1899.
- South Fork of Walla Walla River near Milton, Oreg., 1906; 1907-1917.
- South Fork of Walla Walla River near Milton, Oreg. (lower station),
1903-1906.
- Mill Creek near Walla Walla, Wash., 1913-1917.
- Umatilla River at Gibbon, Oreg., 1896-1911.
- Umatilla River at Pendleton, Oreg., 1891-92; 1903-1906.
- Umatilla River above McKay Creek, near Pendleton, Oreg., 1921—
- Umatilla River above Furnish reservoir, near Yoakum, Oreg., 1915—
- Umatilla River at Yoakum, Oreg., 1903-1916.
- Umatilla River near Umatilla, Oreg., 1903—
- North Fork of Umatilla River near Gibbon, Oreg., 1912-1915.
- McKay Creek near Pilot Rock, Oreg., 1921.
- McKay Creek near Pendleton, Oreg., 1903-4; 1918-1923.
- McKay Creek at mouth, near Pendleton, Oreg., 1922—
- Farmers' mill ditch at Pendleton, Oreg., 1905.
- Birch Creek near Pilot Rock, Oreg., 1919—
- Birch Creek at Rieth, Oreg., 1921-1923.
- Slusher & Gould ditch near Nolin, Oreg., 1905-6.
- Lisle & Crane ditch near Echo, Oreg., 1905.
- Charles Lisle ditch at Echo, Oreg., 1905-6.
- Henrietta mill ditch at Echo, Oreg., 1905-6.
- Wilson & Co.'s ditch at Echo, Oreg., 1905-6.
- Umatilla project feed canal near Echo, Oreg., 1920—
- Echo mill tailrace at Echo, Oreg., 1920—
- Western Land & Irrigation Co.'s (Hinkle) canal at Echo, Oreg., 1905-6;
1921—
- Allen ditch at Echo, Oreg., 1905-6.
- Pioneer ditch at Echo, Oreg., 1905-6.
- Maxwell ditch at Echo, Oreg., 1905-6.
- Maxwell canal near Hermiston, Oreg., 1921—
- Maxwell Land & Irrigation Co.'s (Hermiston) ditch near Hermiston,
Oreg., 1905-6.
- Beitle ditch near Hermiston, Oreg., 1915-6.

Columbia River tributaries—Continued.

Umatilla River tributaries—Continued.

Main canal, on west division of Umatilla project, near Umatilla, Oreg.
1921—

Oregon Land & Water Co.'s ditch at Umatilla, Oreg., 1905-6.

Brownell ditch at Umatilla, Oreg., 1905-6.

Willow Creek near Morgan, Oreg., 1921.

Willow Creek near Arlington, Oreg., 1905-6.

Rock Creek near Goldendale, Wash., 1911-1913.

Squaw Creek near Goldendale, Wash., 1911-1913.

John Day River near Prairie City, Oreg., 1916-17.

John Day River near Dayville, Oreg., 1908-1914; 1920-21.

John Day River at Clarno, Oreg., 1914-15; 1920-21.

John Day River at McDonald, Oreg., 1904—

Strawberry Creek near Prairie City, Oreg., 1916-17.

South Fork of John Day River at Dayville, Oreg., 1908-1914; 1920-21.

Dayville ditch at Dayville, Oreg., 1910-1914.

North Fork of John Day River:

Desolation Creek near Dale, Oreg., 1915-1917.

Camas Creek above Cable Creek, near Ukiah, Oreg., 1914-1917;
1919—

Camas Creek below Cable Creek, near Ukiah, Oreg., 1914.

Cable Creek near Ukiah, Oreg., 1914-1917; 1919—

Rock Creek at Rockcreek, Oreg., 1905; 1911.

Deschutes River above Snow Creek, near Lapine, Oreg., 1922—

Crane Prairie reservoir (Deschutes River) near Lapine, Oreg., 1922—

Deschutes River at Crane Prairie, near Lapine, Oreg., 1914-1917; 1922—

Deschutes River at Pringle Falls, near Lapine, Oreg., 1916-17; 1922—
Deschutes River at Forest Service bridge, near Lapine, Oreg., 1910; 1912;
1913; 1914-1917; 1920; 1922.

Deschutes River near Lava, Oreg., 1905-1907; 1909-1911; 1912; 1913-1915.

Deschutes River at West's ranch, near Lava, Oreg., 1906-1909; 1914.

Deschutes River at Benham Falls, near Bend, Oreg., 1909-1914; 1920-21

Deschutes River at Lava Island, Oreg., 1915-16.

Deschutes River at Bend, Oreg., 1904-1914.

Deschutes River below Bend, Oreg., 1914—

Deschutes River at Tumalo (Laidlaw), Oreg., 1909-1912; 1914-15.

Deschutes River near Cline Falls, Oreg., 1910-11; 1912-13.

Deschutes River at Mecca, Oreg., 1911—

Deschutes River at Sherar, Oreg., 1912-1914.

Deschutes River at Moro, Oreg., 1897-1899.

Deschutes River at Moody (Biggs), Oreg., 1906—

Snow Creek above Crane Prairie, near Lapine, Oreg., 1922—

Cultus River above Cultus Creek, near Lapine, Oreg., 1923—

Cultus River below Cultus Creek, near Lapine, Oreg., 1922.

Quinn River above Crane Prairie, near Lapine, Oreg., 1923—

Brown Creek near Lapine, Oreg., 1922—

Odell Creek near Crescent, Oreg., 1911; 1912; 1913; 1914.

Fall River near Lapine, Oreg., 1912.

Little Deschutes River¹² at Crescent, Oreg., 1904-1908; 1910-1914.

Little Deschutes River above Walker Basin intake (Morson intake prior
to 1922) near Lapine, Oreg., 1914-1917; 1919—

Little Deschutes River near Lapine, Oreg., 1910-1913; 1918.

¹² Formerly known as East Fork (from decision of Geographic Board Oct. 6, 1926).

Columbia River tributaries—Continued.

Deschutes River tributaries—Continued.

- Little Deschutes River at Allen's ranch, near Lava, Oreg., 1905-1912; 1913-1915.
 - Crescent Lake reservoir near Crescent, Oreg., 1922-
 - Crescent Creek at outlet of Crescent Lake, near Crescent, Oreg., 1911; 1912-1915.
 - Crescent Creek below Cold Creek, near Crescent, Oreg., 1912-13; 1922-
 - Crescent Creek near Crescent, Oreg., 1912-13; 1914.
 - Big Marsh Creek near Crescent, Oreg., 1912-1914.
 - Walker Basin canal near Lapine, Oreg., 1922-
 - Arnold canal near Bend, Oreg., 1912-
 - Central Oregon canal near Bend, Oreg., 1905-
 - Pilot Butte canal near Bend, Oreg., 1905-
 - Deschutes County Municipal Improvement District canal near Bend, Oreg., 1923-
 - North canal near Bend, Oreg., 1913-
 - Swalley canal near Bend, Oreg., 1913-
 - Tumalo Creek near Tumalo (Laidlaw), Oreg., 1906-1914.
 - Tumalo Creek near Bend, Oreg., 1906-1908; 1911-
 - Lewis Creek near Tumalo (Laidlaw), Oreg., 1908-9.
 - Wimer canal near Tumalo (Laidlaw), Oreg., 1906-1914; 1916-17.
 - Columbia Southern canal near Tumalo (Laidlaw), Oreg., 1906-1914; 1916; 1917-1921; 1923-
 - Tumalo feed canal near Bend, Oreg., 1914-
 - Crater Creek canal near Bend, Oreg., 1917; 1919-20.
- Squaw Creek near Sisters, Oreg., 1906-
 - Squaw Creek canal near Sisters, Oreg., 1916-1920.
 - McAllister ditch near Sisters, Oreg., 1909-1913.
- Crooked River near Post, Oreg., 1908-1911.
- Crooked River at Hoffman's ranch, near Prineville, Oreg., 1913-14.
- Crooked River near Prineville, Oreg., 1908-1912.
- Crooked River at Prineville, Oreg., 1914.
- Crooked River near Culver, Oreg., 1917-
 - Bear Creek at Rickman ranch, near Roberts, Oreg., 1921-1923.
 - Prineville flour-mill tailrace at Prineville, Oreg., 1914.
 - Ochoco Creek near Howard, Oreg., 1910-11.
 - Ochoco Creek above Mill Creek, near Prineville, Oreg., 1917-1920.
 - Ochoco Creek at Elliott ranch, near Prineville, Oreg., 1908-1910; 1914-1917.
 - Ochoco Creek at Prineville, Oreg., 1912; 1913-1915.
 - Marks Creek near Prineville, Oreg., 1916.
 - Mill Creek near Prineville, Oreg., 1916; 1918; 1920-21.
 - Tableland ditch near Prineville, Oreg., 1915-1917.
 - Elliott ditch near Prineville, Oreg., 1908-1910; 1914-1917.
 - McKay Creek near Prineville, Oreg., 1915-16; 1918-1920.
- Metolius River at Allingham ranger station, near Sisters, Oreg., 1910-1913; 1915-1917.
- Metolius River at Hubbard ranch, near Grandview, Oreg., 1910-1913.
- Metolius River at Riggs ranch, near Sisters, Oreg., 1908-1912.
- Metolius River at Montgomery ranch, near Grandview, Oreg., 1921-
 - Lake Creek near Sisters, Oreg., 1911-1913; 1915-
 - First Creek near Sisters, Oreg., 1915-1917.
 - Jack Creek near Sisters, Oreg., 1915-16.
 - Canyon Creek near Sisters, Oreg., 1915-16.
 - Whitewater River near Grandview, Oreg., 1911-1913.

Columbia River tributaries—Continued.

Deschutes River tributaries—Continued.

Shitike Creek at Warmspring, Oreg., 1911-1916; 1923-

Trout Creek near Antelope, Oreg., 1915; 1916-17.

Trout Creek near Gateway, Oreg., 1915; 1916.

Hay Creek near Hay Creek, Oreg., 1915; 1916.

Warm Springs River near Warmspring, Oreg., 1911-1919.

Mill Creek at outlet of Olallie Lake, Oreg., 1915-16.

Mill Creek near Warmspring, Oreg., 1915.

White River near Tygh Valley, Oreg., 1911-1918.

White River below Tygh Valley, Oreg., 1917-

Clear Creek above intake, near Wapinitia, Oreg., 1918-1922.

Clear Creek at Oak Grove road, near Wapinitia, Oreg., 1917-18.

Gate Creek near Wamic, Oreg., 1917-18; 1920-1923.

Tygh Creek at Tygh Valley, Oreg., 1911-1913; 1918.

Fifteenmile Creek near Dufur, Oreg., 1918-19.

Klickitat River above Pearl Creek, near Glenwood, Wash., 1910; 1916.

Klickitat River above Big Muddy Creek, Wash., 1905.

Klickitat River below Big Muddy Creek, Wash., 1905; 1907-8.

Klickitat River at Camp Klickitat, Wash., 1907-8.

Klickitat River near Glenwood, Wash., 1909-

Klickitat River at Hanson's cable, near Klickitat, Wash., 1908-9.

Klickitat River below Glenwood, Wash., 1914.

Klickitat River at Klickitat (Wright), Wash., 1909-1912.

Klickitat River at Wols Ferry, near Lyle, Wash., 1907-1910.

Klickitat River near Lyle, Wash., 1912.

Pearl Creek near Glenwood, Wash., 1916.

Swamp Creek near Glenwood, Wash., 1916.

West Fork of Klickitat River near Glenwood, Wash., 1910; 1916

Surveyors Creek near Glenwood, Wash., 1916.

Cunningham Creek near Glenwood, Wash., 1916.

Big Muddy Creek near Glenwood, Wash., 1916-1918.

Cougar Creek near Glenwood, Wash., 1916.

Dairy Creek near Glenwood, Wash., 1916.

Little Klickitat River near Goldendale, Wash., 1910-1912.

Hood River at Dee, Oreg., 1913-1917.

Hood River at Winans, Oreg., 1905-1907; 1910-1912; 1913.

Hood River at Tucker Bridge, Oreg., 1897-1899; 1913-1917.

Hood River at Powderdale, near Hood River, Oreg., 1913-

East Fork of Hood River near Mount Hood, Oreg., 1913-1922.

East Fork of Hood River near Dee, Oreg., 1917.

East Fork Irrigation District canal near Mount Hood, Oreg., 1913-

Mount Hood canal near Mount Hood, Oreg., 1917-1920.

West Fork of Hood River near Dee, Oreg., 1913-1916.

Green Point Creek near Dee, Oreg., 1919-1921.

Mount Hood Irrigation District canal near Dee, Oreg., 1919-20.

North Fork of Green Point Creek near Dee, Oreg., 1919-1921.

Farmers canal near Oakgrove, Oreg., 1917; 1920-1922.

Pacific Power & Light Co.'s conduit (tailrace prior to 1923) near Hood

River, Oreg., 1913-14; 1916-

White Salmon River near Guler, Wash., 1918.

White Salmon River at splash dam, near Trout Lake, Wash., 1912-1917.

White Salmon River at Husum, Wash., 1909-1919.

Columbia River tributaries—Continued.

White Salmon River at Condit dam, near Underwood, Wash., 1912-13.

White Salmon River near Underwood, Wash., 1915-

Trout Creek at Guler, Wash., 1909-1911.

Little White Salmon River below Lava Creek, near Cook, Wash., 1903-1906.¹³

Little White Salmon River near Cook, Wash., 1909.

Gorton Creek near Wyeth, Oreg., 1917-1920.

Latourell Creek at Latourell, Oreg., 1912-13.

Sandy River above Salmon River, at Brightwood, Oreg., 1910-1914.

Sandy River below Salmon River, near Brightwood, Oreg., 1907-1911.

Sandy River near Marmot, Oreg., 1911-1915; 1919-

Sandy River at and below dam near Marmot, Oreg., 1915-1919.

Sandy River above Bull Run River, near Bull Run, Oreg., 1910-1912.

Sandy River below Bull Run River, near Bull Run, Oreg., 1910-1914.

Clear Fork of Sandy River near Welches, Oreg., 1913; 1914-15.

Lost Creek near Brightwood, Oreg., 1913-1918.

Zigzag River at Zigzag, Oreg., 1920-21.

Still Creek near Rowe, Oreg., 1910-1912.

Still Creek at Zigzag, Oreg., 1920-21.

Salmon River near Rowe, Oreg., 1910-1912.

Salmon River at Welches, Oreg., 1913-14; 1920-21.

Salmon River at Fish Hatchery, near Brightwood, Oreg., 1912-13.

Sandy River canal near Marmot, Oreg., 1916-1920.

Bull Run River near Bull Run, Oreg., 1895-

Little Sandy River near Marmot, Oreg., 1913-1919.

Little Sandy River near Bull Run, Oreg., 1911-1913; 1919-

Little Sandy flume near Bull Run, Oreg., 1912-13.

Willamette River, Middle Fork (head of Willamette River), above Salt Creek, near Oakridge, Oreg., 1913-14.

Willamette River, Middle Fork, below North Fork, near Oakridge, Oreg., 1911-12.

Willamette River, Middle Fork, at Eula, Oreg., 1923-

Willamette River, Middle Fork, at Jasper, Oreg., 1905-1912; 1913-1917.

Willamette River at Springfield, Oreg., 1911-1913.

Willamette River at Eugene, Oreg., 1919-

Willamette River at Albany, Oreg., 1878-1888; 1892-

Willamette River at Salem, Oreg., 1909-1916.

Willamette River at Oregon City, Oreg., 1909-1912.

Salt Creek near Oakridge, Oreg., 1913-14.

Salmon Creek near Oakridge, Oreg., 1913-1919.

North Fork of Middle Fork of Willamette River near Oakridge (Hazel-dell), Oreg., 1909-1912; 1913-1916.

Fall Creek near Fall Creek, Oreg., 1911.

Coast Fork of Willamette River near Goshen, Oreg., 1905-1912.

Row River near Disston, Oreg., 1910-1913.

McKenzie River at Clear Lake, Oreg., 1912-1915.

McKenzie River at McKenzie Bridge, Oreg., 1910-

McKenzie River at Martins Rapids, near Vida, Oreg., 1910-11.

McKenzie River near Springfield, Oreg., 1905-1915.

Eugene power canal near Waltherville, Oreg., 1912-1915.

Long Tom River near Monroe, Oreg., 1920-

¹³ Records published in U. S. Geol. Survey Water-Supply Paper 272, pp. 428-429.

Columbia River tributaries—Continued.

Willamette River tributaries—Continued.

Muddy Creek near Corvallis, Oreg., 1920-1923.

Celapooya River near Tangent, Oreg., 1920-1923.

Oak Creek near Albany, Oreg., 1920-1923.

North Santiam River near Hoover, Oreg., 1910-1913.

North Santiam River at Detroit, Oreg., 1907-1909.

North Santiam River at Niagara, Oreg., 1908-1919.

North Santiam River at Mehama, Oreg., 1905-1907; 1910-1914; 1921-Santiam River at Jefferson, Oreg., 1905-6; 1908-1916.

Marion Fork of Santiam River at Marion Lake, near Hoover, Oreg., 1907; 1909-1912.

Puzzle Creek near Detroit (Hoover), Oreg., 1907; 1909.

North Fork of Puzzle Creek near Hoover, Oreg., 1909-1912.

South Fork of Puzzle Creek near Hoover, Oreg., 1909-1912.

Pamelia Creek near Detroit, Oreg., 1907; 1909; 1913.

Whitewater Creek near Detroit, Oreg., 1907; 1913.

Breitenbush Creek near Detroit, Oreg., 1910-1913.

South Santiam River near Cascadia, Oreg., 1910-1913.

South Santiam River near Foster, Oreg., 1911.

South Santiam River at Waterloo, Oreg., 1905-1907; 1910-11; 1923-

Middle Santiam River near Foster, Oreg., 1911.

Albany power canal at Albany, Oreg., 1919.

Luckiamute River near Suver, Oreg., 1905-1911.

Yamhill River, South Fork (head of Yamhill River), at Sheridan, Oreg., 1906-1911.

Yamhill River at Lafayette, Oreg., 1908-1914.

Molalla River near Molalla, Oreg., 1905-1909.

Clackamas River at Big Bottom, Oreg., 1920-

Clackamas River above Three Lynx Creek, Oreg., 1911-1913; 1921-

Clackamas River near Cazadero, Oreg., 1909-

Clackamas River at Estacada, Oreg., 1908-1911.

Clackamas River near Barton, Oreg. (replaced by Estacada station), 1905-1908.

Clackamas River at Park Place, Oreg., 1911-12.

Oak Grove Fork at Timothy Meadows, Oreg., 1913-1916; 1918-

Oak Grove Fork at Portland Electric Power Co.'s intake, Oreg., 1909-

Lewis River above Muddy River, near Cougar, Wash., 1909.

Lewis River near Cougar, Wash., 1909-1912.

Lewis River near Amboy, Wash., 1911-

Lewis River at and near Ariel, Wash., 1909; 1922-

Muddy River at mouth, near Cougar, Wash., 1909.

Pine Creek at mouth, near Cougar, Wash., 1909.

Swift Creek at mouth, near Cougar, Wash., 1909.

Canyon Creek near Amboy, Wash., 1922-

Kalama River near Kalama, Wash., 1911-1913; 1916-

Cowlitz River at Lewis, Wash., 1911-1919.

Cowlitz River at Randle, Wash., 1910-1912.

Cowlitz River at Mossy Rock, Wash., 1912-1917.

Columbia River tributaries—Continued.

- Cowlitz River at Mayfield, Wash., 1910-11.
- Ohanapecosh River near Lewis, Wash., 1907-1917.
- Clear Fork near Lewis, Wash., 1907-1917.
- Coal Creek near Lewis, Wash., 1910-1915.
- Lake Creek at outlet of Packwood Lake, near Lewis, Wash., 1911-
- Lake Creek at mouth, near Lewis, Wash., 1907-1915.
- Hagar Creek near Lewis, Wash., 1911-12; 1913-14.
- North Fork of Hagar Creek near Lewis, Wash., 1911-12; 1913-14.
- Johnson Creek below West Fork, near Lewis, Wash., 1911-1914.
- Johnson Creek at mouth, near Lewis, Wash., 1907-1914; 1918-
- Glacier Creek near Lewis, Wash., 1911.
- Cispus River near Randle, Wash., 1910-1912.
- Toutle River at St. Helens, Wash., 1909.
- Toutle River near Silver Lake, Wash., 1919-1923.
- Toutle River near Castle Rock, Wash., 1909-1912.
- Youngs River near Astoria, Oreg., 1916-1917.

STREAMS BETWEEN COLUMBIA RIVER AND KLAMATH RIVER

- Rogue River near Prospect, Oreg., 1907-1912.
- Rogue River below Prospect, Oreg., 1913-
- Rogue River near Trail, Oreg., 1910-1913.
- Rogue River at Raygold, near Central Point,¹⁴ Oreg., 1905-
- Rogue River near Galice, Oreg., 1906.
- California Oregon Power Co.'s flume near Prospect, Oreg., 1913-
- Mill Creek near Prospect, Oreg., 1910.
- Big Butte Creek, South Fork (head of Big Butte Creek), near Butte Falls, Oreg., 1910-11; 1915; 1917-
- Big Butte Creek below Butte Falls, Oreg., 1918-1920.
- Little Butte Creek, South Fork (head of Little Butte Creek), near Deadwood, Oreg., 1917-18.
- Little Butte Creek, South Fork, near Lake Creek, Oreg., 1910-1913.
- Little Butte Creek, South Fork, near Lake Creek (near mouth), Oreg., 1921-
- Little Butte Creek above Eagle Point, Oreg., 1916-
- Little Butte Creek near Eagle Point, Oreg., 1907-1916.
- Dead Indian Creek near Lilyglen, Oreg., 1916-1919.
- Fish Lake reservoir near Lake Creek, Oreg., 1915-
- North Fork of Little Butte Creek at Fish Lake, near Lake Creek, Oreg., 1914-
- North Fork of Little Butte Creek above Medford intake, near Lake Creek, Oreg., 1911-1913; 1922-
- North Fork of Little Butte Creek above intake of Rogue River Valley canal, near Lake Creek, Oreg., 1916-1919; 1921-
- Rogue River Valley canal at intake, near Lake Creek, Oreg., 1914; 1915; 1916.
- Rogue River Valley canal near Brownsboro, Oreg., 1913; 1915-1919; 1921-
- Medford Irrigation District canal near Brownsboro, Oreg., 1922-
- Eagle Point canal near Eagle Point, Oreg., 1920-
- Emigrant Creek (head of Bear Creek) near Ashland, Oreg., 1920-
- Bear Creek near Ashland, Oreg., 1923-
- Bear Creek at Talent, Oreg., 1907-1914.

¹⁴ Formerly published as "Rogue River near Tolo, Oreg." Tolo is a discontinued post office.

Rogue River tributaries—Continued.

- Bear Creek below Phoenix canal, near Talent, Oreg., 1923—
- Bear Creek at Medford, Oreg., 1915—
- Bear Creek near Central Point, Oreg., 1923—
 - East lateral near Ashland, Oreg., 1923—
 - Neil Creek near Ashland, Oreg., 1913.
 - George Dunn ditch near Ashland, Oreg., 1913.
 - Talent lateral near Ashland, Oreg., 1920—
 - Ashland Creek at Ashland, Oreg., 1913.
 - Wagner Creek near Talent, Oreg., 1913.
 - Phoenix canal at Talent, Oreg., 1916—
- Evans Creek at Wimer, Oreg., 1913.
- Applegate River near Buncom, Oreg., 1911–1914.
- Applegate River at Murphy, Oreg., 1907–1910.
 - Cameron ditch near Buncom, Oreg., 1911–1914.
 - East Fork of Little Applegate River near Buncom, Oreg., 1913.
 - Little Applegate River near Ruch, Oreg., 1913.
 - McDonald Creek:
 - McDonald Creek canal near Talent, Oreg., 1923—
 - West Fork of Little Applegate River near Buncom, Oreg., 1913.
 - Spicer ditch near Buncom, Oreg., 1913.
 - Thompson Creek near Applegate, Oreg., 1913.
 - Slate Creek at Wonder, Oreg., 1913.
 - Jumpoff Joe Creek near Merlin, Oreg., 1921–22.
 - Grave Creek near Placer, Oreg., 1913.
- Coquille River, South Fork, at Powers, Oreg., 1916—
- Tenmile Creek:
 - Clear Lake outlet near Reedsport, Oreg., 1917–18.
- South Umpqua River (head of Umpqua River) near Tiller, Oreg., 1910–11.
- South Umpqua River near Brockway, Oreg., 1905–1912.
- Umpqua River near Elkton, Oreg., 1905—
 - Cow Creek at Riddle, Oreg., 1911–12.
 - North Umpqua River at Tokeetee Falls, near Hoaglin, Oreg., 1908–9; 1914–1917.
 - North Umpqua River near Hoaglin, Oreg., 1910–1912; 1914–1916.
 - North Umpqua River near Glide, Oreg., 1915–1920; 1921–22.
 - North Umpqua River near Oakcreek, Oreg., 1905–1908; 1913–1915.
 - North Umpqua River at Winchester, Oreg., 1908–1913.
 - Lake Creek at Diamond Lake, near Fort Klamath, Oreg., 1922—
 - Calapooya Creek near Sutherlin, Oreg., 1912–13; 1922.
 - Luse canal near Sutherlin, Oreg., 1912–13.
 - Mill Creek near Ash, Oreg., 1907–1912; 1915–1917.
- Siletz River at Siletz, Oreg., 1905–1912.
- Wilson River near Tillamook, Oreg., 1914–15; 1916.
 - North Fork of Wilson River near Tillamook, Oreg., 1913–1915; 1916.
- Nehalem River at Salmonberry, near Balm, Oreg., 1913–14.

**REPORTS ON WATER RESOURCES OF THE NORTH PACIFIC SLOPE
DRAINAGE BASINS****PUBLICATIONS OF UNITED STATES GEOLOGICAL SURVEY****WATER-SUPPLY PAPERS**

Water-supply papers may be purchased (at price quoted below) from the SUPERINTENDENT OF DOCUMENTS, Washington, D. C. An asterisk (*) indicates that the report is out of print. Water-supply papers are of octavo size.

- *4. A reconnaissance in southeastern Washington, by I. C. Russell, 1897. 96 pp., 7 pls.

Describes an area "bordered on the south by Oregon, on the east by Idaho, on the north by Snake River, and on the west by the Columbia," and "briefly designated as lying south of Snake River," discusses climate, vegetation, topography and drainage, geologic formations—including the river terraces and soils—irrigation, and the artesian water supply, and gives an outline of the geological history of the region.

- *44. Profiles of rivers in the United States, by Henry Gannett. 1901. 100 pp. 11 pls.

Gives elevations and distances along Columbia, Willamette, Flathead, and Snake rivers.

53. Geology and water resources of Nez Perce County, Idaho, Part I, by I. C. Russell. 1901. 85 pp., 10 pls. 10c.

- *54. Geology and water resources of Nez Perce County, Idaho, Part II, by I. C. Russell. 1901. 55 pp. (87-141).

Nos. 53 and 54 relate to an area "in western Idaho, bordered on the west by portions of Washington and Oregon, "drained through Snake River to the Columbia; they describe the topography, geology, and soils of the region, discuss the relation of the surface features—plateaus, canyons, streams, etc.—to the geology and the climate, the source and quantity of the water supply, including springs and artesian wells, and refer briefly to the occurrence of building stones, lignite, gold, silver, and copper. They include also a short bibliography of artesian waters and two appendixes—one giving list of elevations, and the other notes concerning Portland cement.

55. Geology and water resources of a portion of Yakima County, Wash., by G. O. Smith. 1901. 68 pp., 7 pls. 10c.

Describes topography, climate, soil, agriculture, geology, and surface and ground waters of an area comprising about 50 square miles in the vicinity of North Yakima; discusses in some detail the artesian basins and wells.

- *57. Preliminary list of deep borings in the United States, Part I (Alabama-Montana), by N. H. Darton. 1902. 60 pp.

- *61. Preliminary list of deep borings in the United States, Part II (Nebraska-Wyoming), by N. H. Darton. 1902. 67 pp.

Nos. 57 and 61 contain information as to depth, diameter, yield, and head of water in borings more than 400 feet deep; under head "Remarks" gives information concerning temperature, quality of water, purposes of boring, etc. The lists are arranged by States, and the States are arranged alphabetically. A second, revised, edition was published in 1905 as Water-Supply Paper 149 (q. v.). 5c.

78. Preliminary report on artesian basins in southwestern Idaho and southeastern Oregon, by I. C. Russell. 1903. 53 pp., 2 pls. 5c.

Discusses briefly the rocks and geologic structure of a part of the Snake River Plains in Canyon and Owyhee counties, Idaho, and Malheur and Harney counties, Oreg.; described briefly the conditions on which artesian flow depends, and in some detail the springs and drilled wells in the Lewis, Otis, Harney, and Whitehorse artesian basins; also describes artesian wells in alluvial deposits and discusses the size of drill holes, casings, etc., the preservation of well records, and the importance of laws to control the use of artesian waters; gives list of publications bearing on artesian waters.

- *93. Proceedings of first conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer, 1904. 361 pp. [Inquiries concerning this report should be addressed to the Reclamation Service.] Contains:
- Investigations in Idaho, by D. W. Ross. Describes the irrigable lands in the area drained by Snake River.
 - Investigations in Oregon, by J. T. Whistler. Mentions the Umatilla, Malheur, and Harney projects.
 - Work in Washington, by T. A. Noble. Describes the plains of Columbia River
96. Destructive floods in the United States in 1903, by E. C. Murphy. 1904. 81 pp., 13 pls. 15c.
- Gives an account of a flood (commonly spoken of as the "Heppner disaster") on Willow Creek, a tributary of Columbia River, in Morrow County, Oreg.
- *103. A review of the laws forbidding pollution of inland waters in the United States, by E. B. Goodell. 1904. 120 pp. [Superseded by No. 152, q. v.]
- Cites statutory restrictions of water pollution in Idaho, Nevada, Oregon, Utah, Washington, and Wyoming.
111. Preliminary report on the underground waters of Washington, by Henry Landes. 1905. 85 pp., 1 pl. 10c.
- Describes, by counties, the municipal water supplies, deep wells, and springs in the State, giving also for each county a brief account of the climate, rainfall, topography, drainage, and geology.
118. Geology and water resources of a portion of east-central Washington, by F. C. Calkins. 1905. 96 pp., 4 pls. 5c.
- Describes briefly the topography, geology, climate, vegetation, grazing, and agriculture on the Columbia Plains and in Kittitas Valley; discusses the streams, springs, and shallow and deep wells.
- *122. Relation of the law to underground waters, by D. W. Johnson. 1905. 55 pp.
- Cites legislative acts relating to ground waters in Idaho, Nevada, Oregon, Utah, Washington, and Wyoming.
149. Preliminary list of deep borings in the United States, second edition, with additions, by N. H. Darton. 1905. 175 pp. 10c.
- Gives, by States (and within the States by counties), location, depth, diameter, yield, height of water, and other available information, concerning wells 400 feet or more in depth; includes all wells listed in Water-Supply Papers 57 and 61; mentions also principal publications relating to deep borings.
- *152. A review of the laws forbidding pollution of inland waters in the United States (second edition), by E. B. Goodell. 1905. 149 pp.
- Cites statutory restrictions of water pollution in Idaho, Nevada, Oregon, Utah, Washington and Wyoming.
- *162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index to flood literature, by E. C. Murphy and others. 1906. 105 pp., 4 pls.
- Gives estimates (p. 85) of flood discharge and frequency for Boise River at Boise and Weiser River at Weiser, Idaho.
231. Geology and water resources of the Harney Basin region, Oreg., by G. A. Waring. 1909. 93 pp., 5 pls. 25c.
- The greater part of the area covered by this report is in the Great Basin, but a small tract in the northeastern corner is drained by a number of small streams that are tributary to Malheur River.

253. Water powers of the Cascade Range, Part I, Southern Washington, by J. C. Stevens. 1910. 94 pp., 21 pls. 40c.

Discusses conditions governing hydraulic development, water laws of Washington, and variations in streams; describes the drainage basins of Klickitat, White Salmon, Little White Salmon, Lewis, and Toutle rivers; gives results of observations at gaging stations, and estimates of average minimum discharge and of the available horsepower at the power sites.

- *274. Some stream waters of the western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses, by Herman Stabler. 1911. 188 pp.

Describes collection of samples, plan of analytical work, and methods of analyses; discusses soap-consuming power of waters, water softening, boiler waters, and water for irrigation; gives results of analyses of waters of Boise, Malheur, Payette, and Palouse rivers, and Salmon Creek.

313. Water powers of the Cascade Range, Part II, Cowlitz, Nisqually, Puyallup, White, Green, and Cedar drainage basins, by F. F. Henshaw and G. L. Parker. 1913. 170 pp., 16 pls. 55c.

Describes the geological features and history of the drainage basins, topography and drainage, soils and vegetation, and precipitation; gives stream-flow records and discusses water powers, storage, and power sites; discusses also natural resources and harbors of the Pacific coast, central electric stations, and power utilization, and gives commercial and residential rates. See also 253.

316. Geology and water resources of a portion of south-central Washington, by G. A. Waring. 1913. 46 pp., 1 pl. 5c.

Describes settlements, climate and vegetation, agriculture, grazing, geographic provinces, relation of surface features and structure, and geology; discusses shallow and artesian waters and irrigation enterprises in Sunnyside and Reservation valleys, Horse Heaven Plateau, and the Columbia River Plains, and irrigation along lower Yakima River; gives tabulated data concerning wells and springs.

339. Quality of the surface waters of Washington, by Walton Van Winkle. 1914. 105 pp., 2 pls. 15c.

Discusses briefly the natural and economic features of the State, the constituents and uses of the natural waters, purification of water, methods of analysis, and industrial and geochemical interpretation of the results of analysis; describes the general features of the principal drainage basins and gives the results of an investigation of the character of the river waters; treats briefly of the average chemical composition of river water, the economic value of the rivers, denudation, and the influence of natural features on the character of the waters.

314. Deschutes River, Oreg., and its utilization, by F. F. Henshaw, John H. Lewis, and E. J. McCaustland. 1914. 200 pp., 28 pls. 50c.

A report, prepared in cooperation with the State of Oregon, containing the results of measurements of stream flow, a discussion of the economic distribution of the water, and chapters on the quality of the water, the availability of the water supply, the developed water powers, undeveloped power sites, water rights and appropriations, the relation of the Federal Government to the development of water power, and Government permits for power and reservoir sites.

346. Profile surveys in the basin of Clark Fork of Columbia River, Montana-Idaho-Washington, prepared under the direction of R. B. Marshall, chief geographer. 1914. 6 pp., 3 pls. (22 sheets). 50c.

347. Profile surveys in Snake River basin, Idaho, prepared under the direction of R. B. Marshall, chief geographer. 1914. 12 pp., 3 pls. (37 sheets). 55c.

348. Profile surveys in Hood and Sandy River basins, Oreg., prepared under the direction of R. B. Marshall, chief geographer. 1914. 8 pp., 2 pls. (6 sheets). 30c.

349. Profile surveys in Willamette River basin, Oreg., prepared under the direction of R. B. Marshall, chief geographer. 1914. 8 pp., 3 pls. (16 sheets). 30c.

363. Quality of the surface waters of Oregon, by W. Van Winkle. 1914. 137 pp., 2 pls. 20c.
Describes the topography, drainage, rocks and soils, climate, population, and industries of the State, the constituents of natural waters, water for domestic and industrial uses, and purification of water, methods of analysis, and interpretation of results of analysis; describes the general features of the river basins and the character of the river waters, discusses the conditions influencing the quality of the surface waters, average chemical composition, geochemical character, denudation, industrial value, and value for irrigation.
364. Water analyses from the laboratory of the United States Geological Survey, tabulated by F. W. Clarke, chief chemist. 1914. 40 pp. 5c.
Contains analyses of Soap and Omak lakes, Wash., and of mine waters from Butte, Mont.
366. Profile surveys of Snoqualmie, Sultan, and Skykomish rivers, Wash., prepared under the direction of R. B. Marshall, chief geographer. 1914. 7 pp., 3 pls. (12 sheets.) 20c.
368. Profile surveys in Wenatchee River basin, Wash., prepared under the direction of R. B. Marshall, chief geographer. 1914. 7 pp., 1 pl. (8 sheets.) 20c.
369. Water powers of the Cascade Range, Part III, Yakima River basin, by G. L. Parker and F. B. Storey, 1916. 169 pp., 20 pls. 45c.
Describes the geography of the basin, the geologic history, physiography and river history, climate, settlement, and development, population, and transportation; gives stream-flow records and discusses natural conditions affecting stream flow; storage reservoirs, developed and undeveloped power sites; treats also of the industrial development of the region, discussing irrigation by gravity systems and by pumping, the production of coal and other minerals, and manufacturing; presents a scheme of development and utilization of stored water. The report was prepared under the direction of the Washington State Board of Geological Survey, and is based on data consisting of "stream-flow records, river plans and profiles, reservoir surveys, and field reconnaissance of the rivers and their various tributaries," obtained by the United States Geological Survey and the United States Reclamation Service, supplemented by a large amount of information furnished by private parties.
370. Surface water supply of Oregon, 1878-1910, by F. F. Henshaw and H. J. Dean. 1915. 829 pp., 1 pl. 45c.
Describes briefly the natural features of Oregon and in greater detail the general features of the river basins; consists principally of records of stream flow that have been carefully studied and recomputed when necessary to insure their best possible interpretation.
376. Profile surveys in Chelan and Methow River basins, Wash., prepared under the direction of R. B. Marshall, chief geographer. 1915. 8 pp., 5 pls. 15c.
377. Profile surveys in Spokane River basin, Wash., and John Day River basin, Oreg., prepared under the direction of R. B. Marshall, chief geographer. 1915. 7 pp., 10 pls. 15c.
378. Profile surveys in 1914 on Middle Fork of Willamette River and White River, Oreg., prepared under the direction of R. B. Marshall, chief geographer. 1915. 8 pp., 6 pls. 15c.
379. Profile surveys in 1914 in Umpqua River basin, Oreg., prepared under the direction of R. B. Marshall, chief geographer. 1915. 7 pp., 13 pls. 20c.
400. Contributions to the hydrology of the United States, 1916, Nathan C. Grover, chief hydraulic engineer, 1917. 108 pp., 7 pls. 15c. Contains:
*(b) Artesian water for irrigation in Little Bitterroot Valley, Mont., by O. E. Meinzer.
419. Profile surveys in 1915 in Skagit River basin, Wash., prepared under the direction of W. H. Herron, acting chief geographer. 1916. 8 pp., 12 pls. 15c.

420. Profile surveys along Henrys Fork, Idaho, and Logan River and Blacksmith Fork, Utah, prepared under the direction of W. H. Herron, acting chief geographer. 1916. 8 pp., 10 pls. 10c.
- *425. Contributions to the hydrology of the United States, 1917; N. C. Grover, chief hydraulic engineer. 1918. Contains:
(e) Ground water in Quincy Valley, Wash., by A. T. Schwennesen and O. E. Meinzer. 5c.
469. Surface waters of Wyoming and their utilization, by Robert Follansbee. 1923. 331 pp., 1 pl. 40c.
Contains a brief discussion of the general features and power and irrigation possibilities of that part of the Snake River basin that lies in Wyoming.
486. Water powers of the Cascade Range, Part IV, Wenatchee and Entiat basins, by G. L. Parker and Lasley Lee. 1922. iv, 76 pp., 3 pls. 30c.
Describes the topography, drainage areas, climate, and forestation of these basins. Gives stream-flow records and discusses the conditions affecting stream flow. Discusses, also, irrigation and developed and undeveloped water power.
489. The occurrence of ground water in the United States, with a discussion of principles, by O. E. Meinzer. 1923. xi, 321 pp., 31 pls. 60c.
Discusses principles of occurrence of ground water; kinds of rocks and their water-bearing properties; structure of rocks and its influence on ground water; and water-bearing formations in the United States.
492. Summary of hydrometric data in Washington, 1878-1919, by G. L. Parker and Lasley Lee. 1923. viii, 363 pp., 9 pls. 40c.
Contains gaging-station records and a bibliography of hydrometric data in the State of Washington.
- *500. Contributions to the hydrology of the United States, 1921; N. C. Grover, chief hydraulic engineer. 1922. iv, 74 pp., 4 pls. Contains:
*(a) Coeur d'Alene Lake, Idaho, and the overflow lands, by R. W. Davenport, pp. 1-31, pls. i-iii.
520. Contributions to the hydrology of the United States, 1923-24; N. C. Grover, chief hydraulic engineer. 1925. iv, 129 pp., 23 pls. 25c. Contains:
(c) Power resources of Snake River between Huntington, Oreg., and Lewiston, Idaho, by W. G. Hoyt, pp. 27-51. 10c.

PROFESSIONAL PAPERS

Professional papers may be purchased (at price quoted below) from the Superintendent of Documents, Washington, D. C. An asterisk (*) indicates that the report is out of print. Professional papers are of quarto size.

- *135. The composition of the river and lake waters of the United States, by F. W. Clarke. 1924. iv, 199 pp.
Contains analyses of principal streams and lakes.

BULLETINS

Bulletins may be purchased (at price quoted below) from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C. An asterisk (*) indicates that the report is out of print. Bulletins are of octavo size.

- *199. Geology and water resources of the Snake River Plains of Idaho, by I. C. Russell. 1902. 192 pp., 25 pls.
Describes the topography, geology, climate, vegetation, fauna, and soils of an area extending entirely across the southern part of Idaho; discusses streams, springs, water powers, irrigation and agriculture, industries, and routes of transportation and highways; treats of the origin of surface and subsurface waters, the requisite conditions for artesian wells and the quantity of water available.

252. Preliminary report on the geology and water resources of central Oregon, by I. C. Russell. 1905. 138 pp., 24 pls. 15c.

Describes a portion of the extreme northern part of the Great Basin and a part of the drainage area of Deschutes River and its principal tributary, Crooked River; gives an account of the topography, drainage, rainfall and temperature, winds, and forests; describes the volcanic sedimentary rock formations, and discusses by counties the geology and topography, the surface and ground waters; treats of artesian conditions in the Deschutes basin and makes suggestions concerning artesian well records.

- *264. Record of deep-well drilling for 1904, by M. L. Fuller, E. F. Lines, and A. C. Veatch. 1905. 106 pp.
- *298. Record of deep-well drilling for 1905, by M. L. Fuller and Samuel Sanford. 1906. 299 pp.

Bulletins 264 and 298 give an account of progress in the collection of well records and samples, and contain tabulated records of wells in Idaho, Montana, Nevada, Oregon, Washington, and Wyoming. No. 298 gives detailed records of wells in Flathead County, Mont., and Benton, Jefferson, and Walla Walla counties, Wash. The wells of which detailed sections are given were selected because they afford valuable stratigraphic information.

ANNUAL REPORTS

Each of the papers contained in the annual reports was also issued in separate form.

Annual reports may be purchased (at price quoted below) from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C. An asterisk (*) indicates that the report is out of print.

- Tenth Annual Report of the Director of the United States Geological Survey, 1888-89, J. W. Powell, Director. 1890. 2 parts. Pt. II. Irrigation, viii, 123 pp. 35c.

Makes a preliminary report on the organization and prosecution of the survey of the arid lands for purposes of irrigation; includes an account of the methods of topographic and hydraulic work, the segregation work on reservoir sites and irrigable lands, field and office methods, and brief descriptions of the topography of some of the river basins.

- Eleventh Annual Report of the United States Geological Survey, 1889-90, J. W. Powell, Director. 1891. 2 parts. Pt. II. Irrigation, xiv, 395 pp., 30 pls. and maps. \$1.25. Contains:

*Hydrography, pp. 1-110. Discusses scope of work, methods of stream measurement, rainfall, and evaporation, and describes the more important streams.

*Engineering, pp. 111-200. Defines the scope of the work and gives an account of the survey in the Sun River basin and in the Arkansas, Rio Grande, California, Lahontan, Utah, and Snake River divisions.

*Topography, pp. 291-343. Comprises reports of the topographic surveys in California, Nevada, Colorado, Idaho, Montana, and New Mexico, and a report on reservoir sites.

*Irrigation literature, pp. 345-388. Gives a list of books and pamphlets on irrigation and allied subjects, mainly contained in the library of the United States Geological Survey.

- Twelfth Annual Report of the Director of the United States Geological Survey, 1890-91, J. W. Powell, Director. 1891. 2 parts. Pt. II, Irrigation, xviii, 576 pp., 93 pls. \$2. Contains:

*Hydrography of the arid regions, by F. H. Newell, pp. 213-361, Pls. 53-106. Discusses the available water supply of the arid regions, the duty of water, flood waters, relation of rainfall to river flow; classifies the drainage basins; and describes the rivers of the Missouri, Arkansas, Rio Grande, Colorado, Sacramento, and San Joaquin basins, and the principal streams of the Great Basin in Nevada and Utah and the Snake River basin.

- Thirteenth Annual Report of the United States Geological Survey, 1891-92. J. W. Powell, Director. 1892. (Pts. II and III, 1893.) 3 parts. Pt. III, Irrigation, xi, 486 pp., 77 pls. \$1.85. Contains:

*Engineering results of irrigation survey, by H. M. Wilson, pp. 351-427, Pls. 147-182. Describes structures on the Pocatello canal, Idaho.

- *Sixteenth Annual Report of the United States Geological Survey, 1894-95, Charles D. Walcott, Director. 1896. (Pts. II, III, and IV, 1895.) 4 parts. Pt. II. Papers of an economic character, xix, 598 pp., 43 pls. \$1.25. Contains:

The public lands and their water supply, by F. H. Newell, pp. 457-533, Pls. 35-39. Describes general character of the public lands, the lands disposed of (railroad, grant, and swamp lands, and private miscellaneous entries), lands reserved (Indian, forest, and military reservations), the vacant lands, and the rate of disposal of vacant land; discusses the streams, wells, and reservoirs as sources of water supply; gives details for each State.

- *Nineteenth Annual Report of the United States Geological Survey, 1897-98, Charles D. Walcott, Director. 1898. (Pts. II, III, and V, 1899.) 6 parts in 7 vols. and separate case for maps with Pt. V. Pt. V, Forest reserves, xvii, 400 pp., 110 pls. (16 maps in separate case.) \$2.25. Contains:

- *Priest River Forest Reserve, by J. B. Leiberg, pp. 217-252, Pls. 48-61.
 - *Bitterroot Forest Reserve, by J. B. Leiberg, pp. 253-282, Pls. 62-73.
 - *Washington Forest Reserve, by H. B. Ayres, pp. 283-313, Pls. 76-100.
 - *Eastern part of Washington Forest Reserve, by M. W. Gorman, pp. 315-350, Pl. 101.
 - *Forest conditions of northern Idaho, by J. B. Leiberg, pp. 373-386, Pls. 109-110.
- These reports describe the topography and the streams of the forest reserves.

- *Twentieth Annual Report of the United States Geological Survey, 1898-99, Charles D. Walcott, Director. 1899. (Pts. II, III, IV, V, and VII 1900.) 7 parts in 8 vols. and separate case for maps with Pt. V. Pt. V, Forest reserves, xix, 498 pp., 159 pls., 8 maps in separate case. \$2.80. Contains:

- *The Flathead Forest Reserve, by H. B. Ayres, pp. 245-316, Pls. 77-113.
- *Bitterroot Forest Reserve, by J. B. Leiberg, pp. 317-409, Pls. 115-142. Contains brief descriptions of the streams and lakes in the reserves.

- *Twenty-first Annual Report of the United States Geological Survey, 1899-1900, Charles D. Walcott, Director. 1900. (Pts. III, IV, VI, VI continued, and VII, 1901.) 7 parts in 8 vols. and separate case for maps with Pt. V. Pt. V, Forest reserves, 711 pp., 143 pls., 39 maps in separate case. \$3.85. Contains:

- *Mount Rainier Forest Reserve, Wash., by F. G. Plummer, pp. 81-143, Pls. 33-50.
- *Olympic Forest Reserve, Wash., from field notes by Arthur Dodwell and T. F. Rixon, pp. 145-208, Pls. 51-70.
- *Cascade Range Forest Reserve, Oreg., from T. 28 S. to T. 37 S., inclusive, together with the Ashland Forest Reserve and adjacent forest regions from T. 28 S. to T. 41 S., inclusive, and from R. 2 W. to R. 14 E., Willamette meridian, inclusive, by J. B. Leiberg, pp. 209-498, Pls. 71-84. Contains descriptions of many of the streams flowing through the forest reserves.

GEOLOGIC FOLIOS

Under the plan adopted for the preparation of a geologic map of the United States the entire area is divided into small quadrangles, bounded by certain meridians and parallels, and these quadrangles, which number several thousand, are separately surveyed and mapped.¹⁵ The unit of survey is also the unit of publication, and the maps and description of each quadrangle are issued in the form of a folio. When all the folios are completed they will constitute the Geologic Atlas of the United States.

A folio is designated by the name of the principal town or of a prominent natural feature within the quadrangle. Each folio includes maps showing the topography, geology, underground structure, and mineral deposits of the area mapped and several pages of descriptive text. The text explains the maps and describes the

¹⁵ Index maps showing areas in the North Pacific slope basins covered by topographic maps and by geologic folios will be mailed on receipt of request addressed to the Director, U. S. Geological Survey, Washington, D. C.

topographic and geologic features of the country and its mineral products. The topographic map shows roads, railroads, waterways, and, by contour lines, the shapes of the hills and valleys and the height above sea level of all points in the quadrangle. The areal-geology map shows the distribution of the various rocks at the surface. The structural-geology map shows the relations of the rocks to one another underground. The economic-geology map indicates the location of mineral deposits that are commercially valuable. The artesian-water map shows the depth to underground-water horizons. Economic-geology and artesian-water maps are included in folios if the conditions in the areas mapped warrant their publication. The folios are of special interest to students of geography and geology and are valuable as guides in the development and utilization of mineral resources.

The folios numbered from 1 to 163, inclusive, are published in only one form (18 by 22 inches), called the library edition. Some of the folios that bear numbers higher than 163 are published also in an octavo edition (6 by 9 inches). Owing to a fire in the Geological Survey building May 18, 1913, the stock of geologic folios was more or less damaged by fire and water, but the folios are usable and are sold at the uniform price of 5 cents each, with no reduction for wholesale orders. This rate applies to folios in stock from 1 to 184, inclusive (except reprints), also the library edition of folio 186. The library edition of folios 185, 187, and higher numbers sells for 25 cents a copy, except that some folios which contain an unusually large amount of matter sell at higher prices. The octavo edition of folio 185 and higher numbers sells for 50 cents a copy, except folio 193, which sells for 75 cents a copy. If 34 folios selling at 25 cents each (or their equivalent in higher-priced folios) are ordered at one time, a discount of 40 per cent is allowed; \$5.10 is the minimum amount accepted at this rate.

All the folios contain descriptions of the drainage of the quadrangles. The folios in the following list contain also brief discussions of the underground waters in connection with the economic resources of the areas and more or less information concerning the utilization of the water resources.

An asterisk (*) indicates that the folio is out of print.

*45. Boise, Idaho.

*86. Ellensburg, Wash.

*103. Nampa, Idaho-Oregon.

Describes the relief, drainage, climate, and vegetation of the area; discusses the geologic history and geologic formations, and, under "Economic geology," the surface waters available for irrigation, the springs and shallow wells, and the artesian wells; indicates areas of possible artesian flow.

*104. Silver City, Idaho.

*106. Mount Stuart, Wash.

*139. Snoqualmie, Wash.

218. Riddle, Oreg. 25c.

MISCELLANEOUS REPORTS

Other Federal bureaus and State and other organizations have from time to time published reports relating to the water resources of various sections of the country. Notable among those pertaining to the northern Pacific coast drainage basins are the reports of the commissioner of conservation of the State of Montana; the State land commission; the State engineer of Idaho; the Bureau of Industry, Agriculture, and Irrigation of Nevada; the State engineers of Nevada, Oregon, Utah, and Washington; the annual reports of the United States Bureau of Reclamation; and the reports of the Chief

of Engineers, United States Army. The following reports deserve special mention:

The Oregon system of water titles, by John H. Lewis: Oregon State Engineer Bull. 2, 1912.

State and National water laws, with a detailed statement of the Oregon system of water titles, by John H. Lewis, with a discussion by Clarence T. Johnston and L. J. Le Conte: Am. Soc. Civil Eng. Trans., vol. 76, pp. 637-758, 1913.

Report of the commission on conservation [State of Montana] on bills relating to public lands, water rights, and the protection and preservation of the forests: Helena, 1911; also report of the governor of the State of Montana on the same subject.

How to appropriate the public waters of the State of Nevada, compiled by W. M. Kearney, State engineer, 1911.

Requirements and regulations, including suggestions and instructions in relation to the appropriation, use, and measurement of water in the State of Nevada: State engineer of Nevada, 1912.

Irrigation pumping in Nevada, etc., by Charles Norcross: Nevada Bur. of Industry, Agr., and Irr. Bull. 8, 1913.

The water resources of Washington: Potable and mineral water, by H. G. Byers; artesian water, by C. A. Ruddy; water power, by R. E. Heine: Washington Geol. Survey Ann. Rept. for 1901, vol. 1, pt. 5, 1902.

Preliminary report on the Quincy Valley irrigation project, by Henry Landes and others: Washington Geol. Survey Bull. 14, 1912.

Biennial Report of the State Commissioner of Arid Lands [Washington], 1895-96 and 1897-98.

The irrigated lands of the State of Washington, by George M. Allen, deputy commissioner: State Bureau of Statistics and Immigration, 1910.

Irrigation laws of the State of Wyoming, prepared for publication in the office of the State engineer, 1909.

INDEX BY AREAS AND SUBJECTS

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¹⁶ Many analyses of river, spring, and well waters are scattered through publications, as noted in abstracts.

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